

GRADUATE & PROFESSIONAL STUDY

2002 - 2004 GENERAL CATALOG

UNIVERSITY OF WASHINGTON

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GENERAL CATALOG 2002-2004

GRADUATE AND PROFESSIONAL STUDY

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THE UNIVERSITY OF WASHINGTON

www.washington.edu/home/about.html



THE UNIVERSITY OF WASHINGTON

Founded in 1861, the University of Washington is one of the oldest state-assisted institutions of higher education on the Pacific coast. From its original site on a 10-acre tract of wooded wilderness that is now located in downtown Seattle, the campus has grown to comprise 703 acres of trees, landscape, and buildings. Located between the shores of Lake Washington and Lake Union, it is in a residential section of the city that long has been considered one of the most attractive in the nation. Two additional campuses, one south of Seattle in Tacoma, and one north in Bothell, were opened in 1990.

Enrollment at the University in autumn quarter 2001 was almost 40,000, including its campuses in Bothell and Tacoma, of which 11,000 were in professional and graduate programs and the balance were undergraduates. In 2001, the full-time teaching faculty of the University numbered 3,400 members.

Mission Statement

Founded 4 November 1861, the University of Washington is one of the oldest state-supported institutions of higher education on the Pacific coast. The University is comprised of three campuses: the Seattle campus is made up of seventeen schools and colleges whose faculty offer educational opportunities to students ranging from first-year undergraduates through doctoral-level candidates; the Bothell and Tacoma campuses, each developing a distinctive identity and undergoing rapid growth, offer diverse programs to upper-division undergraduates and to graduate students.

The primary mission of the University of Washington is the preservation, advancement, and dissemination of knowledge. The University preserves knowledge through its libraries and collections, its courses, and the scholarship of its faculty. It advances new knowledge through many forms of research, inquiry, and discussion; and disseminates it through the classroom and the laboratory, scholarly exchanges, creative practice, international education, and public service. As one of the nation's outstanding teaching and research institutions, the University is committed to maintaining an environment for objectivity and imaginative inquiry and for the original scholarship and research that ensure the production of new knowledge in the free exchange of diverse facts, theories, and ideas.

To promote their capacity to make humane and informed decisions, the University fosters an environment in which its students can develop mature and independent judgment and an appreciation of the range and diversity of human achievement. The University cultivates in its students both critical thinking and the effective articulation of that thinking.

As an integral part of a large and diverse community, the university seeks broad representation of and encourages sustained participation in that community by its students, its faculty, and its staff. It serves both non-traditional and traditional students. Through its three-campus system and through educational outreach, evening degree and distance learning programs, it extends educational opportunities to many who would not otherwise have access to them.

The academic core of the University of Washington is its College of Arts and Sciences; the teaching and research of the University's many professional schools provide essential complements to these programs in the arts, humanities, social sciences, and natural and mathematical sciences. Programs in law, medicine, forest resources, oceanography and fisheries, library science, and aeronautics are offered exclusively (in accord with state law) by the University of Washington. In addition, the University of Washington has assumed primary responsibility for the health science fields of dentistry and public health, and offers education and training in medicine for a multi-state region of the Pacific Northwest and Alaska. The schools and colleges of architecture and urban planning, business administration, education, engineering, nursing, pharmacy, public affairs, and social work have a long tradition of educating students for service to the region and the nation. These schools and colleges make indispensable contributions to the state and, with the rest of the university, share a long tradition of educating undergraduate and graduate students towards achieving an excellence that well serves the state, the region and the nation.

Board of Regents
February 1981; revised February 1998

President's Message



A university is a community of scholars and artists, a place where faculty and students communicate with each other to enrich human understanding. Universities have played an essential role in societies for hundreds of years, promoting learning and culture, generating new knowledge, and training professionals in specialized callings. The University of Washington is one of the finest universities in the world.

It is also an exciting place to be, with a lively interplay of teaching, research, and public service. Its contributions to the state, the nation, and the world will continue to grow as we face the challenges of the twenty-first century.

Richard L. McCormick
Richard L. McCormick, President

ACADEMIC CALENDAR

2002-2003

Summer Quarter 2002

Full-term and term a classes begin	June 24
Independence Day holiday	July 4
Term a classes end	July 24
Term b classes begin	July 25
Full-term and term b classes end	August 23

Autumn Quarter 2002

Classes begin	September 30
Veterans Day holiday	November 11
Thanksgiving recess	November 28, 29
Last day of instruction	December 11
Final examinations	December 12-19

Winter Quarter 2003

Classes begin	January 6
Martin Luther King, Jr.'s Birthday holiday	January 20
Presidents Day holiday	February 17
Last day of instruction	March 14
Final examinations	March 17-21

Spring Quarter 2003

Classes begin	March 31
Memorial Day holiday	May 26
Last day of instruction	June 6
Final examinations	June 9-13
Commencement	June 14

2003-2004

Summer Quarter 2003

Full-term and term a classes begin	June 23
Independence Day holiday	July 4
Term a classes end	July 23
Term b classes begin	July 24
Full-term and term b classes end	August 22

Autumn Quarter 2003

Classes begin	September 29
Veterans Day holiday	November 11
Thanksgiving recess	November 27, 28
Last day of instruction	December 10
Final examinations	December 11-18

Winter Quarter 2004

Classes begin	January 5
Martin Luther King, Jr.'s Birthday holiday	January 19
Presidents Day holiday	February 16
Last day of instruction	March 12
Final examinations	March 15-19

Spring Quarter 2004

Classes begin	March 29
Memorial Day holiday	May 31
Last day of instruction	June 4
Final examinations	June 7-11
Commencement	June 12

For directory assistance, call the University switchboard, 206-543-2100.

Address correspondence to:

**University of Washington
(Name of office and box number)
Seattle, Washington 98195**

The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran. This policy applies to all programs and facilities including, but not limited to, admissions, educational programs, employment, and patient and hospital services.

Any discriminatory action can be a cause for disciplinary action. Discrimination is prohibited by Presidential Executive Order 11246 as amended; Washington State Gubernatorial Executive Orders 89-01 and 93-07; Titles VI and VII of the Civil Rights Act of 1964; Washington State Law Against Discrimination RCW 49.60; Title IX of the Education Amendments of 1972; State of Washington Gender Equity in Higher Education Act of 1989; Sections 503 and 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990; Age Discrimination in Employment Act of 1967 as amended; Age Discrimination Act of 1975; Vietnam Era Veterans' Readjustment Act of 1972 as amended; other federal and state statutes, regulations; and University policy. Coordination of the compliance efforts of the University of Washington with respect to all of these laws and regulations is under the direction of the Assistant Provost for Equal Opportunity, Dr. Helen Remick, University of Washington, Equal Opportunity Office, Box 354560, 4045 Brooklyn Avenue Northeast, Seattle, WA 98195, 206-685-3263/V or 206-543-6452/TTY.

Additional information concerning the equal opportunity and affirmative action policies and procedures, including complaint procedures, is in the Operations Manual, D46.1, D46.2, D46.3, and D46.4, and the UW Handbook, Vol. IV, p. 44.

Information on reasonable accommodation for students with disabilities is available from the following offices: for classroom and academic-related accommodation, call Disabled Student Services, 206-543-8924/V, 206-543-8925/TTY, or email at uwdss@u.washington.edu; for other non-academic related information and accommodation, call Disability Services Office, 206-543-6450/V, 206-543-6452/TTY, or email at access@u.washington.edu.

Copies may be purchased from the University Book Store, 4326 University Way Northeast, Seattle, Washington 98105, 206-634-3400.

USING THE GENERAL CATALOG

The material in this catalog has been compiled and organized to provide the reader with a comprehensive overall view of the programs and courses at the University of Washington. It includes academic requirements and procedures necessary for admission and graduation. Information on programs, faculty, and courses is usually arranged in alphabetical order following departmental structure within each school or college.

Because curriculum revisions and program changes usually occur during the two-year period the *General Catalog* is in circulation, students should assume the responsibility of consulting the appropriate academic unit or adviser for more current or specific information. The *General Catalog* is updated regularly at the University's Web site (www.washington.edu). The quarterly *Time Schedule* gives information on courses offered, class hours, and classroom locations, and has the latest calendar dates, fees, and details on registration.

Contact information has been provided wherever possible. All phone numbers, unless noted, are in the 206 area code and are voice numbers. Unless noted, all addresses with @ are email addresses. Many programs and offices at the University can be found through the University's homepage at <http://www.washington.edu>.

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



Dates in this calendar are subject to change without notice. A detailed calendar with the latest information on registration is printed in each issue of the quarterly *Time Schedule* and can be found online at www.washington.edu/students/

2 **About the University**

4 **Academic Calendar**

8 **The Graduate School: Graduate Study**

- 9 Graduate Degree Programs
- 10 Graduate Admissions
- 11 Financial Aid for Graduate Students
- 13 Graduate Degree Policies
- 15 Master's Degree
- 16 Doctoral Degree
- 17 Special Programs and Facilities

18 **Procedures and Fees**

- 18 Registration
- 18 Complete Withdrawal from the University for a Registered Quarter
- 19 Additional Information
- 19 Tuition, Fees, and Special Charges
- 20 Estimated Quarterly Tuition Rates Effective Autumn Quarter 2002
- 21 Cancellation of Tuition
- 22 Tuition Exemptions and Reductions

23 **The University**

- 23 Academic Programs
- 24 Resources and Facilities
- 26 Housing and Food Service
- 26 Transportation and the U-PASS
- 27 Student Services
- 27 Office of the Vice President for Student Affairs
- 29 Student Rights and Responsibilities

30 **The Office of Research**

36 **UW Extension**

37 **University of Washington, Bothell**

38 **University of Washington, Tacoma**

39 **Key to Symbols and Abbreviations**

40 **Academic Programs, Faculty, and Courses**

40 **College of Architecture and Urban Planning**

- 41 Architecture
- 46 Construction Management
- 48 Landscape Architecture
- 50 Urban Design and Planning

54 **College of Arts and Sciences**

- 54 American Ethnic Studies
- 54 American Indian Studies
- 55 Anthropology
- 61 Applied Mathematics
- 64 Art
- 66 Art History
- 68 Asian Languages and Literature
- 73 Astronomy
- 74 Atmospheric Sciences
- 77 Biology
- 78 Botany
- 80 Chemistry
- 83 Classics
- 85 Communication
- 90 Comparative Literature
- 92 Dance
- 92 Digital Arts and Experimental Media
- 93 Drama
- 95 Earth and Space Sciences
- 100 Economics
- 104 English
- 108 Geography
- 111 Germanics
- 113 History
- 119 Humanities (Simpson Center for the Humanities)
- 119 International Studies
- 128 Linguistics
- 131 Mathematics
- 136 Music
- 143 Near Eastern Languages and Civilization
- 147 Neurobiology
- 148 Philosophy
- 150 Physics
- 154 Political Science
- 160 Psychology
- 166 Romance Languages and Literature
- 170 Scandinavian Studies
- 172 Slavic Languages and Literatures
- 174 Sociology
- 178 Speech and Hearing Sciences

- 181 Statistics
 184 Center for Statistics and Social Sciences
 185 Women Studies
 188 Zoology

193 School of Business Administration

- 195 Accounting
 195 Finance and Business Economics
 196 Management and Organization
 197 Management Science
 197 Marketing and International Business

208 School of Dentistry

- 211 Dental Hygiene
 211 Dental Public Health Sciences
 212 Dentistry
 213 Endodontics
 214 Oral and Maxillofacial Surgery
 214 Oral Biology
 216 Oral Medicine
 217 Orthodontics
 218 Pediatric Dentistry
 219 Periodontics
 221 Prosthodontics
 221 Restorative Dentistry

224 College of Education

238 College of Engineering

- 238 Interdisciplinary Engineering Studies Program
 239 Aeronautics and Astronautics
 242 Bioengineering
 242 Chemical Engineering
 245 Civil and Environmental Engineering
 251 Computer Science and Engineering
 256 Electrical Engineering
 262 Industrial Engineering
 264 Materials Science and Engineering
 267 Mechanical Engineering
 272 Technical Communication

275 College of Forest Resources

286 The Information School

292 Interdisciplinary Graduate Degree Programs

- 292 Biology Teaching
 292 Conservation Biology Policy
 292 Environmental Management
 293 Global Trade, Transportation, and Logistics Studies

- 294 Health Services Administration
 295 Molecular and Cellular Biology
 299 Museology
 300 Near and Middle Eastern Studies
 301 Neurobiology and Behavior
 304 Nutritional Sciences
 305 Quantitative Ecology and Resource Management
 307 Quaternary Research Center
 308 Urban Design and Planning

310 Interschool or Intercollege Programs

- 310 Bioengineering
 313 Program on the Environment
 314 Quantitative Science
 314 University Conjoint Courses

316 School of Law

321 School of Medicine

- 324 Anesthesiology
 326 Biochemistry
 328 Bioengineering
 328 Biological Structure
 330 Comparative Medicine
 331 Conjoint Courses
 332 Family Medicine
 334 Genome Sciences
 337 Human Biology
 338 Immunology
 340 Laboratory Medicine
 342 Medical Education and Biomedical Informatics
 344 Medical History and Ethics
 346 Medicine
 353 MEDEX Northwest
 354 Microbiology
 356 Neurological Surgery
 357 Neurology
 359 Obstetrics and Gynecology
 360 Ophthalmology
 361 Orthopaedics
 363 Otolaryngology—Head and Neck Surgery
 364 Pathology
 367 Pediatrics
 370 Pharmacology
 372 Physiology and Biophysics
 374 Psychiatry and Behavioral Sciences
 378 Radiation Oncology
 378 Radiology
 380 Rehabilitation Medicine
 386 Surgery
 388 Urology

389 **School of Nursing**

398 **College of Ocean and Fishery Sciences**

- 398 Aquatic and Fishery Sciences
 - 403 Marine Affairs
 - 404 Oceanography
-

410 **School of Pharmacy**

- 410 Medicinal Chemistry
 - 411 Pharmaceutics
 - 411 Pharmacy
-

417 **Daniel J. Evans School of Public Affairs**

422 **School of Public Health and Community Medicine**

- 422 Biostatistics
 - 426 Environmental Health
 - 430 Epidemiology
 - 434 Health Services
 - 440 Pathobiology
-

443 **School of Social Work**

448 **Faculty Index**

471 **Index**

474 **Index to Prefixes**

476 **Campus Map**



The Graduate School: Graduate Study

Vice Provost and Dean

Marsha L. Landolt

Associate Dean for Academic Programs

John T. Slattery

Associate Dean for Graduate Opportunities and Minority Achievement Program

Johnella E. Butler

Associate Dean for Student Affairs

Elizabeth L. Feetham

Associate Dean for Professional Development

Jody D. Nyquist

Assistant Dean and Director, Center for Instructional Development and Research

Donald H. Wulff

Director, Graduate Admissions

Joan W. Abe



www.grad.washington.edu

The University of Washington awarded its first graduate degree, a Master of Arts in classical languages, in 1885 and its first Doctor of Philosophy degree, in chemistry, in 1914. Since those beginnings, the University has conferred more than 65,000 master's degrees and 14,000 doctoral degrees, exclusive of medical, dental, and first legal doctorates.

Through its graduate programs, the University fulfills several functions vital to a healthy society: the advancement of human knowledge is facilitated through the development and conduct of scientific research; the education of scholars, teachers and a multitude of professionals in areas that cut across the academic spectrum insure that knowledge and information are communicated to the general public for the use and benefit of all. These functions ensure that some of the problems and needs confronting society are resolved.

To manage its developing graduate programs, the Graduate School was created as a temporary entity in 1899 and was permanently established in 1910. The purpose of the Graduate School is to define and support excellence in graduate education and the research and scholarly activities associated with it. Graduate study is guided by the Dean of the Graduate School and an ever-changing graduate faculty of more than 3,000 members who are selected for their interest in and concern for graduate education at the University of Washington. There are now more than 8,000 graduate students working toward master's or doctoral degrees in 100 separate University programs. A growing number of interdisciplinary graduate degree and graduate certificate programs that have been established through the efforts of interested faculty members.

Graduate School policy is enacted through an elected council of ten graduate-faculty members who are chosen from among the graduate-faculty population and who advise the Dean on matters of policy and procedure. Complementary to that input, each degree-offering unit within the University appoints a graduate program coordinator who serves as an important link between the unit and the Graduate School, advising students on questions concerning Graduate School and departmental degree requirements.

The Graduate School also has a number of responsibilities that relate to its primary ones, such as graduate program review, Graduate Opportunities and Minority Achievement Program, the administration of the Graduate School Fund and certain fellowship programs, as well as such central facilities as the University of Washington Press, and the Walker-Ames and the Jessie and John Danz distinguished visiting professorships.

As part of its commitment to excellence, the University is committed to providing opportunities for students to learn and grow through experiences rich in cultural, ethnic, and racial diversity. Within the Graduate School, the Graduate Opportunities and Minority Achievement Program (GO-MAP) works with the University to provide an innovative and inclusive graduate student community and experience. GO-MAP takes a leadership role in the recruitment and retention of ethnic and racial minority and underrepresented students, building community on and off campus, improving campus climate, and enhancing scholarship and research.

In addition, GO-MAP administers several scholarships and assistantships aimed at increasing diversity in the University's graduate programs.



Graduate Degree Programs

The Office of Academic Programs in the Graduate School contributes to the University's educational and research mission by conducting quality assessment of proposed and continuing education programs at the graduate and undergraduate level as well as research institutes and centers. Through program review, it ensures academic program quality, including all aspects of an academic unit, and promotes communication among academic units throughout the three-campus system. The principle mechanism by which this is achieved is through a process of peer review. Reviews of degree programs are conducted on a ten-year cycle, or at predetermined shorter intervals. For further information, see Graduate School Memorandum No. 7: Periodic Review of Existing Degree Programs at www.grad.washington.edu and the schedule of program reviews at www.grad.washington.edu/Acad/Academicprograms.htm, or contact the Office of Academic Programs in the Graduate School at 206-685-3519.

College of Architecture and Urban Planning	
Architecture	M.Arch., M.S.
Construction Management	M.S.C.M.
Landscape Architecture	M.L.A.
Urban Design and Planning	M.U.P.
College of Arts and Sciences	
Anthropology	M.A., Ph.D.
Applied Mathematics	M.S., Ph.D.
Art	M.F.A.
Art History	M.A., Ph.D.
Asian Languages and Literature	M.A., Ph.D.
Astronomy	M.S., Ph.D.
Atmospheric Sciences	M.S., Ph.D.
Botany	M.S., Ph.D.
Chemistry	M.S., Ph.D.
Classics	M.A., Ph.D.
Communication	M.A., M.C., Ph.D.
Comparative Literature	M.A., Ph.D.
Dance	M.F.A.
Drama	M.F.A., Ph.D.
Earth and Space Sciences	M.S., Ph.D.
Economics	M.A., Ph.D.
English	M.A., M.A.T., M.F.A., Ph.D.
French and Italian Studies	M.A., Ph.D.
Geography	M.A., Ph.D.
Germanics	M.A., Ph.D.
History	M.A., Ph.D.
International Studies	M.A.I.S.
(includes China Studies; the Comparative Religion Program;	
International Studies; Japan Studies; Korea Studies; Middle Eastern	
Studies; Russian, East European, and Central Asian Studies; and	
South Asian Studies)	
Linguistics	M.A., Ph.D.
Mathematics	M.A., M.S., Ph.D.
Music	M.A., M.M., D.M.A., Ph.D.
Near Eastern Languages and Civilization	M.A.
Philosophy	M.A., Ph.D.
Physics	M.S., Ph.D.
Political Science	M.A., Ph.D.
Psychology	M.S., Ph.D.
Scandinavian Studies	M.A., Ph.D.
Slavic Languages and Literatures	M.A., Ph.D.
Sociology	M.A., Ph.D.
Spanish and Portuguese Studies	M.A.
Speech and Hearing Sciences	M.S., Ph.D.
Statistics	M.S., Ph.D.
Women's Studies	M.A., Ph.D.
Zoology	M.S., Ph.D.
Graduate School of Business Administration	M.B.A., Ph.D.
Accounting	M.P.Acc.
School of Dentistry	M.S.D.
Oral Biology	M.S., Ph.D.
College of Education	M.Ed., M.I.T., Ed.D., Ph.D.

College of Engineering	M.S., M.S.E.
Aeronautics and Astronautics	M.A.E., M.S.A.A., Ph.D.
Chemical Engineering	M.S.Ch.E., M.S.E., Ph.D.
Civil and Environmental Engineering	M.S., M.S.Civ.E., M.S.E., Ph.D.
Computer Science and Engineering	M.S., Ph.D.
Electrical Engineering	M.S.E., M.S.E.E., Ph.D.
Industrial Engineering	M.S., Ph.D.
Materials Science and Engineering	M.S., M.S.M.S.E., Ph.D.
Mechanical Engineering	M.S.E., M.S.M.E., Ph.D.
Technical Communication	M.S., Ph.D.
College of Engineering and School of Medicine	
Bioengineering	M.S.Bio.E., Ph.D.
College of Forest Resources	M.F.R., M.S., Ph.D.
Information School	M.L.I.S., M.S.I.M., Ph.D.
Interdisciplinary Degree Programs	
Biology Teaching	M.A.T.
Health Services Administration	M.H.A.
Individual Program	Ph.D.
Molecular and Cellular Biology	Ph.D.
Museology	M.A.
Near and Middle Eastern Studies	Ph.D.
Neurobiology and Behavior	Ph.D.
Nutritional Sciences	M.S., Ph.D.
Public Health Genetics	Ph.D.
Quantitative Ecology and	
Resource Management	M.S., Ph.D.
Urban Design and Planning	Ph.D.
School of Law	LL.M., Ph.D.
School of Medicine	
Biochemistry	M.S., Ph.D.
Biological Structure	M.S., Ph.D.
Comparative Medicine	M.S.
Genome Sciences	M.S., Ph.D.
Immunology	M.S., Ph.D.
Laboratory Medicine	M.S.
Medical Education and Biomedical Informatics	M.S.
Medical History and Ethics	M.A.
Microbiology	M.S., Ph.D.
Pathology	M.S., Ph.D.
Pharmacology	M.S., Ph.D.
Physiology and Biophysics	M.S., Ph.D.
Rehabilitation Medicine	M.O.T., M.P.T., M.R.M., M.S.
School of Nursing	M.N., M.S., Ph.D.
College of Ocean and Fishery Sciences	
Aquatic and Fishery Sciences	M.S., Ph.D.
Marine Affairs	M.M.A.
Oceanography	M.S., Ph.D.
School of Pharmacy	M.S., Ph.D.
Medicinal Chemistry	M.S., Ph.D.
Pharmaceutics	M.S., Ph.D.
Pharmacy	M.S., Ph.D.
Evans School of Public Affairs	M.P.A.
School of Public Health and Community Medicine	M.S., Ph.D.
Biostatistics	M.S., Ph.D.
Environmental Health	M.P.H., M.S., Ph.D.
Epidemiology	M.P.H., M.S., Ph.D.
Genetic Epidemiology	M.S.
Health Services	M.S., M.P.H., Ph.D.
Pathobiology	M.S., Ph.D.
School of Social Work	M.S.W., Ph.D.

Because the following professional doctoral degrees offered by the University are not considered to be graduate degrees, they are not administered through the Graduate School.

School of Dentistry	D.D.S.
School of Law	J.D.
School of Medicine	M.D.
School of Pharmacy	Pharm.D.



Graduate Admissions

The Office of Graduate Admissions
301 Loew, Box 84808
University of Washington
Seattle, WA 98124-6108
206-543-5929; FAX 206-543-8798
uwgrad2@grad.washington.edu (U.S. citizens and residents) or
intlgrad@u.washington.edu (international)

Additional program information is available on the World Wide Web at www.grad.washington.edu.

The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam-era veteran in accordance with University policy and applicable federal and state statutes and regulations.

Application to the UW through the Office of Graduate Admissions is available for three types of students. It is important to understand the distinctions between the categories.

- A **graduate student** is a person working toward a master's or doctoral degree or earning a school administrator's credential. Students must be admitted to this status in order to earn a degree. Information about the Application for Admission to the Graduate School is obtained from the program to which you wish to apply.
- A **visiting graduate student** is a person who plans to transfer a limited number of graduate credits earned at the UW to another institution where he or she is actively pursuing a graduate degree. Admission is based in part on availability of resources. Visiting graduate applicants must have been admitted to another recognized graduate school, be currently pursuing a graduate degree there, and be in good standing. A Certificate of Status signed by the home institution is required. The Application and Certificate are available online at <https://www.grad.washington.edu/application/>. Individual departments may require additional materials, such as transcripts, GRE/GMAT scores, a statement of purpose, or a list of desired course work.
- Some graduate programs have chosen to offer admission to **graduate non-matriculated students**. These students are not presently seeking a graduate degree but may apply a maximum of 12 credits earned in this category to degree requirements should they later be accepted into a graduate program. Applicants should meet minimum Graduate School admission requirements but *admission as a graduate nonmatriculated student does not imply admission to a graduate degree program*. The Application to Graduate Nonmatriculated Status must be obtained from the program to which you wish to apply. Official sealed transcripts from all collegiate institutions previously attended must be sent to the Graduate Nonmatriculated Office, Box 84808, University of Washington, Seattle, WA 98124-6108. (Refer to Graduate School Memorandum No. 37 for further information.)

Admission to the UW is necessarily a selective process. The prospective student must hold a baccalaureate degree from an accredited college or university in this country or an equivalent degree from a foreign institution. The student's record should be a strong one with an average grade of "B" or a 3.00 grade-point, or better. The primary criterion and the priority for admission of new applicants into a graduate program is the applicant's ability, as decided by the appropriate faculty, to complete the graduate program expeditiously with a high level of achievement. One aspect of meeting this criterion is the matching of interests between applicants and faculty. Additional factors may be used in developing a

pool of qualified applicants for admission to the Graduate School. Weights given these and other factors vary among graduate degree programs. No factor will confer admission on an academically unqualified applicant. These factors include, but are not limited to, the following:

1. Priority for admission of applicants into a graduate degree program based upon the applicant's apparent ability, as determined by the University, to complete the program with a high level of achievement.
2. No practice may discriminate against an individual because of race, color, creed, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran.
3. Sustained efforts shall be made to recruit qualified applicants who are members of groups that are underrepresented in certain disciplines.
4. All applicants to a degree-offering unit shall be processed through the same set of procedures to assure that all applicants are evaluated on their individual merits.
5. Tests and criteria for admission should relate to the actual requirements of the graduate program. Reasonable accommodation for testing conditions may be made to compensate for relevant disabilities.
6. Additional factors may be used in developing a pool of qualified applicants for admission to the Graduate School. Weights given these and other factors may vary among graduate degree programs. No factor will confer admission on an academically unqualified applicant. These factors include, but are not limited to, the following:
 - a. Grades earned, especially for subjects in or closely related to the field of the applicant's proposed graduate work.
 - b. Scores on the Graduate Record Examination (GRE) Verbal, Quantitative, and Analytical Tests, on the GRE Advanced Test, on other tests related to the applicant's field, and on other aptitude tests which may be required.
 - c. Personal interviews of the applicant by the department admissions committee.
 - d. The career objectives of the applicant and the extent to which the graduate degree program may be expected to prepare the applicant for those objectives.
 - e. Written and oral recommendations from persons who are qualified to evaluate the applicant's academic record and promise.
 - f. The applicant's degree objective (i.e., master's degree, doctoral degree, or a master's followed by a doctoral degree).
 - g. Activities or accomplishments; educational goals; prior employment experience; living experiences, such as growing up in a disadvantaged or unusual environment; special talents.
 - h. Academic accomplishments in light of the applicant's life experiences and special circumstances. These experiences and circumstances may include, but are not limited to disabilities, low family income, first generation to attend college, need to work during college, disadvantaged social or educational environment, difficult personal and family situation or circumstances, and refugee status or veteran status.

Importance given to these factors will vary among degree programs.

Most Graduate School admissions are for summer or autumn quarters. Admissions for winter and spring quarters may be severely restricted due to considerations of space. The following are graduate admissions closing dates. *It is important to remember that individual departments often have much earlier deadlines which supersede those listed below, particularly for autumn quarter.*

- Autumn Quarter—July 1
- Winter Quarter—November 1
- Spring Quarter—February 1
- Summer Quarter—May 15

Each academic program at the UW has a graduate program coordinator who is responsible for providing advice, guidance, and assistance to applicants as well as to students working toward graduate degrees. Prospective graduate students are urged to contact the graduate program coordinator in their program of interest for information about any aspect of graduate study, including research, curriculum, faculty, and financial support in the form of teaching and research assistantships, grants, and scholarships. Information about graduate programs is available at www.grad.washington.edu.

Admission Process

Information about the application process for both graduate and graduate non-matriculated status must be obtained directly from the department. Visiting graduate applicants should go to <https://www.grad.washington.edu/application/> for application information. *It is very important to submit all application documents in time to meet departmental deadlines as these will supersede graduate admissions deadlines.*

Required Examinations

The Graduate Record Examination (GRE) is required for admission as a graduate student except in the following circumstances:

- Applicants to Art, Dance, Drama, and to the Master of Music and Doctor of Musical Arts degree in Music.
- Applicants holding earned doctorates (such as Ph.D., D.D.S., M.D., Ed.D., J.D.) from accredited U.S. institutions.
- Applicants to the M.B.A., M.P.Acc., or Ph.D. degrees in the School of Business Administration, who must submit scores from the Graduate Management Admission Test (GMAT).

Scores must be sent directly from the Educational Testing Service to the University of Washington.

For further information you may write to:

Graduate Record Examinations
Educational Testing Service
P.O. Box 6000
Princeton, NJ 08541-6000
609-771-7670 or 510-654-1200
gre-info@ets.org
www.gre.org

International Applicants

Email inquiries from international applicants should be sent to intlgrad@u.washington.edu. You may also refer to the World Wide Web at www.grad.washington.edu for further information.

In addition to the other requirements for all applicants, a minimum score of 500 on the Test of English as a Foreign Language (TOEFL) or 173 on the computer-based test (TOEFLC) must be presented by applicants who are not citizens of the United States unless they meet one of the following exceptions:

- Citizens of Australia, Canada, Ireland, New Zealand, or the United Kingdom.
- Applicants holding bachelor's or advanced degrees from accredited institutions in the United States or in one of the countries listed above.

Applicants offered admission with TOEFL scores between 500 (173 TOEFLC) and 580 (237 TOEFLC) *must* fulfill an English as a Second Language (ESL) requirement before a graduate degree will be conferred by the University of Washington.

With the exception of citizens of the countries listed above, all international and immigrant status applicants who intend to apply for teaching assistantships must also take the Test of Spoken English (TSE).

Official test scores must be received by the University of Washington within two years of the test date. No waivers of this English competency requirement will be given.

Due to the time required for evaluation of applications, overseas applicants for autumn quarter are strongly encouraged to submit the application and transcripts to the Office of Graduate Admissions no later than the prior November 1. Applications received after this date will be processed as soon as possible but significant delays may result.

Registration

After successful applicants have been offered admission, the Registration Office sends a request for a \$100 Enrollment Confirmation Deposit to indicate the intent to register. This nonrefundable deposit will apply toward the first quarter's tuition.

Once admitted, graduate students are expected to maintain registered or on-leave status until the degree is conferred. (See section on Continuous Enrollment.)

Financial Aid for Graduate Students

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

Fellowships, Traineeships, and Scholarships

A limited number of fellowships, traineeships, and scholarships is available through individual departments to outstanding students in fields of study leading to advanced degrees. Application forms may be obtained from the graduate program coordinators in the departments.

The Graduate School and the University of Washington Libraries have collaborated to provide the Grants and Funding Information Services (GFIS) for University of Washington graduate students (and faculty) who are seeking any type of general research funding for use at the University of Washington. GFIS promotes awareness of external funding information resources by providing drop-in educational consultations, maintaining a print collection for grant seekers, and offering quarterly seminars highlighting Web-based grant-seeking tools. GFIS works with students and faculty to devise a search strategy, helping to focus efforts and locate available resources. GFIS also will demonstrate searching on several online databases and how to use its print collection of funding resource books so that students can perform future searches based on changing funding needs. GFIS also maintains resources to assist in the proposal-writing process, including grant-writing handbooks and links to online resources.

To set up a consultation, email gfis@u.washington.edu, call 206-616-3084, or submit a research profile using GFIS's online form. For funding seminar schedules, check the Web at www.lib.washington.edu/gfis/events.html.

Graduate Student Service Appointments

The University provides for the appointment of many graduate students as teaching, research, and staff assistants; predoctoral associates; predoctoral instructors; and predoctoral lecturers. Approximately 3,000 such appointments were made during the past year.

The University's policy regarding these appointments is set forth in detail in Executive Order 28. Copies of this statement are available from the graduate program coordinator or the Graduate School, or can be obtained from the Graduate School Web site at www.grad.washington.edu/fellow/execor28.htm. Some of the information is provided below.

Appointments are granted only to graduate students who have carefully defined educational goals and who exhibit the highest intellectual competence and attainment. Succeeding appointments may be made if the student maintains high scholarship and continues to make satisfactory progress toward the degree.

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



2000-2002 Graduate Student Service Appointments

Students holding these appointments for at least 20 hours per week and for at least five of the six pay periods of an academic quarter will receive a waiver of the resident operating fee (ROF) portion of "tuition and fees" as well as a waiver for the \$37 per quarter technology fee. Appointees who are not state residents are treated as residents for tuition purposes during the term of the appointment. Appointees are required to pay approximately \$192 tuition per quarter.

All appointees who are eligible for the ROF waiver also receive paid graduate appointee health insurance. See www.grad.washington.edu/Insurance/insurance.htm for details.

Salary for Half-Time Service

(20 hours per week)

Effective July 1, 2002 – June 30, 2003

Title	Monthly salary	Academic year (9 months) salary
Teaching Assistant	\$1,260	\$11,340
Predoctoral Teaching Associate I	1,351	12,159
Predoctoral Teaching Associate II	1,455	13,095
Predoctoral Instructor*	1,455	13,095
Predoctoral Lecturer*	1,455	13,095
Research Assistant	1,260	11,340
Predoctoral Research Associate I	1,351	12,159
Predoctoral Research Associate II	1,455	13,095
Predoctoral Researcher*	1,455	13,095
Staff Assistant	1,260	11,340
Predoctoral Staff Associate I	1,351	12,159
Predoctoral Staff Associate II	1,455	13,095

* Minimum

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

Two special categories for teaching appointments and one for research appointments are provided above the predoctoral associate level: Predoctoral Instructor, for the graduate student who has achieved Candidate status and is ready for increased teaching responsibility; Predoctoral Lecturer, for a mature and competent graduate student who, though he or she need not be a Candidate, has had exceptional previous teaching or other professional experience; and Predoctoral Researcher, for the student who has special skills or qualities obtained outside of his or her experience as a graduate student or who carries major responsibilities in relation to research activities. For the 2002-2003 academic year these appointments carry a minimum stipend of \$1,455 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.

International students with teaching appointments (Teaching Assistant, Predoctoral Teaching Associate I and II, Predoctoral Instructor, Predoctoral Lecturer) must meet a spoken-English requirement before they may be given classroom duties.

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 20 hours of service per week to the University. The appointments may be on a nine-month basis and ordinarily cover the period from September 16 through June 15. Some of these appointments may be extended to 11 or 12 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.

A graduate student service appointee must register for, and carry throughout each quarter except summer quarter, a minimum of 10 credits in formal courses or in research, thesis, or dissertation work. For summer quarter, the requirement is at least 2 credits.

Work Study Graduate Assistantships

Graduate students who are eligible for the need-based college work-study program may qualify for work study graduate assistantships in teaching or research. Students must submit financial aid applications to the Office of Student Financial

Aid by the February 28 deadline to be considered for these positions. Information is available from the Office of Student Financial Aid.

Employment Opportunities

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

Spouses of students also may apply for regular full- and part-time University employment. These positions cover a wide range of occupations and offer pay comparable to the prevailing salaries in the community. Some carry such fringe benefits as vacations, sick leave, and opportunities to enroll in University courses. Inquiries may be directed to the Staff Employment Office, 1320 Northeast Campus Parkway.

Loans

Long-term educational loans are available to graduate students through the Federal Perkins Student Loan, the Federal Direct Stafford Loan, and the Federal Direct Unsubsidized Stafford Loan programs. An application form for these programs (the Free Application for Federal Student Aid, or FAFSA) is available in the office of Student Financial Aid, Box 355880, 105 Schmitz Hall, 206-685-9395, or from the U.S. Department of Education Web site at www.ed.gov/offices/OPE/express.html. The Office of Student Financial Aid may also be reached by email (osfa@u.washington.edu) or on the Web at www.washington.edu/students/osfa/. The application deadline is February 28 for the following autumn quarter.

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

The Federal Perkins Student Loan and the subsidized Federal Direct Stafford Loan are awarded to students who demonstrate financial need. Students who do not qualify for need-based assistance may qualify for Federal Direct Unsubsidized Stafford Loans. For more detailed information on these loan programs, visit the Office of Student Financial Aid Web site at www.washington.edu/students/osfa/.

Short-term emergency loan funds also are available through the Office of Student Financial Aid. Several different types of short-term loans are possible. More information is available from the Office of Student Financial Aid, Short-Term Loans, 172 Schmitz, 206-685-1282. The Graduate School also has a short-term emergency loan available. For more information, call 206-543-5900.

Graduate Opportunities and Minority Achievement Program

The Graduate Opportunities and Minority Achievement Program (GOMAP) works to develop and maintain a diverse and welcoming climate from which all students may benefit. As part of its duties, GOMAP oversees the Graduate School Fund for Excellence and Innovation (see Special Programs and Facilities) and assists University of Washington graduate programs in developing and maintaining efforts designed to increase the enrollment of students from ethnic minority groups that have been historically underrepresented in graduate programs.

Recognizing that financial aid in the form of scholarships, grants, and fellowships is important in achieving and maintaining diversity, the GOMAP administers a variety of need- and merit-based fellowships. Merit-based awards are generally made through the nomination and support of the department in which the student is enrolled. Need-based awards are based upon an evaluation of the student's need as established by the Free Application for Federal Student Aid (FAFSA) and the Office of Student Financial Aid. Students who have varied cultural experiences or educationally or economically disadvantaged backgrounds and who will therefore contribute to the intellectual and social enrichment of the University, are encouraged to apply. Students must be U.S. citizens or permanent residents to be eligible.

Financial assistance from individual departments may also be available. Students should apply directly to the chair of their department. Students are also encouraged to make use of the University's Grants and Funding Information Service located in Suzzallo Library.

Further information on fellowships administered by GOMAP may be obtained by writing to the University of Washington, Graduate School, Graduate Opportunities and Minority Achievement Program, Box 351240, Seattle WA 98195-1240, or emailing gomap@u.washington.edu.

All awards are contingent upon the student's admission to the UW Graduate School.



Graduate Degree Policies

Usually focused on a specific field of knowledge, graduate study is conducted through a variety of means, including lectures, seminars, independent advanced study, special reading courses, internships, and participation in research. Graduate programs leading to the Master of Arts, Master of Science, or Doctor of Philosophy degrees emphasize the development of the student's ability for independent scholarly work and the creation of new knowledge through research. Practice-oriented programs, which ordinarily lead to the degree of master or doctor in a particular professional field, emphasize preparation of the student for professional practice at the frontiers of existing knowledge.

Many master's and all doctoral programs culminate in the presentation of a thesis or dissertation conveying the results of the independent study and research carried out by the student. A master's thesis contributes to knowledge, reviews or critiques the state of knowledge in a field, creates a new design or composition, or represents some other appropriate kind of independent contribution. A doctoral dissertation must set forth a significant contribution to knowledge or understanding in the student's field, be presented in scholarly form, and demonstrate that the student is competent to engage independently in the pursuit of solutions to important problems. The student must defend the doctoral dissertation in a Final Examination conducted by a faculty committee and open to all other graduate-faculty members. A member of the graduate faculty from some other discipline participates as an official representative of the Graduate School, including various major evaluations such as the General Examination and Final Examination.

Graduate Program Coordinator

The graduate student's initial work at the University is guided by the graduate program coordinator in his or her field. The coordinator must be a senior tenured member of the graduate faculty and is the official representative of the academic unit that offers the graduate degree program. The graduate program coordinator maintains familiarity with policies and procedures of the Graduate School and provides overall coordination of graduate activities within the unit.

Graduate Courses

Graduate courses are intended for, and ordinarily restricted to, either students enrolled in the Graduate School or graduate nonmatriculated students, and are given numbers from 500 through 800. Some courses at the 300 and 400 levels are open both to graduates and to upper-division undergraduates. Such courses, when acceptable to the supervisory committee, may be part of the graduate program. The Graduate School accepts credit in approved 300-level courses for the minor or supporting fields only. Courses at the 300 level are not included in the calculation of grade-point average (GPA) and will not apply toward the minimum Graduate School requirement of 18 graded credits for the master's or doctoral degree. Approved 400-level courses are accepted as part of the major as well as minor or supporting fields. Courses numbered 498 and entitled Special Topics or Special Projects normally are not applicable to a graduate degree program if addressed primarily to introductory content and undergraduate students. Undergraduate research (499) is not accepted as part of the graduate program. Graduate School Memorandum No. 36 offers additional information on graduate courses. With the exception of summer quarter, students are limited to a maximum of 10 credits per quarter of any combination of courses numbered 600, 700, or 800.

Repeating Courses

Graduate students may repeat any course. Both the first and second grades will be included in the cumulative GPA. Subsequent grades will not be included, but will appear on the permanent record. The number of credits earned in the course will apply toward degree requirements only once.

Grading System for Graduate Students

In reporting grades for graduate students, units that offer graduate degrees use the system described herein. Grades are entered as numbers, the possible values beginning at 4.0 and decreasing by one-tenth increments until 1.7 is reached. Grades below 1.7 are recorded as 0.0 by the Registrar. A minimum grade of 2.7 is required in each course that is counted toward a graduate degree. A minimum GPA of 3.00 is required for graduation.

Correspondence between number grades and letter grades is as follows:

Numeric grade-point equivalent	Letter grade	Numeric grade-point equivalent	Letter grade
4.0	A	2.8	B-
3.9		2.7	
3.8	A-	2.6	
3.7		2.5	
3.6		2.4	C+
3.5		2.3	
3.4	B+	2.2	
3.3		2.1	
3.2		2.0	C
3.1		1.9	
3.0	B	1.8	
2.9		1.7	
		1.6-0.0	E

The following letter grades also may be used:

I Incomplete. An incomplete may be given only when the student has been in attendance and has done satisfactory work to within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control.

To obtain credit for the course, a student must successfully complete the work and the instructor must submit a grade. In no case may an incomplete be converted into a passing grade after a lapse of two years or more. An incomplete received by a graduate student does not automatically convert to a grade of 0.0 but will remain a permanent part of the student's record.

N No grade. Used only for hyphenated courses and courses numbered 600 (Independent Study or Research), 601 (Internship), 700 (Master's Thesis), 750 (Internship), or 800 (Doctoral Dissertation). An *N* grade indicates that satisfactory progress is being made, but evaluation depends on completion of the research, thesis, internship, or dissertation, at which time the instructor or supervisory committee chair should change the *N* grade(s) to one reflecting the final evaluation.

S/NS Satisfactory/not satisfactory. A graduate student, with the approval of the graduate program coordinator or supervisory committee chair, may elect to be graded *S/NS* in any numerically graded course for which he or she is eligible. If a student does not so elect, then the student is graded on a numerical basis. If approval is granted, the student must elect the *S/NS* option either when registering or no later than the end of the seventh week of the quarter.

CR/NC Credit/no credit. With the approval of the faculty in the academic unit, any course may be designated for grading on the credit/no-credit basis by notice in the appropriate *Time Schedule*. For such courses, the instructor submits a grade of *CR* or *NC* to be recorded by the Registrar's Office for each student in the course at the end of the quarter. All courses numbered 600, 601, 700, 750, and 800 may be graded with a decimal grade, *CR/NC*, or *N* at the instructor's option.

W Course Withdrawal.

HW Hardship Withdrawal. Refer to the University of Washington *Time Schedule* for procedures and dates, or visit the Web at www.washington.edu/students/reg/wdoffleave.html#Q3.

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

The student may petition the Dean of the Graduate School to modify the procedures described above. The petition should be accompanied by comments and recommendations from the graduate program coordinator.

Scholarship

A cumulative GPA of 3.00 or above is required to receive a degree from the Graduate School. A graduate student's GPA is calculated entirely on the basis of numeric grades in 400- and 500-level courses. The grades of S, NS, CR, NC, and N are excluded, as are all grades in courses numbered 600, 601, 700, 750, and 800, and in courses at the 100, 200, and 300 levels.

Failure to maintain a 3.00 GPA, either cumulative or for a given quarter, constitutes low scholarship and may lead to a change-in-status action by the Graduate School. Failure to maintain satisfactory performance and progress toward a degree may also result in a change-in-status action by the Graduate School.

(See Graduate School Memorandum No. 16 for additional information.)

Withdrawal Policy

Refer to the University of Washington *Time Schedule* for procedures and dates, or look on the Web at www.washington.edu/students/reg/wdoffleave.html

Language Competency Requirements and Examinations

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

Requirements for foreign-language competence are established by the graduate faculty in the unit offering the graduate program. Language competence in certain languages other than English (i.e., languages that may have special significance to the field) may be specified as helpful or desirable or may be required. Students should consult the graduate program coordinator for information and advice about desirable or required competence in foreign languages.

When appropriate, students are urged to establish foreign-language competence as undergraduates before entering the Graduate School or as early as possible in their graduate careers. The University's language-competence requirements in French, German, and Spanish may be satisfied by successful completion of the standardized examinations given by the Educational Assessment Office. Other foreign language examinations are also given at the UW.

It is assumed that citizens of certain English-speaking countries who are admitted to the Graduate School are competent in the English language; citizens of non-English-speaking countries must demonstrate a satisfactory command of English, both for admission and for appointment as teaching assistants.

Refer to Graduate School Memorandum No. 8, *English Language Competence for Admission to the Graduate School* (www.grad.washington.edu/Acad/gsmemos/gsmemo08.htm) for more information.

Enrollment Requirement

The enrollment requirement for the master's degree is 30 credits at the University of Washington

For the doctoral degree, the enrollment requirement is 90 credits, 60 of which must be taken at the University of Washington. With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may substitute for 30 credits of enrollment. Doctoral study requires an immersion in an academic field and its intellectual community. Degree-granting units may require a period of full-time or on-site study.

Only courses at the 400-, 500-, 600-, 700-, and 800-levels can be applied to enrollment or course credit in the major field for advanced degrees (please see Graduate Courses earlier in this section regarding courses numbered 498 and 499). Courses at the 300-level are not applicable to enrollment or course credit toward advanced degrees except when applied by permission of the graduate program coordinator or supervisory committee toward the graduate minor or supporting courses. Courses numbered below 300 are not applicable to enrollment or course credit for advanced degrees.

Final Quarter Registration

A student must maintain registration as a full- or part-time graduate student at the University for the quarter the master's degree, the Candidate certificate, or the doctoral degree is conferred.

A student who does not complete all degree requirements by the last day of exam week must be registered for the following quarter.

Continuous Enrollment and Official On-Leave Requirement

Policy

To maintain graduate status, a student must be enrolled on a full-time, part-time, or On-Leave basis from the time of first enrollment in the Graduate School until completion of all requirements for the graduate degree. The student must be registered when applying for the master's degree, the passing of the master's final examination, or doctoral General or Final Examinations, the filing of the thesis or dissertation, and the receiving of the degree. Summer quarter On-Leave enrollment is automatic for all graduate students who were either registered or on-leave the prior spring quarter. Failure to maintain continuous enrollment constitutes evidence that the student has resigned from the Graduate School.

A student's petition for On-Leave status must be approved by the departmental graduate program coordinator or alternate and submitted to the Registration Office no later than the fifth day of the quarter. To be eligible for On-Leave status, the student must have registered for, and completed, at least one quarter at the UW and have been registered and completed the previous quarter, or have been officially On-Leave (except summer quarter). An On-Leave student is entitled to use the University Libraries and to sit for foreign-language competence examinations, but is not entitled to any of the other University privileges of a regularly enrolled and registered full- or part-time student. The student pays a nonrefundable fee to obtain On-Leave student status covering four successive academic quarters or any part thereof. An On-Leave student returning to the University on or before the termination of the period of the leave must file a Returning Student Reenrollment Application (available at 225 Schmitz) by the deadline stated on the form and register in the usual way as a full- or part-time student (see Graduate School Memorandum No. 9 for procedures). A student who returns before the termination of the On-Leave period and maintains registration for any part of a quarter cancels On-Leave status. Please note: Periods spent On-Leave are included as part of the maximum time periods allowed for completion of a graduate degree.

Readmission

A student previously registered in the Graduate School who has failed to maintain graduate student status but who wishes to resume studies must file an application in person or by mail for readmission to the Graduate School by the regularly published closing dates. If the student is readmitted, registration will occur during the usual registration period. If the student has attended any other institution during the period when not registered at the UW, 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.

The Graduate School normally allows six years to complete requirements for a master's degree and ten years for a doctoral degree. Periods spent On-Leave or out of status are included.

Concurrent Degree Programs

Formal Concurrent Degree Programs

Concurrent programs are defined as a pair of programs that may be taken at the UW by a postbaccalaureate student resulting in the satisfaction of the requirements for either two graduate degrees or a graduate and a professional degree. Rather than sequentially completing first one degree and then the other, the student's time and the University's resources may sometimes be conserved by providing arrangements that permit the student to proceed in a coordinated way toward completion of the degree objectives.

These specific programs have been formally approved and students are coded with the concurrent codes.

To earn two master's degrees, a student must complete two separate sets of minimum Graduate School degree requirements of 36 credits each for a total of 72 credits. If a program requires more than 36 credits for the master's degree, a graduate student, with prior approval of both graduate programs, may apply a maximum of 12 credits beyond 36 earned in one program toward the master's degree in the second program. Thus, the minimum number of additional credits for the second degree, with these 12 approved credits, is 24. Up to 12 credits earned toward a Ph.D. degree may be counted toward a master's degree in another program with the approval of both degree-granting units.

Informal Concurrent Degree Programs

Students in these programs pursue two degrees from different departments simultaneously. These programs have not been approved as formal concurrent programs, but students complete the same requirements as in the formal concurrent programs.

Students choosing this option must complete an Informal Concurrent Degree Application, which may be obtained from the Graduate Student Services Office, 229 Gerberding.

Graduate School Memorandum No. 35: Concurrent Degree Programs contains additional information and is available from the Academic Programs office in the Graduate School or may be found through the Graduate School homepage at www.grad.washington.edu.

Master's Degree

Summary of Requirements

It is the responsibility of each master's candidate to meet the following Graduate School minimum requirements:

- Under a thesis program, a minimum of 36 or more quarter credits (27 course credits and a minimum of 9 credits of thesis) must be earned. Under a non-thesis program, a minimum of 36 or more quarter credits of course work must be earned.
- At least 18 of the minimum 36 quarter credits for the master's degree must be for work numbered 500 and above. (In a thesis program, 9 of the 18 credits must be course credits and 9 may be for 700, Master's Thesis.)
- Numerical grades must be received in at least 18 quarter credits of course work taken at the UW. The Graduate School accepts numerical grades (a) in approved 400-level courses accepted as part of the major, and (b) in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
- A minimum of 30 credits must be earned at the University of Washington.
- In a thesis degree program, a thesis, approved by the supervisory committee, must be submitted to the Graduate School. A student must register for a minimum of 9 credits of thesis (700). With the exception of summer, students are limited to a maximum of 10 credits per quarter of thesis (700).
- A final master's examination, either oral or written, as determined by the student's supervisory committee, must be passed, if it is a departmental requirement.
- Any additional requirements imposed by the graduate program coordinator in the student's major department or by the student's supervisory committee must be satisfied. A master's degree student usually takes some work outside the major department. The graduate program coordinator in the major department or the student's supervisory committee determines the requirements for the minor or supporting courses.
- Students may now apply for the master's degree on the Web at www.grad.washington.edu/stsv/mastapp.htm. The online application period commences Monday, the third week of each quarter and closes Friday (midnight Pacific Time), the second week of the subsequent quarter (the quarter the student intends to graduate). For example, if competing in winter quarter, the earliest an online request can be submitted is the third week of autumn quarter and the latest is Friday of the second week of winter quarter. If degree requirements are not met in the requested quarter, students must complete another degree request for the quarter in which they expect to complete requirements. Students will receive an email confirming receipt of their Master's Degree Request.
- The graduate student must maintain registration as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).
- All work for the master's degree must be completed within six years. This includes quarters spent On-Leave or out of status and applicable work transferred from other institutions (see detailed information under Transfer Credit).
- A student must satisfy the requirements for the degree that are in force at the time the degree is to be awarded.*

Second Master's Degree Requirement

A second master's degree may be earned at the UW by completing an additional separate set of requirements. Please refer to Concurrent Degree Programs earlier in this section and to Graduate School Memorandum No. 35 for more specific information.

Transfer Credit

A student working toward the master's degree may petition the Dean of the Graduate School for permission to transfer to the UW the equivalent of a maximum of 6 quarter credits of *graduate level* course work taken at another recog-

nized graduate school. These credits may not have been used to satisfy requirements for another degree. The petition must include a written recommendation from the graduate program coordinator and an *official* transcript indicating completion of the course work. Transfer credits are not entered on the UW transcript.

Approved transfer credits are applied toward the total credit count for the master's degree only. (Transfer credits are not applicable toward a doctoral degree.) The 18 quarter credits of numerically graded course work, and the 18 quarter credits of 500-level-and-above course work may not be reduced by transfer credit.

UW students who are within 6 credits of completing their undergraduate degree and who have met the requirements for admission to the Graduate School may register the quarter immediately preceding admission to Graduate School for up to 6 credits in 500-level courses in addition to the last 6 credits they require of undergraduate work. The graduate program which has admitted the student must approve registration for the courses. The student, after admission to the Graduate School, must file a petition with the Dean of the Graduate School to transfer the 6 credits.

The student must also provide a letter from the Office of Graduations and Academic Records stating that these credits have not been applied toward his or her undergraduate degree.

Credit taken as a nonmatriculated student or postbaccalaureate student at the UW may not be transferred into a graduate program. Credit by either independent study through correspondence or advanced credit examinations is not transferable.

Thesis Program

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 the appropriate forms signed by the members of the supervisory committee from the student's graduate program, must be submitted to the Graduate School by the last day of the quarter (last day of exam week) in which degree requirements are completed. The faculty in the graduate program may require that the student present an additional copy for its own use. The Graduate School publishes a booklet, *Style and Policy Manual for Theses and Dissertations*, which outlines format requirements. This manual should be obtained from the Graduate School and read thoroughly *before* the student begins writing the thesis. The thesis must meet all format requirements before being accepted by the Graduate School. Thesis advisers are available in the Graduate School for consultation during the thesis preparation process.

A \$25 binding fee is payable at 129 Schmitz before the thesis is submitted to the Graduate School.

Non-thesis Programs

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

Final Examination for Master's Degree

As soon as is appropriate, the graduate faculty in the student's graduate program appoints a supervisory committee, consisting of two to four members. The chair and at least one-half of the total membership must be members of the graduate faculty (see Graduate School Memorandum No. 13). The committee chair arranges the time and place of the final examination, the results of which must be reported to the Graduate School by the last day of the quarter (last day of exam week) in which degree requirements are met. At least two graduate-faculty members of the committee, including the chair, must sign the Master's Application (warrant). If the exam 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 further period of study.

Application for Master's Degree

Students may now apply for the master's degree on the Web at www.grad.washington.edu/stsv/mastapp.htm. The online application period commences Monday, the third week of each quarter and closes Friday (midnight Pacific Time), the second week of the subsequent quarter (the quarter the student intends to graduate). For example, if competing in winter quarter, the earliest an online request can be submitted is the third week of autumn quarter and the latest is Friday of the second week of winter quarter. If degree requirements are not met in the requested quarter, students must complete another degree request for the quarter in which they expect to complete requirements. Students will receive an email confirming receipt of their Master's Degree Request. 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. All requirements for the degree must be met by the end of the current quarter if the application is to be approved. If this is not possible, the applicant is notified of deficiencies by the Graduate School. Once approved, the application is forwarded to the appropriate graduate program. Registration must be maintained for the entire quarter in which application for the degree is made. If a student should withdraw during the quarter, the application becomes void and a new one must be submitted at the appropriate time.

Upon completion of departmental requirements, the master's degree application is signed by the supervisory committee and returned to the Graduate School. It must be received by the last day of the quarter (last day of exam week) if the degree is to be conferred that quarter. If all requirements are completed after this deadline, registration for the following quarter is required.

The student and the graduate program coordinator should be thoroughly acquainted with the requirements for the particular degree.

Master of Arts for Teachers

Master's degree programs for experienced teachers, which focus upon the fields of knowledge normally taught in the common school and the community college, have been established at the University. These programs provide alternatives to the research-oriented Master of Arts and Master of Science degree programs, which emphasize particular fields of knowledge. Programs leading to the M.A.T. degree are offered in Biology Teaching and English.

Doctoral Degree

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

Summary of Requirements

In order to qualify for the doctoral degree, it is the responsibility of the student to meet the following Graduate School *minimum* requirements:

1. Completion of a program of study and research as planned by the graduate program coordinator in the student's major department or college and the Supervisory Committee. Half of the total program, including dissertation credits, must be in courses numbered 500 and above. At least 18 credits of course work at the 500 level and above must be completed prior to scheduling the General Examination.
2. Presentation of 90 credits, 60 of which must be taken at the University of Washington.

With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may substitute for 30 credits of enrollment.
3. Numerical grades must be received in at least 18 quarter credits of course work taken at the UW prior to scheduling the General Examination. The Graduate School accepts numerical grades in approved 400-level courses accepted as part of the major, and in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
4. Creditable passage of the General Examination. Registration as a graduate student is required the quarter the exam is taken and candidacy is conferred.
5. Preparation of and acceptance by the Dean of the Graduate School of a dissertation that is a significant contribution to knowledge and clearly indicates training in research. Credit for the dissertation ordinarily should be at least one-third of the total credit. *The Candidate must register for a minimum of 27 credits of dissertation over a period of at least three quarters.* At least

one quarter must come after the student passes the General Examination. With the exception of summer quarter, students are limited to a *maximum* of 10 credits per quarter of dissertation (800).

6. Creditable passage of a Final Examination, which is usually devoted to the defense of the dissertation and the field with which it is concerned. The General and Final Examinations cannot be scheduled during the same quarter. Registration as a graduate student is required the quarter the exam is taken and the degree is conferred.
7. Completion of all work for the doctoral degree within ten years. This includes quarters spent On-Leave or out of status as well as applicable work from the master's degree from the UW or a master's degree from another institution, if applied toward one year of resident study.
8. Registration maintained as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).
9. *A student must satisfy the requirements that are in force at the time the degree is to be awarded.*

Appointment of Doctoral Supervisory Committee

A *Supervisory Committee* is appointed by the Dean of the Graduate School to guide and assist a graduate student working toward an advanced degree and is expected to evaluate the student's performance throughout the program. The supervisory committee should be appointed no later than four months prior to the General Examination. Appointment of the supervisory committee indicates that the graduate faculty in the student's field finds the student's background and achievement sufficient for admission into a program of doctoral study and research. "Preliminary" examinations, if required, should be completed prior to the request for appointment of the supervisory committee (see Graduate School Memorandum No. 13: Supervisory Committees for Graduate Students).

Admission to Candidacy for Doctoral Degree

At the end of *two years of graduate study*, the chair of the supervisory committee may present to the Dean of the Graduate School, for approval, a Request for General Examination (signed by all supervisory committee members including the Graduate School Representative) permitting the student to take the General Examination for admission to candidacy for the doctoral degree. This means that, in the opinion of the committee, the student's background of study and preparation is sufficient to justify the undertaking of the examination. A warrant is issued to the department if the Graduate School requirements have been met. The Request for General Examination must be received at least three weeks prior to the proposed examination date. Written and other examinations prior to the oral are the responsibility of the graduate program and do not need Graduate School approval. At least four members of the committee (including the chair, GSR, and one additional graduate faculty member) must be present at both the General and Final Examinations. Registration as a graduate student is required the quarter the exam is taken and candidacy is conferred.

If the student's performance is judged by the supervisory committee to be satisfactory, the signed warrant certifying successful completion of the General Examination is filed in the Graduate School. If the General Examination is unsatisfactory, the supervisory committee may recommend that the Dean of the Graduate School permit up to a maximum of two additional re-examinations, after a further period of study. Any members of the committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School.

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

The Candidate's certificate and the doctoral degree may not be awarded in the same quarter.

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 Education, and Doctor of Musical Arts. Students who have passed the Graduate School General Examination and who have completed all requirements for the degree except the dissertation and the Final Examination are awarded the Candidate certificate.

Dissertation and Final Examination

The Candidate must present a dissertation demonstrating original and independent investigation and achievement. The dissertation should reflect not only mastery of research techniques but also ability to select an important problem

for investigation and to deal with it competently. Normally the dissertation is written in the English language. However, if there are circumstances that warrant the dissertation be written in a foreign language, approval must be received from the Dean of the Graduate School. The Graduate School publishes a booklet, *Style and Policy Manual for Theses and Dissertations*, which outlines format requirements. This manual should be obtained from the Graduate School and read thoroughly *before* the student begins writing the dissertation. The dissertation must meet all format requirements before being accepted by the Graduate School. Thesis advisers are available in the Graduate School, and students are encouraged to consult with them throughout the dissertation preparation process.

When the supervisory committee agrees that the doctoral Candidate is prepared to take the Final Examination, the Dean of the Graduate School should be informed of the decision and asked to designate a reading committee consisting of at least three voting members of the supervisory committee.

Once the reading committee is established officially with the Graduate School, a Request for Final Examination (signed by all members of the supervisory committee including the Graduate School Representative) is presented to the Graduate School three weeks prior to the Final Examination date, and if the Candidate has met all other requirements, a warrant authorizing the Final Examination is issued by the Graduate School. At least four members of the committee (including the chair, GSR, and one additional graduate faculty member) must be present at both the General and Final Examinations.

If the Final Examination is satisfactory, the supervisory committee signs the warrant and returns it to the Graduate School by the last day of the quarter in which the degree requirements are completed. Any members of the committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School. If the examination is unsatisfactory, the supervisory committee may recommend that the Dean of the Graduate School permit a second examination after a period of additional study.

After the Final Examination, the doctoral Candidate has 60 days in which to submit the dissertation to the Graduate School. Registration as a graduate student is required the quarter the dissertation is submitted and the degree is conferred.

Publication of Doctoral Dissertations

Part of the obligation of research is publication of the results, and in the case of doctoral research, this means microfilm publication of the dissertation and/or abstract. This is a Graduate School requirement in addition to any previous or planned publication of any or all of the dissertation and provides worldwide distribution of the work. The Candidate submits the publication agreement when the dissertation is presented to the Graduate School. Publication in microfilm does not preclude other forms of publication.

The following fees for microfilming the doctoral dissertation are paid at the Cashier's Office, 129 Schmitz (all fees are subject to change): microfilming the entire dissertation, \$60; *optional* copyright fee (applicable only when the entire dissertation is microfilmed), \$45; or microfilming of only the abstract, \$60. *These fees are in addition to the \$25 binding fee.*

Individual Ph.D. Program

The Graduate School maintains the Individual Ph.D. (IPh.D.) Program for exceptionally able students whose objectives for study are of an interdisciplinary nature that cannot be met within one of the University units authorized to grant the Ph.D. degree. The program is intended for dissertation topics that require supervision from two or more of the disciplines in which the University offers the Ph.D. degree. It is not intended as a mechanism for offering the Ph.D. degree within units that do not have their own authorized Ph.D. programs.

A graduate student may apply to the IPh.D. Program when he or she has completed the master's degree, or has been admitted to the Graduate School and has completed at least three quarters of full-time work at the UW, and has carefully planned an appropriate program of studies.

Proposals, including GRE scores, are due by December 15 of each year, and decisions on admission are made by May 31 of the following year. Information and application materials for the Individual Ph.D. Program are available at www.grad.washington.edu/inter/iphd.htm.

Special Programs and Facilities

Graduate School Support for Interdisciplinary Units and Graduate Student Recruitment

The objective of the *Graduate School Fund for Excellence and Innovation* (GSFEI) is to support the overall goals of graduate education and research through funding in the following areas: (1) program support for interdisciplinary units on campus, (2) graduate student recruitment support to Ph.D.-degree

granting units on campus, (3) honoraria and colloquia support for the dissemination of research, (4) matching support on proposals to establish research centers, (5) graduate student travel to present the results of research, (6) book publication subsidies for faculty, and (7) other uses that benefit graduate education and research on campus.

GSFEI revenues come from various sources that include state funds provided in the University's biennial budget, private donations, institutional allowances provided with fellowships and traineeships, patent, invention, and copyright royalties accruing to the University, and various special, short-term and renewable awards from the President's and Provost's Offices for maintenance of certain unique needs.

GSFEI policies and procedures may be accessed on the Web at grad.washington.edu or obtained from the Graduate School, G-1 Communications, Box 353770, or requested by calling 206-543-7436.

Related to its primary responsibilities for graduate education, the Graduate School has responsibility for the following programs:

Special Professorships and Lectureships

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

Chaired by the Dean of the Graduate School, a committee of University faculty members considers nominations from their colleagues and makes recommendations to the President for the appointment to Walker-Ames Professorships of distinguished scholars of national and international reputation.

Since 1936, when the first Walker-Ames Visiting Professor was appointed, over 345 scholars and members of the profession have come to the University as temporary members of the faculty, enriching the intellectual life of the University community and the state.

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

Nominations and appointments for the Danz lectureships are made in the same manner as the Walker-Ames professorships. Since 1961 when the lectureship was established there have been more than 100 appointed lectureships. Other arrangements compatible with the Danz bequest (e.g., the publicizing of the Danz Lectures) may be made upon approval of the committees involved.

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

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

Center for Law and Justice

Joseph G. Weis, Director
117 and 119 Savery, Box 353340

The Center for Law and Justice is a multidisciplinary research center established in 1975. Its goals are to engage in research, to contribute to the education and training of students, to offer consultation, and to provide liaison to the community in the areas of law and justice. To achieve these goals the Center (1) appraises faculty members of research opportunities and assists in the development of proposals, (2) involves students from different disciplines in research training and education and sponsors biweekly colloquia, and (3) provides consultation to the criminal justice system and responds to the broader informational needs of the community.

University of Washington Press

Pat Soden, Director
1326 Fifth Avenue, Suite 555, Box 359120

The University of Washington Press, the book-publishing division of the University, has over a thousand titles in print, with special emphasis on art, anthropology, Asian-American studies, Asian studies, environmental studies, ethnology, history, international studies, and regional subjects. The Press publishes about 60 new books each year, including reprints and imports. Authors include both members of the University faculty and scholars outside the University. In addition to its own publishing program, the Press distributes art books and catalogues for numerous museums.

Procedures and Fees

The University and its colleges and schools reserve the right to change the fees, the rules, and the calendar regulating admission and registration; the instruction in and the graduation from the University and its various divisions; and any other regulations affecting the student. The University also reserves the right to withdraw courses and programs at any time.

It is the University's expectation that all students follow University regulations and procedures as they are stated in the *General Catalog*. Appeals may be filed with the student's dean or with the Vice President for Student Affairs in nonacademic matters. Students are expected to observe the standards of conduct contained in the Student Conduct Code (WAC 478-120).

Registration

 www.washington.edu/students/reg/regelig.html

Instructions for registration are available on MyUW (myuw.washington.edu) in the Student Personal Services menu by selecting Registration. Notification is emailed to each student quarterly with information about registration for the next quarter.

Registration Period I

 www.washington.edu/students/reg/addpolicy.html

Designed to accommodate currently registered matriculated students and students eligible to register under the Quarter Off Eligibility Policy, Registration Period I occurs during the latter half of the quarter preceding the quarter for which the student is registering. However, currently enrolled students registering for autumn quarter do so in spring quarter.

Registration Period II

Registration occurs after Registration Period I closes and is intended primarily to accommodate new and returning students. Continuing students who fail to register during Registration Period I may register during this period. Students who have not completed their initial registration by the end of this period (update and selection of address information, insurance/optional charges, and ASUW membership) are charged a Late Registration Fee.

Registration Period III

All students may register or make course changes during this period. Dropped courses do not appear on the transcript. Students are charged a Change of Registration service fee for registration changes made after Period III. One fee is charged for all changes occurring during the same day. A tuition forfeiture is charged for total credit reductions after Period III if applicable. See Fee Forfeiture section.

Late Add Period

All students may register or make registration changes during this period. All added courses require an entry code or faculty number. A Change of Registration service fee is charged.

Unrestricted Drop Period

 www.washington.edu/students/reg/wdpolicy.html

Courses dropped during this period will not appear on the transcript. A Change of Registration fee is charged.

Late Course Drop Period (Annual Drop)

Students may drop one course each academic year (autumn through summer quarters) after the fourteenth calendar day of the quarter through the seventh week of the quarter. A course drop will be recorded on the transcript with a W followed by the number of the week of the drop (W3-W7). A Change of Registration service fee is charged.

Credits Required for Full- or Half-Time Status Requirements

 www.washington.edu/students/reg/regpol.html

Some agencies require that a student have full-time status to receive maximum benefits. To be classified as a full-time student by the University, a professional student must register for and complete at least 12 credits per quarter and a graduate student must register for and complete at least 10 credits per quarter.

To be classified as a half-time student by the University, a professional student must register for at least 6 credits per quarter and a graduate student must enroll for at least 5 credits per quarter.

Restrictions on Attending Classes

 www.washington.edu/students/reg/regpol.html

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

An instructor may allow a student to attend his or her class only if the student's name is on the official class list from the Office of the Registrar. An unregistered student may attend through the fourteenth calendar day of the quarter if the student is on an official wait list for the course.

Adding Courses/Permission Guidelines

 www.washington.edu/students/reg/regopt.html

For reasons of public safety and instructional quality, it is important to limit course enrollment to the approved classroom capacity. The Office of the Registrar monitors course enrollment and accepts student registration in fully enrolled courses according to the following guidelines:

1. Through the second week of the quarter, departments may choose to overload courses up to 115% of the room capacity to offset anticipated student course drops and withdrawals as demonstrated by past registration activity.

Students must secure entry codes from instructors or departments to add closed courses. However, if enrollment is at 115% of room capacity, registration requests are denied. Students should be informed when receiving entry codes to overload courses that registration is not guaranteed if enrollment exceeds 115% of room capacity.

If centralized room-capacity records do not correctly reflect the actual seating capacity, notification should be made to the Room Assignments/Time Schedule Office in the Office of the Registrar.

2. Students may add courses during the Late Add Period or through the twenty-first calendar day of the quarter. Adds after the seventh calendar day of the quarter require an entry code or faculty number. Departments may also add students to departmental courses during this period through departmental registration screens. To add courses after this period, students must submit a faculty-approved Late Add Petition form to the Registration Office.
3. A course may not be changed to or from an audit registration after the first two weeks of the quarter. See below for transcript entry.

Dropping a Course

 www.washington.edu/students/reg/wdpolicy.html

Students dropping a course during the first two weeks of a quarter shall have no entry on their permanent academic transcript. If all courses are dropped, then a complete withdrawal date is recorded on the transcript.

A course drop made during the third through the seventh weeks of the quarter is recorded on a student's transcript with a W grade and a number designating the week of the quarter in which the course drop was transacted. Only one drop after the fourteenth day of a quarter is permitted each academic year (autumn through summer quarter).

A student who does not officially drop a course through the registration system or the offering department is given a grade of 0.0.

Students receiving or applying for financial aid should check with the Office of Student Financial Aid, 105 Schmitz, 206-543-6101, before dropping a class because it may affect their eligibility.

Students receiving veterans' benefits should contact the Office of Special Services, 460 Schmitz, when dropping courses.

Complete Withdrawal from the University for a Registered Quarter

 www.washington.edu/students/reg/wdoffleave.html

Once registered, a student must officially withdraw if he or she later chooses not to attend the University for the registered quarter. Official withdrawal must be made by the fifth day of the quarter for the student to avoid further financial obligation (see Tuition, Fees, and Special Charges for refund information on withdrawals).

1. To withdraw from a quarter, students may complete a Withdrawal Card and submit it in person to the Registration Office, 225 Schmitz, or write to the Registration Office, Box 355850, Seattle, WA 98195-5850. Withdrawal forms are available at advising offices and the Registration Office. An official withdrawal is effective the day it is received in the Registration Office, or if submitted by mail, the date of the postmark.
2. Students who drop the last course on their schedules will be considered withdrawn for the quarter. Students who drop courses beginning the eighth calendar day of the quarter are charged a Change of Registration service fee per day for any course drops.
3. Submission of a graduate On-Leave application does not constitute official withdrawal from the University.
4. Refer to the grading section in the Graduate School: Graduate Study section.
5. Students receiving veterans' benefits should immediately notify the Office of Special Services of withdrawal.
6. Students with a scholarship or loan awarded through the University should notify Student Fiscal Services.
7. Students who withdraw due to conscription into the armed forces or who are called to active duty military service may be entitled to either a full refund of tuition and fees or academic credit, depending on when in the quarter official withdrawal occurs. Students should contact the Registration Office for complete information.

Additional Information

Address Change

 www.washington.edu/students/reg/address.html

Students are responsible for notifying the Office of the Registrar when their address changes. Individual addresses may be viewed and updated through MyUW. (Select Change of Address under the Student Personal Services menu.). A confirmation message will be sent to the student's email address. *The mailing of notices to the last address on record constitutes official notification.*

Residence Classification Requirements

 www.washington.edu/students/reg/residency.html

Residence classification information is available from the Graduation and Academic Records Office, 264 Schmitz.

Student Identification Cards

 www.washington.edu/students/reg/id.html

All new students should go to the Student ID Card Center, 225 Schmitz, to be issued a permanent student identification card. Photo identification (such as a driver's license, state ID card, or passport) is required to obtain a student ID card. Returning students who have not retained a previous ID card should obtain a new one. A quarterly validation sticker is mailed with the registration confirmation to each registered student. The student ID card with attached validation sticker is used for a variety of campus services. It is the student's means of identifying his or her status as a student at the University.

Registered students whose ID cards have been lost or stolen can have them replaced at the Student ID Card Center. Students who request such replacement are charged a nonrefundable fee. Replacement of cards made invalid by changes in a student's name or rendered unusable by normal wear and tear is provided without charge upon return of the original card to the Student ID Card Center. Two pieces of identification (one with a photo) are required to obtain a replacement card.

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

Transcripts

 www.washington.edu/students/reg/transcripts.html

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

Transcript Fee

A charge of \$4, paid to the Transcript Office in advance, is required for each transcript.

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 is not returned to the student. Any student who desires transcripts of his or her course work undertaken elsewhere must order official transcripts from the institution. The University does not issue or certify copies of transcripts from other institutions.

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

Information on educational benefits and tuition reduction programs for veterans and their dependents is available from the Office of Special Services, 460 Schmitz.

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

The University's academic programs of study are approved by the Washington State Higher Education Coordinating Board's State Approving Agency (HECB/SAA) for enrollment of persons eligible to receive educational benefits under Title 38 and Title 10 USC.

Tuition, Fees, and Special Charges

Estimated Expenses

The cost of a student's education at the University varies, the amount depending on his or her classification, status as resident or nonresident, and field of study. In computing college costs, a student should consider such additional expenses as insurance coverage, books, and laboratory supplies. Personal expenses (e.g., clothing, laundry, recreation, and transportation), which vary with each individual, as well as between-quarter expenses, should not be overlooked.

The following figures are prepared and updated each year by the Office of Student Financial Aid and reflect modest, but adequate, probable costs for students attending the University during the nine-month academic year. They should be used only as a guide in determining the year's expenses.

Books	\$ 777
Room and Board	8,319
Transportation	747
Miscellaneous personal expenses	<u>2,043</u>
Total	\$11,886

This budget assumes room and board is paid for by the student.

	<i>Resident tuition and fees</i>	<i>Nonresident tuition and fees</i>
Business students	8,469	17,569
Graduate students—Tier I*	6,508	15,595
Graduate Students—Tier II†	6,758	15,845
Graduate Students—Tier III‡	7,008	16,095
Law students	10,230	17,969
Doctor of Pharmacy (PharmD)	7,758	16,695
Medical and dental students	11,421	27,574

Tuition and fees are subject to change.

*Tier I comprises all Ph.D. students and all master's degree programs not specified in tiers II and III.

†Tier II comprises Education masters, Forest Resources masters, non-professional School of Medicine masters, Nursing masters, Oceanography and Aquatic and Fishery Sciences masters, Public Affairs masters, and Public Health and Community Medicine masters

‡Tier III comprises Architecture and Urban Planning masters, Engineering masters, and Information School masters

Enrollment Confirmation Deposit

 depts.washington.edu/nsp/first2.html

A new graduate student is required to confirm his or her intention to enroll by paying a nonrefundable \$100 Enrollment Confirmation Deposit (not required of students admitted summer quarter). The \$100 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 a refund except by petition in the situations listed below:

1. A new or returning matriculated student who is unable to obtain courses required for the completion of the degree or certificate program, or courses which are determined by an appropriate academic adviser to be acceptable alternate courses. A written verification from the appropriate academic adviser must be attached to this petition. Such requests for refund must be submitted by Friday of the second week of the quarter.
2. A new or returning matriculated student who, after meeting with an appropriate academic adviser, determines that the program for which admission was granted differs substantially from what the student was led to expect based upon earlier available information. This petition for refund must be submitted before the student registers for courses and in no case later than the first day of the quarter for which admission has been granted. A written verification from the appropriate academic adviser must be included.
3. A new or returning student who applies by the prescribed deadline for financial aid administered by the University's Office of Student Financial Aid, and who cannot be awarded financial aid adequate to his or her needs as determined by that office, and who is therefore unable to attend the University. This petition and a copy of the Notice of Award and Acceptance must be submitted no later than two weeks after receipt of notice of the financial aid award.
4. A new or returning student who is unable to attend the University because of pregnancy, disability, or death, or because of being called involuntarily into the military service of the United States or into civil duty. Documentation is required.

Fee Payment



www.washington.edu/students/sfs/sao/ttnrates.html

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

Payment of this obligation is due by Friday of the third week of the quarter. Nonpayment of tuition and fees by the due date results in a charge of \$120 for late payment. For balances under \$150, the late fee is \$50. There is no late fee for balances under \$50. One-half of tuition is assessed when registration is canceled for nonpayment of tuition and fees. The Summer Quarter Bulletin and *Time Schedule* should be consulted for fees and fee payment schedule applicable to summer quarter only.

When the payment is not in conformance with the tuition and fee billing, specific instructions on how the payment is to be applied must accompany the payment. In the absence of instructions, the University makes a reasoned interpretation of the student's intent and accounts for the funds accordingly. The student number must be specified on all payments.

Estimated Quarterly Tuition Rates Effective Autumn Quarter 2002



www.washington.edu/students/sfs/sao/ttnrates.html

Graduate Program—Tier I¹

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$12	\$616	\$1,480
3 credits	17	922	2,219
4 credits	22	1,228	2,958
5 credits	27	1,534	3,697
6 credits	32	1,840	4,436
7-18 credits	37	2,146	5,175
Additional fee per credit for more than 18 credits	NA	288	721

Graduate Program—Tier II³

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$12	\$635	\$1,504
3 credits	17	954	2,255
4 credits	22	1,273	3,006
5 credits	27	1,592	3,757
6 credits	32	1,911	4,508
7-18 credits	37	2,230	5,259
Additional fee per credit for more than 18 credits	NA	300	733

Graduate Program—Tier III⁴

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$12	\$663	\$1,527
3 credits	17	993	2,290
4 credits	22	1,323	3,053
5 credits	27	1,653	3,816
6 credits	32	1,983	4,579
7-18 credits	37	2,313	5,342
Additional fee per credit for more than 18 credits	NA	312	745

Doctor of Pharmacy (PharmD)

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$12	\$733	\$1,574
3 credits	17	1,099	2,361
4 credits	22	1,465	3,148
5 credits	27	1,831	3,935
6 credits	32	2,197	4,722
7-18 credits	37	2,563	5,509
Additional fee per credit for more than 18 credits	NA	348	768

Law⁵

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$5	\$971	\$1,707
3 credits	9	1,454	2,559
4 credits	13	1,937	3,411
5 credits	17	2,420	4,263
6 credits	21	2,903	5,115
7-18 credits	25	3,387	5,967
Additional fee per credit for more than 18 credits ⁶	NA	465	834

Graduate Business Programs

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$12	\$800	\$1,668
3 credits	17	1,200	2,501
4 credits	22	1,600	3,334
5 credits	27	2,000	4,167
6 credits	32	2,400	5,000
7-18 credits	37	2,800	5,833
Additional fee per credit for more than 18 credits	NA	381	815

Medical and Dental⁷

	Technology Fee	Resident ²	Nonresident ²
2 credits (minimum)	\$12	\$583	\$1,404
3 credits	17	874	2,109
4 credits	22	1,165	2,814
5 credits	27	1,456	3,519
6 credits	32	1,747	4,224
7 credits	37	2,038	4,929
8 credits	41	2,329	5,634
9 credits	45	2,620	6,339
10 credits	49	2,911	7,044
11 credits	53	3,202	7,749
12 credits	57	3,493	8,454
13 or more credits	61	3,784	9,159

¹ Tier I comprises all Ph.D. students and all masters degrees not specified in tiers II and III.

² Includes technology fee.

³ Tier II comprises Education masters, Forest Resources masters, non-professional School of Medicine masters, Nursing masters, Oceanography and Aquatic and Fishery Sciences masters, Public Affairs masters, and Public Health and Community Medicine masters

⁴ Tier III comprises Architecture and Urban Planning masters, Engineering masters, and Information School masters

⁵ For the purposes of assessing tuition, a law student is any student solely pursuing the Juris Doctor degree. Visiting law students will be considered law students for tuition purposes. Students solely pursuing graduate degrees in the School of law—i.e., degrees other than the Juris Doctor degree—pay graduate tuition. A student concurrently pursuing the Juris Doctor degree and a graduate degree (concurrent law student) will be assessed the law tuition rate for all credits taken in a quarter when 6 or more credits are in School of Law courses. Concurrent law students, who have completed 135 credits for the Juris Doctor degree and are pursuing a graduate law degree, pay graduate tuition.

⁶ Does not apply to law students exclusively in Juris Doctor program.

⁷ A student concurrently pursuing a medical degree and a graduate degree will be assessed the medical tuition rate for all credits taken in a quarter when 6 or more credits are in School of Medicine courses.

Fees are subject to change without notice.

Tuition rates for resident and nonresident students apply to the academic year (autumn, winter, and spring quarters). Summer quarter tuition is listed in the *Summer Quarter Bulletin and Time Schedule*.

Tuition charges are based on student classification, e.g., undergraduate, graduate, or professional, and not on course level. Students pursuing the Doctor of Pharmacy degree are charged graduate tuition.

Fees listed above do not apply to students registered through UW Extension. See the UW Extension Bulletin for their fee structure.

Special Course and Laboratory Fees

The amounts listed above cover normal University charges for course registration. Some courses, however, have extraordinary expenses associated with them, and in such cases the University may charge additional fees in amounts that approximate the added instructional or laboratory costs.

Other Fees

Auditors: There is no reduction in fees for auditors.

Admission Application Fees: Graduate, \$45; Medicine, Dentistry, \$35; Law, \$50. Former students returning in the same classification, \$35.

On-Leave Registration Fee: This fee of \$35, charged to graduate students only, provides for a maximum on-leave period of four successive academic quarters or any part thereof and is not refundable.

Late Registration/Reregistration Fees: A late registration service charge of \$25 is assessed when a student registers after the last scheduled day of Period II registration and through the fourteenth day of the quarter. Students registering after the fourteenth day pay a \$75 Late Registration Fee. Waiver or refund of the Late Registration Fee may be petitioned in the Registration Office. Waiver or refund of the \$75 reregistration fee may be petitioned in the Student Fiscal Services Office.

Change of Registration Service Fee: A charge of \$20 is made for any number of add, drop, or change transactions processed during a given day beginning the eighth calendar day of the quarter.

Transcript Fees: A charge of \$4, paid to the Transcript Office in advance, is required for each transcript.

Thesis and Dissertation Fees: Publication binding fee, \$25; dissertation micro-filming fee, \$52; abstract-only microfilming fee, \$50; optional copyright service fee, \$35.

Replacement Fees: Duplicate diploma, \$10; student identification card, \$5 (non-photo), \$10 (photo).

U-PASS Fee: A U-PASS validation sticker is mailed quarterly with a student's registration confirmation. The U-PASS is valid on all Metro and Community Transit routes at all times and provides parking privileges to carpoolers, riding privileges to vanpool and Night Ride passengers, and merchant discounts. The quarterly fee of \$35 (subject to change) is included on the tuition bill. Students who do not wish to participate in the U-PASS program must return the validation sticker to the University by the tuition payment deadline. The sticker can be returned by mail in the return envelope provided, mailed with the tuition payment, or returned in person to Student Fiscal Services.

All fees are subject to change without notice.

Cancellation of Tuition

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

Continuing Students

1. A student who withdraws on or before the seventh calendar day of the quarter does not pay tuition.
2. A student who withdraws after the seventh calendar day through the thirtieth calendar day of the quarter must pay one-half tuition.
3. A student who withdraws after the thirtieth calendar day must pay full tuition.

New and Returning Students

1. A student who withdraws on or before the seventh calendar day forfeits the \$100 Enrollment Confirmation Deposit but does not pay the regular tuition.
2. A student who withdraws after the seventh calendar day through the thirtieth calendar day of the quarter must pay one-half tuition. The \$100 Enrollment Confirmation Deposit is applied toward payment of tuition.
3. A student who withdraws after the thirtieth calendar day of the quarter must pay full tuition. The \$100 Enrollment Confirmation Deposit is applied toward payment of tuition.



Fee Forfeiture

A student who does not completely withdraw but drops one or more courses may be eligible for lower tuition, depending on the total number of credits remaining after the course drop and on the time period when the drop was made. Tuition for students making a course drop on or before the seventh calendar day of the quarter is determined by the total credits remaining. Tuition for students making a course drop after the seventh calendar day through the thirtieth calendar day of the quarter is computed on the total credits remaining plus one-half the difference between the old tuition and the new tuition. There is no cancellation or reduction in tuition for courses dropped after the thirtieth calendar day of the quarter.

Fee Refund

When a fee payment is made by check, a 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.

Financial Obligations

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

Until this hold is cleared, the University (1) does not release the student's record or any information based upon the record, (2) does not prepare transcripts or certified statements, and (3) denies registration.

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

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

Tuition Exemptions and Reductions



www.washington.edu/students/reg/tuition_exempt.html

Faculty/Staff, Washington State Employee, and Washington National Guard Member Tuition Exemption Programs

Eligible faculty, staff, state employees, and Washington National Guard members admitted to the University may request an exemption for a maximum of 6 credits each quarter under these tuition exemption programs. Applicable tuition will be charged for credits that exceed the 6-credit limit. Because such students are registered on a space-available basis, they must register after other students. The quarterly *Time Schedule* lists registration dates when students enrolling under these exemption programs may register. Eligibility information may be obtained from either the Staff Training and Development Office, or the Registration Office.

"Access" Program for Older Adults



www.washington.edu/students/reg/access.html

The UW allows Washington residents who are 60 years of age or older to audit certain courses on a space-available basis. Students who attend the University under the Access Program are limited to two courses per quarter. There is a nominal registration fee. As auditors, students do not receive credit, participate in discussions, complete laboratory work, or take examinations.

Tuition Reductions

The following categories of students may be eligible for reduced tuition and fees. Students in these categories may contact the offices shown for information or to obtain an application. The reductions are established by legislative mandate and may be revoked by the legislature at any time.

Category

Contact Office

Active duty military assigned to Washington and their children and spouses	Office of Special Services, 460 Schmitz, 206-543-6122, resquest@u.washington.edu
American Indian students who meet specific eligibility requirements	Office of Special Services, 460 Schmitz
Children of POWs or MIAs	Office of Special Services, 460 Schmitz
Children of Washington law enforcement officers or firefighters who died or became totally disabled in the line of duty	Office of Special Services, 460 Schmitz
UW faculty members and their children and spouses who are not Washington state residents	Academic Personnel Office, 85 Gerberding, 206-543-5630
Immigrants holding a refugee classification who have been in the United States less than one year	Office of Special Services, 460 Schmitz
Senior citizens under the Access Program	Registration Office, 206-543-8580, regoff@u.washington.edu
UW staff members and their children and spouses who are not Washington state residents	Office of Special Services, 460 Schmitz
TAs/RA's with half-time appointments	Graduate School, 201 Gerberding
Veterans who served in the Persian Gulf combat zone in 1991	Office of Special Services, 460 Schmitz
Veterans who served in Southeast Asia during the period of August 5, 1964-May 7, 1975	Office of Special Services, 460 Schmitz
Medical students in the WWAMI Program	School of Medicine, Office of Academic Affairs, A300 Health Sciences
Award recipients under the Washington State Scholars and Washington Award for Vocational Excellence (WAVE) programs	Office of Student Financial Aid, Outreach Services, 172 Schmitz
Students participating in the WICHE Program	Student Accounts and Cashiers Office, 129 Schmitz



The University

Academic Assessment

As part of an ongoing effort to ensure the quality of the education received by its students, the UW has instituted a comprehensive assessment program designed to measure student learning outcomes. This assessment program conforms with guidelines established by the state's Higher Education Coordinating Board. From time to time, students may be asked to participate in outcomes assessment by completing satisfaction surveys, sitting for achievement examinations, compiling portfolios of their academic work, or providing other academic performance indicators. The purpose of all such activities is to monitor the quality of the University's academic programs.

While it is a University requirement that students participate in these assessment activities when asked to do so, participants can be assured that assessment results will be treated in the strictest professional confidentiality. Whenever those results appear in University assessment reports or other public documents, they will be presented anonymously and in aggregate fashion.

Academic Sessions

University instruction is offered during autumn, winter, and spring quarters, each lasting approximately 11 weeks. The 9-week summer quarter is divided into two 4 1/2-week terms.

Accreditation

The University is accredited by the Northwest Association of Schools and Colleges and is a member of the Association of American Universities. Individual schools and colleges are members of the various accrediting associations in their respective fields. Currently enrolled or prospective students should contact the Office of the Registrar to review accreditation documents for the University and the respective department to review programmatic accreditation documents.

Academic Programs

The University offers a wide range of undergraduate, graduate, and professional degree programs. In addition to these programs, the following educational opportunities are available.

Certificate Programs



www.extension.washington.edu/extinfo/

UW Extension offers more than 80 specially designed credit and non-credit evening certificate programs of study in many areas, primarily to working adults. Some certificate programs address such personal-interest areas as film, writing, and sound production. Other programs focus on specific careers in business, industry, and technology, offering specialized training that supplements other education and work experience. Students are prepared to enter new fields or to grow professionally in areas ranging from accounting to computer programming to project management. All certificate programs and instructors have been approved by the appropriate academic units. Programs are designed by advisory boards consisting of leading professionals in the field and UW faculty. To accommodate working professionals, UW Extension schedules most classes to meet evenings or weekends. Several certificate programs are offered to students at a distance through various technologies. Course fees and admission requirements vary, and enrollment in all certificate programs is limited. More information may be obtained by consulting the quarterly UW Extension catalog, available by telephone, 206-543-2320 or by UW Extension's Web site.

Evening Classes

Opportunities for evening study at the University are varied to serve individual student interests and academic goals. For nonmatriculated (not formally admitted) students, UW Extension offers hundreds of evening credit courses and evening non-credit courses, which are described in the UW Extension section of this catalog.

Evening Degree Program



www.evedegree.washington.edu/evedeg/

Students can complete a bachelor's or graduate degree in the evening through the University of Washington Evening Degree Program. A wide variety of courses are scheduled for the convenience of evening-degree students. Some programs use technology for the delivery of courses to make the degrees more accessible.

Evening Degree Program graduate-level programs include the Master of Science in Construction Management, the Master of Social Work (M.S.W.), the Master of Professional Accounting (M.P.Acc.), the Master of Public Administration (M.P.A.), Master of Business Administration (M.B.A.), the Master of Education (M.Ed.) and the Doctor of Education (Ed.D.) in educational leadership and policy studies with an emphasis in higher education, the Master of Applied Physics (M.S.), the Professional Master's in Computer Science and Engineering (M.S.), the Master of Library and Information Sciences (M.L.S.), the External Doctor of Pharmacy Program (Pharm.D.), the Master of Health Administration (M.H.A.), and the Master of Medical Engineering (M.M.E.) which is offered by the Department of Bioengineering.

Distance Learning Degree Programs

Degree programs available to students that incorporate distance learning technologies include the Master of Social Work (M.S.W.), the Professional Master's in Computer Science and Engineering (M.S.), the External Doctor of Pharmacy (Pharm.D.), the Master of Health Administration (M.H.A.), and the Education at a Distance for Growth and Excellence program for engineers (M.S.).

For more information on these programs call 206-543-6160 or 206-543-2320, or visit the Evening Degree Web site.

Summer Quarter



www.summer.washington.edu/uwsq/

During summer quarter, more than two thousand courses in most major fields are available to graduate and undergraduate students pursuing degree programs on a year-round basis as well as to summer-only students seeking to broaden, intensify, or refresh subject-matter competence. Summer-only students can apply for admission as nonmatriculated students and can earn credits which may apply toward a degree at another college. This status also accommodates teachers and school administrators who take special-interest courses to earn additional university credits and postbaccalaureate students who do not desire formal admission to a graduate or second undergraduate program.

Credits earned during summer quarter are evaluated as residence credits and, with the exception of separate fee schedules for medical and dental students, summer quarter fees closely parallel those of the other quarters. A complete listing of summer-quarter courses is published in the Summer Quarter bulletin, available on request from the University of Washington, Office of Summer Quarter, Box 354224, Seattle, Washington 98195, 206-543-2320 or 1-800-543-2320 or visit the summer-quarter Web site.



UW Bothell and UW Tacoma



www.bothell.washington.edu
www.tacoma.washington.edu

At its Bothell and Tacoma campuses, the University offers bachelor's and master's degree programs designed to provide additional educational opportunities for residents of the Puget Sound region. The campuses are located in Bothell, 15 miles to the north of the Seattle campus, and in Tacoma, 35 miles to the south. Undergraduate programs at Bothell and Tacoma are offered at the upper-division level, for students who have already completed the first two years (80 to 90 credits) of undergraduate study. The following degree programs are currently available at both campuses: Bachelor of Arts in Liberal Studies, Bachelor of Arts in Business Administration, Bachelor of Science in Nursing (designed for registered nurses), Bachelor of Science in Computing and Software Systems, and Master of Education. In addition, a Teaching Certificate Program is available at both campuses for students preparing to teach at the K-8 grade levels. The Tacoma campus also offers Master of Nursing and Master of Social Work degree programs. The Bothell campus also offers a Bachelor of Science in Environmental Sciences, a Master of Business Administration degree, a Master of Arts in Public Policy, and a Master of Nursing. A Master of Science in Computing and Software Systems is planned to begin in autumn 2003. Further information is provided in the University of Washington, Bothell and University of Washington, Tacoma sections of this catalog.

Resources and Facilities

Burke Museum



www.washington.edu/burkemuseum/

The Burke Museum of Natural History and Culture serves both the University and the public in its mission to encourage understanding of, and appreciation for, the natural and cultural heritage of Washington state, the Pacific Northwest, and the Pacific Rim. The Burke has three scientific divisions—anthropology, geology, and zoology—holding more than four million specimens. Collections of national and international ranking include Northwest Indian art, Northwest archaeology, vertebrate and invertebrate paleontology, mammals, and birds. Other noteworthy collections include Asian and Pacific ethnography, minerals and gems, paleobotany, arachnids, lepidoptera, and micropaleontology.

The collections are accessible for research by UW faculty, students, and visiting scientists. The museum's public galleries feature two long-term exhibits ("Life and Times of Washington State" and "Pacific Voices"), as well as a series of changing shows on Pacific-region cultures and natural history. Hours are 10 a.m. to 5 p.m. daily, except July 4th, Thanksgiving, December 25th, and January 1st. Admission is free to UW staff and students.

Computing Resources



www.washington.edu/computing/
www.washington.edu/oepl/

The diverse computing and networking needs of instructional and research groups on campus are served by central organizations as well as individual schools, colleges, and departments. Together these provide a variety of computers, facilities, and support services to the UW community. A wide array of computing options and services is offered by Computing and Communications (C&C), the central UW organization for computing and networking, and by UWired, a collaborative effort to integrate information technology into teaching and learning.

Students, faculty, and staff members can create accounts on computers provided by C&C, which give them access to tools for teaching, learning, and research. They can use Internet and Web resources including MyUW, a personal portal to UW resources, and servers where they can create Web pages. They can browse the UW course catalog and Time Schedule; use email; get news and campus events; research term papers; search library catalogs; and use software for statistics, graphics, programming, and text formatting. In addition, UW Internet Connectivity Kit software allows them to connect their own computer to the Internet, either from home (via a modem and a phone line) or from a residence hall or office (usually via Ethernet). To obtain the personal network identification (UW NetID), that provides access to these resources, see www.washington.edu/computing/uwnetid/.

The University's largest drop-in labs are operated by SACG. These labs are more than just a place to check email and do word processing—they are information commons, co-located with other services to provide students with a rich set of resources required to enhance learning. The labs offer PC and Macintosh computers connected to the campus network, free workshops, student consultation, and computers with special adaptive equipment to assist people with

motor, visual, hearing, or learning impairments. For hours, locations, and additional information see depts.washington.edu/sacg/.

The Educational Technology Development Group operates the university's Center for Teaching, Learning and Technology (CTLT), providing free assistance, workshops, and one-on-one faculty consultation. The CTLT is equipped with a variety of hardware and software to allow faculty to experiment with different technology options and receive assistance in using them effectively. In addition, resources are available for a fee in the John Locke Computer Center in Health Sciences. Students, faculty, and staff working on UW-related projects can use this campus lab for printing, posters, scanning, and digital video. For information, see net.hs.washington.edu/locke/

The CTLT also is home to the development efforts behind Catalyst, a project to support innovation in teaching via the Web. Catalyst provides educators with the resources, ideas, tools, and information needed to make use of the Web in education, and it functions as a campus clearinghouse for new approaches to educational technology.

C&C provides other computing-associated services, such as telecommunications, UWTV cable channel 27, video production and videoconferencing, micro-computer and workstation support, training, administrative systems support, individual consulting, publications, and online documentation. For details about the computing resources available on campus through C&C (including how to get started and take advantage of low-cost training), see the Computing and Networking Web page. Your questions can be answered via the Web at www.washington.edu/computing/help/, by sending email to help@cac.washington.edu, or by calling C&C Information, 206-543-5970.

Ethnic Cultural Center and Theatre

The Ethnic Cultural Center and Theatre complex is a facility for student-organized events and activities. Twenty-four of the University's student organizations use the ECC/TC as their center of activity. The staff of the center offers students opportunities for the development of cultural, social, and student-government programs. The Ethnic Cultural Center/Theatre complex also maintains an outstanding theatre facility which provides opportunities for students interested in participating in or creating on-stage productions, symposia, and other events.

Office of Educational Assessment



www.washington.edu/oea/

Testing and educational evaluative services for University departments and individual students are available at the Office of Educational Assessment. Of particular interest to prospective and entering students are the office's programs for admissions testing, including the Scholastic Assessment Test (SAT), and for placement testing in mathematics and foreign languages. Also, the Office administers a variety of tests for international students and others for whom English is not their native language. These tests are used for admission and Academic English Program (AEP) placement or waiver. For the University student approaching graduation, the Office administers tests required for admission to graduate, law, medical, and other professional schools, as well as those tests often requested by prospective governmental or private employers. The Office is located at 453 Schmitz. For more information, and test times and dates, call 206-543-1170.

English As A Second Language Department



www.edoutreach.washington.edu/esl/

The English As A Second Language Department offers a variety of courses to help students improve their English and learn more about American culture. Additional information appears in the University Extension section of this catalog.

Hall Health Primary Care Center



depts.washington.edu/hhpccweb

The University provides outpatient health and medical care for students, faculty, staff, and their families, and others through the Hall Health Primary Care Center. Located on campus, the Center is staffed by physicians and nurse practitioners affiliated with the UW Physicians group (UWP) and is accredited by the Accreditation Association for Ambulatory Health Care.

Services include immunizations, acute care, diagnosis and treatment of illness or injury, employee health, and health education.

The following specialties are represented: internal medicine, family practice, women's health, sports medicine, physical therapy, mental health, adolescent medicine, pediatrics and prenatal services, dermatology, minor out-patient surgery, nutrition services, and travel medicine. Common conditions in other specialties also may be treated. The Health Education staff offer a variety of health-

promotion services including providing learning resources, assistance with self-care, and educational programs.

The following services are provided at no cost for students: unlimited visits with HHPCC consulting nurses; advice about concerns for HIV and STD exposures; reproductive health counseling for women; unlimited access to the Wellness Resource Center; blood pressure screening and consultation; after hours consulting nurse service for urgent medical problems; one visit per quarter for acute illness/injury (excluding routine physicals and annual women's exams); and one crisis intervention counseling session per full academic year. Fees are charged for follow-up visits and preventative care visits, as well as specialty services, including but not limited to mental health, nutrition services, physical therapy, travel clinic, lab work, and x-rays.

UW Student Accident and Insurance Plan is not necessary to use Hall Health Primary Care Center. Student insurance is recommended if the student is not otherwise covered by a private insurance plan. Hall Health Primary Care Center accepts most insurance plans.

Dependents of students, faculty, and staff, and others are welcome at Hall Health Primary Care Center and are eligible for care on a fee-for-service basis.

Student health insurance, available through the UW, *should not be confused* with services through Hall Health Center. A student may use Hall Health Center services without having student insurance. Occasionally, injuries and illnesses occur which may require extensive diagnostic lab tests, x-rays, medications, and treatment in an emergency room, off-campus clinic, or hospital, and which may involve surgery, rehabilitation, or prolonged therapy. The student should protect himself or herself against such major medical expenses by obtaining student health insurance (if not covered by family health insurance or other health plans). This low-cost medical-surgical-hospital policy, designed to meet those specific needs, may be purchased at the time of registration.

Hall Health Primary Care Center is open five days a week, Monday through Friday, 8 a.m. to 5 p.m., except Tuesdays, when the clinics open at 9 a.m. Selected clinics may offer appointments before or after the usual hours.

Additional information may be obtained from Hall Health Primary Care Center, Box 354410, University of Washington, Seattle, WA 98195, 206-685-1011, or from the Hall Health Web site (www.hallhealthcenter.com).

Henry Art Gallery



www.henryart.org

The Henry Art Gallery, the art museum of the University, brings nationally noted special exhibitions of contemporary and historical work in all media to the campus community. The museum's offerings include exhibitions, lectures, symposia, and an active publishing program. The Henry's permanent collection includes a large research collection of ethnic textiles and Western dress as well as a small but distinguished collection of European and American paintings, prints, drawings, photographs, and contemporary American ceramics and Japanese folk pottery.

Hailed as the Northwest's premier contemporary art museum, the Henry Art Gallery offers challenging, thought-provoking visual art exhibitions and brings innovative programming to the region. The Henry organizes exhibitions and hosts nationally and internationally touring exhibitions including such recent shows as the wildly popular Superflat and the intriguing exhibition Gene(sis): Contemporary Art Explores Human Genomics. Founded in 1927, the museum's major renovation, completed in April 1997, quadrupled its size.

The Henry Gallery Association offers membership to students, faculty members and the community for the purpose of supporting the museum's programs. UW students are admitted free at all times. For details, please call the Henry at 206-543-2281 or visit its Web site at www.henryart.org.

Intercollegiate Athletics



www.gohuskies.com

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

There are twelve women's teams: cross-country, soccer, volleyball, gymnastics, basketball, swimming, indoor track, tennis, golf, softball, outdoor track and field, and crew. Women's competition is in the ten-team Pacific-10 Conference (Pac-10).

Eleven sports are offered for men's competition: baseball, basketball, crew, cross-country, football, golf, soccer, swimming, tennis, indoor track, and outdoor track and field. Men's teams compete on a full Pacific-10 Conference schedule, as well as with other institutions locally, regionally, and nationally. The University is a member of the National Collegiate Athletic Association.

Facilities available to intercollegiate athletic teams are Bank of America Arena at Hec Edmundson Pavilion, Pavilion Addition, Husky Stadium, Dempsey Indoor Practice Facility, Husky Baseball Field, Husky Softball Field, Conibear Shellhouse and other crew facilities on Lake Washington at the eastern boundary of the campus, the Lloyd Nordstrom Tennis Center, Husky Soccer Field, and the Washington National golf course in Auburn.

Office of International Programs and Exchanges



depts.washington.edu/ipe/

The Office of International Programs and Exchanges (IP&E) administers and cooperates in more than 80 international-study programs in Latin America, Europe, the Middle East, Africa, and Asia. Qualified undergraduate and graduate students are enrolled concurrently at the University and abroad, earning UW credit and maintaining residency and financial aid eligibility. Quarter, semester, and academic-year programs are offered. Opportunities for study include language and liberal arts courses, advanced language programs requiring two to three years of college-level language preparation, and specialized professional programs. The University also has more than 100 reciprocal exchange agreements with major research institutions abroad, including universities. These arrangements allow qualified UW students to enroll in regular courses at the foreign university while maintaining full UW standing.

Many overseas programs are supported by scholarships from private endowments. Additional scholarship support is available to undergraduate students and special consideration is given to underrepresented groups of students.

Program information and counseling are available from the Office of International Programs and Exchanges, 516 Schmitz, Box 355815; 206-543-9272; ipe@u.washington.edu.

Language Learning Center



depts.washington.edu/lc/

The Language Learning Center (LLC) provides technological and pedagogical resources for faculty and students to teach, learn, and research languages and cultures. The LLC develops and acquires software, audio, and video materials for course work, reading and aural/oral teasing, and class assignments. The LLC offers audio, video, satellite, and cable TV facilities and services, with multi-standard video and videodisc equipment available upon reservation. The LLC recording studio is used to create original native-speaker resources for use in language instruction. Audio media sales to large language classes augment Web-based resources. Computer-assisted language materials integrating interactive digitized audio, video, and graphics/animation are developed for student use in the LLC. The Language and Culture Room is a general-purpose facility used for informal language practice, moderated conversation groups, and special events, such as cultural activities, feature and documentary video and film viewing, and technology and pedagogy seminars. Two computer labs provide digital multi-media courseware, multi-lingual word processing, email, and Web browsing. Two digital multi-media classrooms can be reserved by instructors. The media sales office provides take-home media for students. The LLC is located on the ground floor of Denny Hall and is open during regular academic sessions.

University Libraries



www.lib.washington.edu

The University Libraries, with more than six million volumes, consists of the Suzzallo and Allen Libraries, Odegaard Undergraduate Library, the Health Sciences Library and Information Center, East Asia Library, 15 branch libraries, and the UW Bothell and UW Tacoma Libraries. The University Libraries maintains nationally ranked collections in fisheries, forestry, East Asian languages and literature, Scandinavian studies, and Slavic and South Asian area studies. In addition to printed books and periodicals, the Libraries' holdings include e-books and e-journals, archival materials and manuscripts, maps, newspapers, microforms, research reports, media materials, CD-ROMs, government publications, photographs, and architectural drawings.

The Libraries Information Gateway provides access to the UW Libraries Catalog, dozens of licensed databases (many of which are full text) covering a wide array of subjects, e-journals, links to Internet resources selected by UW Libraries subject specialists, tools, and UW Libraries self-initiated services like renewing checked-out material and requesting materials from other University Libraries units online. The Information Gateway is accessible from all Libraries locations or from anywhere in the world at www.lib.washington.edu.

The Suzzallo and Allen Libraries, a combined facility, house the major social sciences and humanities collections. The Suzzallo Library serves as the central acquisitions and processing unit of the campus libraries system and contains the interlibrary borrowing service, fee-based document delivery service (Library Express), and the public-service divisions of Government Publications, Map

Collections, Microform and Newspaper Collections, Reference and Research Services, Periodicals, and International Studies (Near East, Slavic and Eastern Europe, South Asia, and Southeast Asia). Reference and research assistance is available during most library hours. The 1925 and 1935 sections of the Suzzallo Library, including the beautiful Suzzallo Reading Room, have been closed since 2000 for seismic renovation, but will open again in the fall of 2002. The Allen Library houses the Natural Sciences Library, and Manuscripts, Special Collections, University Archives, which includes the Pacific Northwest Collection. The University Libraries' administrative offices are located also in Allen.

The Odegaard Undergraduate Library (OUGL) supports undergraduate teaching and learning through an extensive collection of books, periodicals, and media; collaborative learning spaces; specialized reference services; and general-access computing. The collection is interdisciplinary, with an emphasis on materials in the social sciences and the humanities. OUGL is the primary reserve unit for non-health-sciences classes. Many reserve materials are available electronically through the Libraries Catalog or MyUW (myuw.washington.edu). Media services and materials for course-related usage are provided in the University Libraries Media Center in OUGL. The UWired Commons is a 365-seat general-access computing facility in OUGL. OUGL librarians also offer classes on how to use the library, including computerized indexes and search strategies for term papers.

The Health Sciences Libraries (HSL) house the largest and most comprehensive collection of health-sciences materials in the Pacific Northwest at three locations: Health Sciences Library and Information Center, located in the Health Sciences Center; the Social Work library, located in the School of Social Work; and the K.K. Sherwood Library at Harborview Medical Center. HSL supports education, research, and patient care in the fields of dentistry, medicine, nursing, pharmacy, public health, and social work, as well as in the related behavioral, biological, and quantitative sciences. In addition to a print collection of 350,000 volumes, the libraries offer access to a wide range of non-print resources and provide extensive user services, including curriculum-based instructional support; interlibrary loan services for health-sciences personnel, and document delivery services for affiliates and non-affiliates. HSL serves as headquarters for the National Network of Libraries of Medicine/Pacific Northwest Region (NN/LM PNR), with responsibility for promoting access to biomedical information resources in Alaska, Idaho, Montana, Oregon, and Washington. In partnership with the Health Sciences Center, HSL houses the Integrated Advanced Information Management System Program, the Research Funding Service, the Primate Information Center, the Bioinformatics Consultation Service, and the Health Services Microlab.

The East Asia Library is one of the major resource centers of its kind in the United States and is an international leader in the provision and development of electronic services for its subject areas. The collections are especially strong in anthropology, archaeology, economics, history, art, languages, literature, law, music, political science, religion, and sociology with respect to the histories and cultures of China (including Taiwan and Hong Kong), Japan, Korea, Inner Asia, and Tibet.

Fifteen subject-oriented branch libraries, generally located in close proximity to the schools, colleges, and departments they serve, provide a wide range of library services to faculty, students, and staff. Larger branches include the business, engineering, music, and natural sciences libraries.

University Research Facilities

 www.washington.edu/research/

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

University Theatres

 asc.arts.washington.edu/drama/season.html

The School of Drama operates three theatres: the Playhouse, with a thrust stage; the Penthouse Theatre, the first theatre-in-the-round built in America; and Meany Studio Theatre, which seats 225. Faculty- and student-directed plays drawn from the full range of world dramatic literature are presented throughout the year.

The School also gives technical and design support to opera and dance productions of the School of Music and the Department of Dance.

Women's Center

 depts.washington.edu/womenctr/

The Women's Center, located in Imogen Cunningham Hall, promotes the advancement of women on campus and in the community by offering a wide variety of non-credit workshops and classes including college success classes

(GRE preparation courses, computer, and writing classes); career and financial classes; fitness, health, and creativity classes; the Noontime Lecture Series; the Women for the Common Good lecture series; the Distinguished UW Women's Scholar Series; and the Feminist Research and Activist Forum. The Center provides services for women re-entering the University and houses a modest library with a job board and scholarship information.

Housing and Food Service

 www.washington.edu/hfs/

University-Owned Housing

Residence Halls

The UW provides housing for more than 5,300 students in eight residence halls. All are located within easy walking distance of classrooms and other campus facilities. Food service is available to residence hall students at locations throughout the campus through the use of the À La Carte Plus™ debit-card system. Students live in an environment of responsible freedom, and a residential-life staff enhances the University experience through a variety of educational, cultural, and social programs.

Single-Student Apartments

The University also has apartments available for single students, 20 years of age or older. Stevens Court provides four-bedroom apartments that have private bedrooms, a common kitchen and living room, and bathrooms. The Commodore-Duchess Apartments have studio apartments for single students.

Family Housing

Convenient apartment housing is available for about 500 student families.

For detailed information on housing or the Husky Card, visit the Housing and Food Services (HFS) Web site (above); email HFS at hfsinfo@u.washington.edu; write to the Student Services Office, Box 355842, Seattle, WA 98195-5842; or call 206-543-4059.

Food Service

University Food Services operates dining facilities throughout the campus. The diverse schedules and dietary preferences of the campus community are accommodated by providing full meal service, à la carte menu items, and catering services, as well as convenient hours of operation.

Food may be purchased through the Husky Card program at all University Food Services facilities and on-campus convenience stores. This program, available to the entire campus community, offers prepaid meal service through use of a debit card. The Husky Card (your UW ID card) provides the flexibility for purchase of food at many locations on campus. The card may also be used at the UW Bookstore and other UW facilities. For more information on the opening an account, call 206-543-7222, or visit the HFS Web site at www.washington.edu/hfs/.

Transportation and the U-PASS

 www.washington.edu/upass/

Walking and biking are the best ways to get to campus, but when you need another transportation method, use the U-PASS. The U-PASS program provides students with many benefits at a highly discounted price. With a U-PASS sticker, you get free rides on all regular Metro, Community Transit and Sound Transit Express bus service throughout the region, discounted rides on the Sounder commuter train service, free trips on the Night Ride shuttle, free parking when you drive with other U-PASS holders, subsidized vanpool fares, discounted bike helmets and light sets, and discounts at many local merchants. In addition, the U-PASS funds bicycle improvements, including more secure racks and lockers. The U-PASS sticker is sent with registration confirmation materials before each quarter.

Having a U-PASS provides many alternatives. Although expensive, parking is available for those students that must drive. An easy way to avoid paying for parking is to ride or drive with someone else. Two U-PASS holders in a car get free parking in the E1 lot (near the stadium) when they arrive between 7:00 and 10:00 a.m., and three U-PASS holders get free parking on the main campus. Other student parking is available for a daily fee in the E1 lot, which fills up quickly. A limited number of parking permits are available from Parking Services to commuter students on a first-come, first-served basis the first day of each quarter.

For more information, visit the U-PASS Web site at www.washington.edu/upass/ or contact the Transportation Office at upass@u.washington.edu or 206-543-0450.

Student Services

Office of the Vice President for Student Affairs

The Division of Student Affairs assists the University in fulfilling its academic mission by providing a broad range of services and programs designed to further the educational and personal development of students. The Division consists of ten units: Admissions and Records, Center for Career Services, Student Counseling Center, Disabled Student Services, Housing and Food Services, Recreational Sports Programs, Student Financial Aid, Student Publications, and Student Activities and Union Facilities.

Students are encouraged to contact the Office of the Vice President for Student Affairs, 206-543-4972, 476 Schmitz, for information concerning various aspects of extra-class life at the University.

Center for Career Services



depts.washington.edu/careers/

The University's Center for Career Services, which includes a Minority Job Placement Program, offers career information and services to assist undergraduates, graduate students, and alumni (1) to make a viable connection between their academic backgrounds and their career or long-range employment objectives, (2) to develop effective job-seeking strategies, and (3) to find suitable employment upon leaving the University or to change employment thereafter.

A variety of programs are offered and include individual and group career counseling, career options and job-search seminars, employer and alumni career panels, mock interviews a résumé database, career-related internships and career fairs, credential files, online job listings, campus interviews, employee information, and student employment listings (including on-campus jobs). Students may also send questions to ccsnslr@u.washington.edu.

Students are encouraged to begin using the services of the Center early in their academic careers. This is best accomplished by visiting the Center at 134 Mary Gates Hall or calling 206-543-0535 to make an appointment with a career counselor. The Center also maintains a Web site at depts.washington.edu/careers/.

Childcare Program



www.washington.edu/students/ovpsa/cc/

The Childcare Program provides eligible student-parents with direct financial assistance to purchase services at licensed childcare facilities in the Seattle-King County area. To apply, students must submit the Free Application for Federal Student Aid (FAFSA) to the designated processor by the end of February each year and a Childcare Request Application to the Childcare Office, 482 Schmitz, before the end of May each year. Brochures describing the program are available at the Childcare Office, 206-543-1041.

Student Counseling Center



depts.washington.edu/scc/

All currently enrolled, matriculated students at the University may make use of the services of the Student Counseling Center and its staff of psychologists and counselors to discuss educational progress, personal concerns, or career goals. Individual, couples, and group counseling is provided for a variety of issues including academic, career, personal, and social issues. Because of the number of students seeking help, the Center offers only short-term therapy. Psychological tests, when necessary, are provided as part of the Center's counseling service. Workshops on special topics such as test anxiety, time management, test taking, note taking, and stress management are available.

There is a \$15 fee for the first assessment appointment, which is provided to determine if the Student Counseling Center's services are appropriate. Individual appointments after the first visit currently cost \$30 each. For students financially unable to pay the fee, an extended-payment plan is offered. The Center is located on the fourth floor of Schmitz Hall, 206-543-1240. Additional information may be found at the Center's Web site.

Disabled Student Services

The University is committed to ensuring facility and program access to students with either permanent or temporary physical, sensory, or psychological disabilities through a variety of services and equipment. The Disabled Student Services (DSS) Office coordinates academic accommodations for enrolled students with

documented disabilities. Accommodations are determined on a case-by-case basis and may include classroom relocation, sign language interpreters, recorded course materials, note taking, and priority registration. DSS also provides needs assessment, mediation, referrals, and advocacy as necessary and appropriate. Requests for accommodations or services must be arranged in advance and require documentation of the disability, verifying the need for such accommodation or service.

Technical and adaptive equipment is available through both DSS and Computing and Communications. Information about adaptive-technology computer software and equipment and their locations on campus may be obtained from DSS. Publications include *Access Guide for Persons with Disabilities*, (showing classroom access, elevator locations, ramps, parking, and restrooms), and the *Campus Mobility Route Map*, as well as other publications.

To the maximum extent possible, students with disabilities are integrated into the general student population and their problems are solved through the usual channels. Various other departments offer additional services: the Transportation Department provides free on-campus transportation with wheelchair lifts for students with mobility limitations through Dial-a-Ride, 206-685-1511, and UW Night Ride, 206-799-4151 after 6 p.m.

Additional information is available from Disabled Student Services, 448 Schmitz, Box 355839, 206-543-8924 (Voice), 206-543-8925 (TTY), uwdss@u.washington.edu.

Student Health Insurance Program



www.washington.edu/students/ovpsa/insurance.html

An accident and sickness insurance plan is available to matriculated University students (Seattle campus) and dependents on a voluntary basis. A student may enroll in the plan at the time of registration through the seventh calendar day of each quarter. The appropriate premium is paid by the quarterly tuition due date. Brochures describing the insurance eligibility, coverage, and costs are available at the Student Insurance Office, 469 Schmitz, 206-543-6202; Hall Health Primary Care Center; and the HUB.

The University also sponsors a field-trip accident insurance plan. Application forms may be requested from the Risk Management Office, 22 Gerberding, Box 351276, 206-543-3419.

Insurance for Foreign Students

All students from foreign countries are required to have a health-and-accident insurance policy in force while registered at the University. This may be achieved by purchasing either the student accident and sickness insurance offered through the University or other coverage, proof of which must be furnished to the International Services Office and for which an insurance waiver must be obtained. To avoid cancellation of registration, international students must pay tuition and either pay for the University-sponsored insurance or have a waiver on file by the tuition due date.



International Services Office



www.washington.edu/students/gencaat/front/International.html

The International Services Office provides assistance to international students, scholars, and faculty in meeting United States Immigration and Naturalization Service regulations dealing with such matters as maintaining lawful status, extensions of stay, transfers of schools/programs, and working authorizations. The Office also provides a formal orientation to the campus and community for new international students and visiting faculty; advice and counsel for educational, financial, and personal problems; and dissemination of important and timely information through newsletters and workshops. The Office is located in 459 Schmitz, 206-543-0841.

Office of Special Services

The Office of Special Services, 460 Schmitz, assists students eligible for veterans' educational benefits, advises and monitors students who must meet English As A Second Language requirements, and administers certain tuition-reduction programs (see Procedures and Fees section).

Office of Student Financial Aid

The Office of Student Financial Aid, 105 Schmitz, administers federal, state, and private financial aid programs designed to help students pay for their education. Assistance is offered in the form of grant aid, scholarships, long-term loans that must be repaid after leaving school, and work opportunities. Information describing the different programs, eligibility criteria, and application procedures may be viewed on the Web at www.washington.edu/students/osfa/ or may be obtained by calling 206-685-9535.

There is a limited amount of grant aid for graduate students and assistance is generally limited to long-term loans and work opportunities. Information on graduate fellowships, scholarships, and teaching and research assistantships may be obtained from the graduate program coordinator in the individual department or program (see the Graduate School section of this catalog).

To be eligible for financial aid, an individual must be a citizen or permanent resident of the United States and be admitted to the University as a matriculated, degree-seeking student. Priority consideration is given to students who apply before the University's financial aid application deadline of February 28 (e.g., February 28, 2002, for the academic year beginning in September 2002).

The Office of Student Financial Aid also administers a short-term loan program for full-time students who find themselves in temporary financial difficulty. University students may take advantage of the short-term loan program without applying for financial aid.

Student Legal Services



www.washington.edu/students/handbook/legal.html

Student Legal Services (SLS) provides legal advice, counseling, negotiating, and court representation in many civil and criminal matters. All currently enrolled undergraduate and graduate students at UW Seattle are eligible for a free initial consultation. If additional services are needed, there is an hourly charge of \$15, plus a \$10 office supply fee. Students are responsible for court costs, if any. The office is staffed by third-year law students supervised by licensed attorneys. To make an appointment or learn more about SLS, call 206-543-6486 or visit the office, 31 Brooklyn Building, Box 354563, 4045 Brooklyn Avenue NE. No legal advice is given over the phone.



Student Publications



www.washington.edu/students/studentdir.html
www.thedaily.washington.edu

Student publications at the University include *The Daily* and the *Student Directory*. *The Daily* is published Monday-Friday throughout the academic year and is distributed in the mornings 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 Union Facilities



depts.washington.edu/sauf/

The Husky Union Building (Student Union Building) and the South Campus Center are the principal centers of student activities and programs on the campus.

Husky Union Building

The Husky Union Building (HUB), located in the center of campus, houses a variety of facilities and services for students, and faculty and staff members. These include lounges, a 478-seat auditorium, a multipurpose ballroom, a barber and hair-styling shop, a branch of the University Book Store, several retail food operations, a study/music lounge with email access, a lost-and-found office, a ticket sales office, a newsstand, a self-service post office, a limited-service bank, three cash machines, a number of student-organization offices, and a games area which includes a twelve-lane bowling center. Meeting rooms accommodating from 10 to 175 persons are available for registered student organizations.

South Campus Center

The South Campus Center, located on the shore of Portage Bay, serves as the central meeting place for students and faculty on the southern end of campus. Facilities and services similar to those in the HUB are available and include meeting and conference rooms, display cases, a hair-styling shop, amusement games, a cash machine, a branch of the University Book Store, a newsstand, and lounges with beautiful views of Portage Bay.

Student Activities and Organizations

Student Activities Office

The services provided by the Student Activities Office (SAO) include assisting student organizations in understanding University policies and procedures, providing technical help in the planning and conduct of student events, and furnishing information and assistance in order that they may represent themselves and their interests in an effective manner. Advisers are available to assist students involved in group activities with budget and program planning, advertising, orientation to campus resources, and leadership and organizational skill development. Underlying the SAO service functions is a desire to provide an environment in which students can learn from their experiences in extracurricular activities as a supplement to their classroom experiences. Additional information about the services is available from the Student Activities Office, 207 HUB, 206-543-2380.

Student Organizations



depts.washington.edu/sao/

Students at the University are encouraged to become active in at least one of the campus's approximately 450 voluntary student organizations, which include honorary, professional, and social organizations; service clubs; activity groups; and religious and fraternal organizations. Voluntary student organizations that register with the University receive various benefits and services to assist their respective activities. Additional information is available from the Student Activities Office, 207 HUB, 206-543-2380.

Associated Students of the University of Washington



depts.washington.edu/asuweb/

The Associated Students of the University of Washington (ASUW) is a voluntary, nonprofit association of students designated by the University Board of Regents to carry out a variety of student activities and to represent student interests. In order to vote in ASUW elections, hold ASUW office, or be employed by the ASUW, a student must be a member of the ASUW. Membership is open to all students by providing an affirmative answer on the University registration form each quarter.

The ASUW has an annual budget of approximately \$1 million, supported by the services and activities fee paid as part of tuition and from program revenue. The government of the ASUW is headed by an eleven-member board of directors elected by the student body each year, and one representative from the Graduate and Professional Student Senate. The ASUW maintains agencies and



service groups to provide students with a varied program of activities during the school year and nominates students for service on a number of University committees. ASUW services include the Experimental College, a bicycle repair shop, and an ongoing film and entertainment series. Questions regarding the ASUW and its services should be directed to either the ASUW Office, 204L HUB, 206-543-1780, or the Student Activities Office, 207 HUB, 206-543-2380.

Graduate and Professional Student Senate

 depts.washington.edu/gpss/

The Graduate and Professional Student Senate (GPSS) serves primarily as an advocate for the academic welfare of graduate and professional students. It is composed of representatives elected from each graduate and professional degree-granting unit. Funded from student services and activities fees, GPSS dedicates a portion of its budget each year to direct allocations for departmental student groups and for special programs benefiting students from many departments. GPSS publishes informational bulletins, monitors legislative issues of impact to graduate students, maintains graduate student representation on University administrative committees, assists with personal or academic grievances and, in general, seeks to represent graduate student issues and concerns within the University community. Questions regarding the GPSS should be directed to the GPSS Office, 300 HUB, 206-543-8576.

Recreational Sports

 depts.washington.edu/ima/

The Department of Recreational Sports Programs provides a comprehensive program of more than seventy sports and fitness activities designed to meet the diverse needs and interests of students. To provide this service, the department manages recreation facilities that include the Intramural Activities Building (IMA), Golf Driving Range, Waterfront Activities Center (canoe rentals), outdoor facilities (Denny Field and tennis courts), Hutchinson Hall swimming pool and locker rooms, and the practice Climbing Rock. Programs and facilities are open to students with a valid student identification card (Husky card).

For additional information call the telephone numbers listed below, or visit the Recreational Sports Web site at depts.washington.edu/ima/.

Intramural Activities Building: The IMA is located north of Husky Stadium and south of parking lot E1. The IMA includes activity space for basketball, volleyball, badminton, swimming, squash, racquetball, handball, martial arts, aerobics, archery, and roller skating. The IMA has a fitness center with free weights, weight machines, and cardiovascular machines. Located near the IMA are 13 tennis courts (seven are night lit), and three multipurpose sports fields for flag football, softball, soccer, rugby, lacrosse, ultimate, and other outdoor activities. For more information, contact the IMA at 206-543-4590 or ima@u.washington.edu.

The **fitness center** is equipped with 18 climbers, 24 treadmills, 12 recumbent cycles, 12 stationary cycles, 21 cross trainers, six ergometers, 62 single-station weight machines, 40 strength benches, a step mill, and Olympic weights, including barbells and dumbbells.

Sports Skills Instruction: Recreational Sports offers non-credit classes in aikido, aerobics, step aerobics, hydro-aerobics, deep-water fitness, Abs, body

composition, conditioning, first aid and CPR, golf, judo, karate, kung fu, racquetball, rock climbing, rowing, scuba diving, ski conditioning, snow skiing/snowboarding (indoor), squash, swim conditioning, swimming, tae kwon do, tai chi, tennis, weight training, and yoga. For more information, call Sports Skills Instruction at 206-543-2571.

Club Sports: Recreational Sports offers club sports, including aikido, archery, climbing, cycling, equestrian, fencing, ice hockey, judo, karate, kayaking, kendo, kung fu, lacrosse (men's and women's), rowing, rugby, sailing, scuba diving, snow skiing, soccer, tae kwon do, ultimate Frisbee (men's and women's), volleyball (men's and women's), and water polo (men's and women's). For more information, contact Club Sports at 206-543-9499.

Intramural Sports are offered for men, women, and men and women combined in a variety of activities, including basketball, bowling, crew, flag football, inner-tube basketball, soccer, softball, swimming, tennis, track and field, ultimate Frisbee, and volleyball, as well as special events. For more information, call Intramural Sports at 206-543-8558.

The **Golf Driving Range** is located at the foot of the 45th Street viaduct and is the center for all golf activities on campus. The facilities include 43 hitting tees, and two putting and chipping greens, and are open seven days a week. Group lessons are available for beginning players. For more information, contact the Golf Driving Range at 206-543-8759 or seagren@u.washington.edu.

Waterfront Activities Center (WAC): The campus center for water sports (e.g., canoe rentals, sailing, kayaking, rowing) is located at the WAC southeast of Husky Stadium. The WAC offers locker rooms with saunas, private boat storage for non-motorized craft, and group rental of the lounge and meeting rooms. The facility is open from 10 a.m. to dusk, seven days a week. For more information, contact the WAC at 206-543-9433 or h2o@u.washington.edu.

Student Rights and Responsibilities

Student Conduct Code

 www.washington.edu/students/handbook/conduct.html

The University Board of Regents has adopted a *Student Conduct Code*, which applies to both the academic and nonacademic conduct of students while they are attending the University. The *Code* specifies standards of conduct, jurisdiction for hearing disciplinary matters, and due-process procedures. Students may obtain copies of the code through either their advisers or the Office of the Vice President for Student Affairs, 476 Schmitz.

Computer Use Policy

 www.washington.edu/computing/rules/

All faculty, staff, and students who use any computer at the University are responsible for using computer resources in an ethical and legal manner. For example, it is not appropriate to share computer accounts or use them for commercial purposes, to send unwanted email, or to distribute copyrighted software, music, or images. Those who do not follow the rules could lose their UW computing privileges. For detailed information see the Web, or contact Computing and Communications Information at 206-543-5970.

University Policy on Student Education Records

 www.washington.edu/students/reg/ferpa.html

A copy of the University's policy on a student's right to inspect his or her education records and the University's responsibility to maintain the confidentiality of such records is located at each departmental reference station. The policy is filed under the Washington Administrative Code 478-140-010. Copies of the policy are available at the Registration Office, 225 Schmitz.

Sexual Harassment Complaint Procedure

 www.washington.edu/students/handbook/harrass.html

Students, staff, faculty, and other users of University services who have a concern or complaint regarding sexual harassment may contact either the Ombudsman for Sexual Harassment, 206-543-0283, or the University Complaint Investigation and Resolution Office, 206-616-2028. Personnel in these offices provide assistance in resolving concerns and complaints. Also, University staff may contact their human resources representative about sexual harassment concerns.

The Office of Research

Acting Vice Provost for Research

Malcolm R. Parks

Associate Vice Provost for Research

E. James Davis

Director, Grant and Contract Services

Carol A. Zuiches



www.washington.edu/research/

The Office of Research provides a range of services in support of scholarly and scientific inquiry at the University of Washington. The Vice Provost for Research works with faculty to establish appropriate research policies, develop research-related initiatives, increase resources available for research, and guarantee that the successes of faculty and the public benefits of research programs are widely known and understood. The Office of Research cooperates with the Graduate School and other units within the University that depend on or are affected by the research and graduate education activities of UW faculty. The Office of Research also serves as a point of contact with the public and private sectors on issues relating to research, including the solicitation of corporate research support. The Office of Research works with the Office of Intellectual Property and Technology Transfer (OIPTT) to facilitate the transfer of research discoveries, and the promotion of economic development.

The Office of Grant and Contract Services (GCS) reviews and approves all proposals to outside agencies for support of UW research. The Director of GCS is responsible for negotiating the terms and conditions for grants and contracts in consultation with the principal investigator and appropriate UW administrators. All grant and contract awards received by the University are communicated to GCS, which maintains a historical record of grant activity. GCS is also responsible, through its Human Subjects Division, for managing the human subjects review process at the University in cooperation with University's Human Subjects Review Committees.

Funding for UW Research

External Support for Research and Training is fundamental to the UW's established role as one of the nation's leading research institutions. During fiscal year 2001, the University received roughly \$707 million in grant and contract support for a wide array of research and training programs. Since the late 1960s, the University has ranked among the top five institutions in the United States in the receipt of federal research awards. About 80 percent of the University's grant and contract funds comes from federal agencies, most of the remainder coming from foundations, industry, and other private sources. These funds are awarded in response to faculty-initiated, University-approved proposals for funds to support specific projects in accord with the University's research, education, and public-service goals. Grant and contract funding supports about 5,900 full- and part-time employees and provides significant opportunities for students who work with faculty members in the conduct of research as a vital component of their education.

In addition to federal research funding, corporations provide an increasing amount of funding for research. Last year, the UW received more than \$44 million in corporate research awards. Private gifts to the University total more than \$103 million per year and also add significantly to the opportunities of students and faculty to pursue research interests.

Internal Support for Research at the UW is based in part on the principle of directing revenue that arises from UW research discoveries back into the University's research enterprises. The Office of Research administers the Royalty Research Fund (RRF), which is derived from the UW's central share of royalty and licensing income negotiated by OIPTT and the Washington Research Foundation with companies that commercialize University technologies. The goal of the RRF is to stimulate additional scholarly initiatives, to encourage faculty to explore new directions in research and scholarship, and to improve the environment for intellectual endeavors at the University. Proposals must demonstrate a high probability of generating important new scholarly materials or resources, significant data or information, or essential instrumentation resources that are likely to lead to external funding or that might lead to a new technology.

The RRF guidelines, procedures, and application forms are available from the Office of Research.

Special Facilities

In support of scholarship, research activities, and regular academic offerings, the University maintains a wide range of special facilities that provide unique educational opportunities. The following list is illustrative of the range and diversity of special facilities at the UW.

Applied Physics Laboratory

A research and development organization within the College of Ocean and Fishery Sciences, APL is one of four university research centers in the United States affiliated with the U.S. Navy. APL conducts a program of fundamental research, technology development, engineering, and education, emphasizing naval applications of ocean and polar science, acoustics, and engineering. APL has a \$30 million annual research and development budget. The staff conduct research for the Navy, NSF, NASA, NOAA, ARPA, and other federal agencies and who participate in partnerships with private companies. In addition, about 60 graduate and undergraduate students participate in research at APL.

Burke Memorial Washington State Museum

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

Henry Art Gallery

The Henry Art Gallery is a major art museum serving the campus community and the public. The newly renovated gallery contains a number of art galleries, study and research laboratories, and an auditorium.

Friday Harbor Laboratories

The Friday Harbor Laboratories facility is the principal marine-science field station of the University of Washington. Its faculty is drawn from various academic units of the University, including botany, fisheries, oceanography, and zoology, as well as visiting faculty members from many other U.S. and foreign institutions.

The Laboratories, located approximately 80 miles north of Seattle near the town of Friday Harbor on San Juan Island, offer a biological preserve of nearly 500 acres of wooded land with about two miles of shoreline. The island is one of the largest of the 172 that make up the San Juan Archipelago, located in the northwest section of the state of Washington between Vancouver Island and the United States mainland. In addition to the Friday Harbor site, the Laboratories' administration has the responsibility for overseeing biological preserves leased or owned by the University on San Juan Island and Lopez Island. Goose and Deadman islands, biological preserves owned by the Nature Conservancy, are also under the stewardship of the Laboratories.

The Laboratories are located close to seawaters that range from oceanic to those highly diluted by streams, some with depths to 1,000 feet, others with bottoms varying from mud to rock, and water movements ranging from those of quiet bays and lagoons to those of swift tideways. The waters about the San Juan Archipelago abound in varied marine flora and fauna.

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

Nuclear Magnetic Resonance Facility

The UW has one of the most advanced facilities for nuclear magnetic resonance (NMR), with high-field superconductivity magnets capable of investigating biomolecules, macromolecules, and solid state samples at frequencies of 500 MHz for protons. The UW also has a state-of-the-art 750 MHz spectrometer.

Center for Experimental Nuclear Physics and Astrophysics

The Center for Experimental Nuclear Physics and Astrophysics (CENPA) supports a broad range of experimental physics research. Investigators do basic research using in-house accelerators and are also engaged in non-accelerator research in solar neutrino physics in collaboration with investigators in Canada and Russia.

Oceanographic Research Vessels

These are operated for field study and research in Puget Sound and the Pacific Ocean. Of particular note is the R/V Thomas G. Thompson, a modern vessel capable of multidisciplinary research in most oceans of the world.

Speech and Hearing Clinic

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

University of Washington Medical Center/Harborview Medical Center

The University operates two major teaching hospitals: its own 450-bed University of Washington Medical Center and, under contract with King County, the 351-bed Harborview Medical Center.

University Libraries

With nearly six million volumes, an equal number of microforms, several million items in other formats, and more than 50,000 serial titles, the University of Washington Libraries houses one of the top research collections in the country and forms a part of one of the most innovative electronic campus information networks in the world. The fully integrated, computerized UW Libraries Catalog provides bibliographic information and circulation status for the cataloged holdings of the Libraries. The UW Libraries Catalog and an increasing number of other databases (ERIC, MEDLINE, INSPEC, PsychINFO, MLA Bibliography, etc.) may be searched by author, title, subject, publisher, keyword, and various numbers, including call number, International Standard Book Number (ISBN), International Standard Serial Number (ISSN), and Superintendent of Documents Number. Publication date and date ranges are among the limit options available.

The UW Libraries Information Gateway provides access through a single World Wide Web location to all the Libraries' resources, print and electronic, as well as tools, services, and the ability to search a wide range of Internet resources. For more information, call Reference and Research Services, 206-543-0242, or consult the Libraries' Web site (www.lib.washington.edu).

The Libraries also offer an extensive array of services at each of its 22 units. The Suzzallo and Allen Libraries, the Odegaard Undergraduate Library, the Health Sciences Library and Information Center, the East Asia Library, and 15 branch libraries each provide reference services and offer instruction in the use of library resources.

X-Ray Beamline Facility

Located at the Advanced Photon Source of the Argonne National Laboratory in Argonne, Illinois, this facility is operated by a Pacific Northwest consortium led by the UW. It supports the investigation of the properties of x-rays and their interaction with matter. The Advanced Photon Source uses synchrotron radiation to provide the most brilliant source of x-rays currently available.

Centers, Institutes, and Other Research Organizations

More than 170 centers, institutes and other organizations operate at the UW in support of faculty research activity. In many cases, centers and institutes are created to facilitate interdisciplinary research or to coordinate research involving many participants, some from outside the UW community.

Addictive Behaviors Research Center
 Advanced Power Technologies Center (APT)
 Aerospace & Energetics Research Program
 Alcohol and Drug Abuse Institute
 Alzheimer's Disease Research Center
 APEC Internet Collaboration Center
 APEC Study Center
 AVID Clinical Trial Center
 Behavioral Research and Therapy Clinics (BRTC)
 Biomolecular Structure Center
 Bone and Joint Center
 Canadian Studies Center
 Cardiovascular Research and Training Center
 Cascade Center for Public Service
 Cascadia Community and Environment Institute (CCEI)
 Center for Advanced Research Technology in the Arts and Humanities (CARTAH)
 Center for Advanced Study and Research on Intellectual Property (CASRIP)
 Center for AIDS and STD
 Center for AIDS Research
 Center for American Politics and Public Policy
 Center for Anxiety and Depression

Center for Applied Microtechnology (CAM)
 Center for Child Environmental Health Risks Research
 Center for Clinical Research
 Center for Clinical Research of Epilepsy
 Center for Community Development and Real Estate
 Center for Cost and Outcomes Research (CCOR)
 Center for Design of Analog-Digital Integrated Circuits (CDADIC)
 Center for Disability Policy and Research
 Center for Ecogenetics and Environmental Health
 Center for Educational Renewal
 Center for Effective Schools
 Center for Engineering, Learning, and Teaching (CELT)
 Center for Environmental Design and Education
 Center for Health Education and Research
 Center for Health Management Research
 Center for Inherited Diseases
 Center for Instructional Development and Research
 Center for Intelligent Materials and Systems (CIMS)
 Center for International Business Education and Research (CIBER)
 Center for International Trade in Forest Products (CINTRAFOR)
 Center for Internet Studies
 Center for Labor Studies
 Center for Law, Commerce, and Technology
 Center for Medical Education Research
 Center for Multicultural Education
 Center for Nanotechnology
 Center for Process Analytical Chemistry (CPAC)
 Center for Social Science Computation and Research (CSSCR)
 Center for Streamside Studies
 Center for Studies in Demography and Ecology
 Center for Studies in Social Psychology
 Center for Sustainable Communities
 Center for the Study and Teaching of At-Risk Students (C-STARS)
 Center for the Study of Teaching and Policy
 Center for the Study of the Pacific Northwest
 Center for Urban Horticulture
 Center for Urban Water Resources Management
 Center for Vascular Biology
 Center for Videoendoscopic Surgery (CVES)
 Center for West European Studies
 Center for Women's Health Research
 Center of Excellence for Chemically-Related Illness
 Center on Human Development and Disability
 Center on Reinventing Public Education
 Child Health Research Center
 Clinical Nutrition Research Unit
 Columbia Basin Research
 Comprehensive Center for Oral Health Research
 Consortium for Risk Evaluation with Stakeholder Participation
 Core Center for Gene Therapy
 Cystic Fibrosis Center
 Dart Center for Journalism and Trauma
 deTornyay Center for Healthy Aging
 Diabetes Endocrinology Research Center
 Diagnostic Imaging Sciences Center
 East Asian Studies Center
 Electron Microscopy Consortium
 Engineering Center for Surfaces, Polymers, and Colloids
 EPA Northwest Research Center for Particulate Matter and Health
 European Union Center
 Fetal Alcohol and Drug Unit
 Field Station for Protected Area Research
 Fiscal Policy Center
 Fisheries Research Institute
 Friday Harbor Laboratories
 General Clinical Research Center
 George M. O'Brien Kidney Research Center
 George Taylor Institute
 George M. O'Brien Research Center
 Geriatric Research, Education, and Clinical Center
 Halbert Robinson Center for the Study of Capable Youth
 Harborview Center for Sexual Assault and Traumatic Stress
 Harborview Injury Prevention and Research Center
 Human Interface Technology Laboratory (HIT LAB/HITL)
 Human Services Policy Center (HSPC)
 Institute for Economic Research
 Institute for Ethnic Studies in the United States
 Institute for International Policy
 Institute for Nuclear Theory (INT)
 Institute for Public Policy and Management
 Institute for Risk Analysis and Risk Communication
 Institute for the Study of Educational Policy

Institute on Aging
 Intelligent Transportation Systems (ITS)
 International Studies Center
 Joint Institute for the Study of the Atmosphere and Ocean (JISAO)
 Markey Center for Genetic Medicine
 Markey Molecular Medicine Center
 Middle East Studies Center
 Multidisciplinary Pain Center
 Nathan Shock Center of Excellence for the Basic Biology of Aging
 National Alzheimer's Coordinating Center
 National ESCA and Surface Analysis Center for Biomedical Problems (NESAC/BIO)
 National Research Center for Statistics and the Environment
 National Simulation Resource in Circulatory Mass Transport and Exchange
 Northwest Center for Occupational Health and Safety
 Northwest Center for Public Health Practice
 Northwest Center for Research on Women
 Northwest Policy Center
 Northwest Prevention Effectiveness Center (NWPEC)
 Northwest Regional Spinal Cord Injury System
 Olympic Natural Resource Center
 OSHA Training Institute Education Center
 Pacific Earthquake Engineering Research Center
 Pacific Northwest Agricultural Safety and Health Center
 Pacific Northwest Consortium-Collaborative Access Team (PNC-CAT)
 Pacific Rim Finance Center
 Pain Clinical Research Center
 Pediatric Epilepsy Research Center
 Pharmaceutical Outcomes Research and Policy Program
 Polar Science Center
 Poplar Molecular Genetics Cooperative
 Population Research Center
 Program in Drug Interactions
 Puget Sound Blood Center and Program
 Quaternary Research Center
 Regional Clinical Dental Research Center
 Regional Epilepsy Center
 Regional Primate Research Center
 Resource Facility for Kinetic Analysis
 Robert Wood Johnson Clinical Scholars Program
 Russian, East European, and Central Asian Studies Center (REECAS)
 School Law Division
 Science and Technology Center for Molecular Biotechnology
 Sexually Transmitted Diseases Cooperative Research Center
 Simpson Center for the Humanities
 Social Work Prevention Research Center
 South Asian Studies Center
 Southeast Asian Studies Center
 Specialized Center of Research (SCOR): Adult Respiratory Failure
 Stand Management Cooperative (SMC)
 Transportation Northwest (TransNow)
 Treaty Research Center
 University of Washington Engineered Biomaterials (UWEB)
 UW Health Policy Analysis Program
 UW Hepatitis C Cooperative Research Center
 Virginia Merrill Bloedel Hearing Research Center
 Volcano Systems Center
 W. M. Keck Center for Advanced Studies in Neural Signaling
 Warren G. Magnuson Institute for Biomedical Research and Health Professions Training
 Washington Cooperative Fish and Wildlife Research Unit
 Washington Sea Grant Program
 Washington State Transportation Center (TRAC)
 Western Regional Aquaculture Center (WRAC)
 WWAMI Rural Health Research Center

Field Stations

Field work is an essential component of research and instructional programs in many academic disciplines, and access to appropriate field sites is vital and necessary for research universities. Detailed information about each of the University's research sites is available in *University of Washington Field Stations*, an inventory available from the Office of Research. The following list of 30 sites represents a broad spectrum of types and locations.

Apache Point Observatory, Archaeology Field School, Big Beef Creek, Blue Glacier, Cheeka Peak Atmospheric Research Station, Chignik Lake, Clifford A. Barnes Research Vessel, Energy Test Homes, Friday Harbor Laboratories, Joe E. Monahan Findlay Lake Reserve, Lake Iliamna and Porcupine Island, Lee Forest, Manastash Ridge Observatory, Olympic Natural Resources Center,

Organization for Tropical Studies, Pack Forest, Regional Primate Research Center, Rome Center, Seismic Network, Seward Park Hatchery, Thomas G. Thompson Research Vessel, Thompson Research Site, Union Bay Ecological Research Area, University of Washington Aircraft Hangar, Washington Park Arboretum, Westport House, Wind River Canopy Crane Research Facility, Wood River System.

The Impact of UW Research

Research programs at the UW benefit students, the state, and the nation. Over the last decade, these programs have produced life-saving advances in medical technology, support for key state and regional industries, research and analysis on critical public-policy issues, patented technologies, training for more than 10,000 graduate and professional students each year, as well as contributions to scholarly literature in virtually all major fields of the arts, sciences, and humanities. The following sections contain brief descriptions of a few of the many interesting research projects currently underway at the UW.

Earth, Ocean, and Atmospheric Sciences

UW earth scientists have a long tradition of concentrating on regional studies to learn more about the forces that continue to shape the Pacific Northwest. Recent evidence suggests that great earthquakes of magnitude 7 or 8 have occurred in the Pacific Northwest in the not-too-distant past, and are likely to recur at some time in the future. Data gathered from a network of seismic stations throughout the Pacific Northwest are permitting new faults in the region to be mapped and characterized. The first three-dimensional images of structures within the earth in this region are being generated. Lessons learned from seismic studies since the eruption of Mount St. Helens are being applied to eruptive activity around the globe, from Alaska to Mount Pinatubo in the Philippines. Additionally, extreme conditions deep inside the earth are simulated in the UW High Pressure Mineral Physics Lab in order to understand the geologic processes that shape our planet.

Underwater observing platforms have been installed to monitor volcanic activity on the sea floor more than a mile and a half below the surface of the Pacific Ocean off the coast of Washington state. These undersea volcanoes and hydrothermal vents spew out heated, mineral-laden waters that nourish exotic life forms and form rich metal deposits. The heat-loving organisms, capable of existing without light from the sun, are among the most ancient forms of life on earth.

UW scientists have long been interested in polar research, including both the Arctic and the Antarctic. The University is one of the major centers in the world for studies of ocean currents, ice formation, ice movement, and air-sea-ice interaction in these regions. UW personnel have developed unusual expertise for operating in polar regions. Through the Applied Physics Laboratory, UW investigators regularly conduct studies from bases sited on Arctic pack ice and have deployed a series of weather buoys on the ice and in Arctic waters that form part of a worldwide weather-forecasting system.

An ice core containing an unprecedented record of climate conditions in a near-coastal area of Antarctica has been obtained by scientists in the UW Quaternary Research Center. The ice sample, which goes back 140,000 years through a complete ice-age cycle, was taken at Taylor Dome, the site of major changes in glacier cover that affected sea level at the end of the last ice age.

Work by UW atmospheric scientists has established the role of sulfate aerosol in global climate change. Other studies are shedding light on past and future El Niño weather events—intervals of especially warm ocean temperature that periodically appear around December in the equatorial Pacific and that disrupt weather patterns around the globe. UW researchers have developed a theoretical understanding of the mechanisms that give rise to the El Niño phenomenon. Cores obtained from coral formations in the Pacific provide a record of past El Niño events and may lead to more accurate forecasts of these weather changes in the future.

UW atmospheric scientists pioneered the study of clouds and weather systems by flying into the heart of storms approaching the Washington coast. Now, aeronautical engineering researchers at the UW will be able to gather weather data using a fleet of unmanned airplanes. With the advent of global positioning satellite technology, these unmanned aircraft can be piloted by computer on flights of more than a thousand miles to gather data to improve the accuracy of north-west weather forecasts.

The School of Fisheries, renowned for the development of the Donaldson salmon as well as for its contributions to the High Seas Salmon Program and Alaska Salmon Program, also has made many important contributions to the development of shellfish aquaculture in Puget Sound and around the world. The triploid oyster, prized for its superior characteristics, was developed by UW fisheries researchers.

The Columbia River Salmon Passage model, or CRISP, is a computer model that relates the number of juvenile salmon that survive their journey through reservoirs and dams on the Columbia River to various parameters such as hatchery release dates, reservoir levels, and water flow rates. The model may help fishery biologists and planners understand the complex implications of river management decisions.

Physical and Chemical Sciences

Extremely high precision measurements of atomic properties are the forte of a strong atomic physics group, which brought recognition in the form of a Nobel Prize awarded to Professor Hans Dehmelt in 1989. Later, the University won a competition sponsored by the Department of Energy for its first Nuclear Theory Institute. Since that time, a distinguished staff and an international visitor program have made the University a center for research in fundamental nuclear physics and associated problems in astrophysics and particle physics.

The University has been a leader in the development and use of XAFS, a sophisticated x-ray tool for determining the structure of materials. Physicists studying condensed matter are engaged in the development of the Advanced Photon Source, a high-energy x-ray source that will be the most intense in the world. With this source it will be possible to carry out detailed studies of topics such as the growth and structure of liquid-crystal films; the structure on an atomic scale of proteins and new, specially tailored drugs; and the structure of thin films, ranging from one atom thick to multiple-layered heterostructures with many layers of atoms.

Astronomers at the University conduct research in a wide variety of astronomical subjects, from the study of solar system bodies to the nature of the universe. The UW's Interplanetary Dust Laboratory has pioneered the discovery and study of cometary and asteroidal dust. The Stardust mission led by UW astronomer Don Brownlee will gather and return samples of interstellar dust from a comet called Wild-2 in January 2004. Stardust, which was selected by NASA as the fourth flight mission in its Discovery program, was launched on an expendable launch vehicle in February 1999. The return capsule carrying the comet dust samples will parachute to Earth in January 2006.

The University is part of a consortium that has constructed a 3.5-meter optical telescope located at Apache Point in the New Mexico mountains. An innovative design made this telescope lighter and more inexpensive to build than previously possible. One of the largest university-operated telescopes in the country, faculty and students can access it remotely from a laboratory in the new Astronomy-Physics Building on the UW campus.

UW astronomers have also used the Hubble Space Telescope to probe the secrets of stellar evolution, deriving a fresh understanding of the way that stars are born, change, and die. Scientists explore the nature of galaxies and their mysterious content of "dark matter." Other studies range from the nature of cos-

mic black holes to mergers and violent collisions of galaxies, and quasar phenomena.

Basic research in the chemical sciences is aided by exceptional research tools. The Department of Chemistry is collaborating with Pacific Northwest National Laboratory, Richland, Washington to construct a 1,000-megahertz nuclear magnetic resonance (NMR) spectrometer which will provide an instrument of unprecedented power for probing molecular structure. The University also has state-of-the-art equipment for studies involving magnetic resonance imaging (MRI), used by health researchers studying complex biological processes.

The Center for Process Analytical Chemistry is a joint University/industry effort to develop novel sensors and instrumentation for continuous monitoring of chemical processes used in the manufacturing and environmental settings. Projects range from fiber-optic sensors and spectrometric methods to data analysis and process-control algorithms. Research results from the Center transferred to industrial sponsors have led, for example, to a commercial, online, near-infrared spectrometer for determining quality parameters of hydrocarbon fluids.

Engineering and Applied Sciences

A group of UW engineering researchers working in the field of biomimetics is taking its inspiration from nature in designing new materials. The group is probing the secrets of such natural substances as slug mucus, spider webs, and abalone shells in order to produce man-made materials that are stronger, lighter, less expensive, and more environmentally benign to manufacture than conventional materials.

The Washington Technology Center (WTC) is a state resource, established in 1983 with funding from the combined Department of Community and Economic Development. It was created to encourage collaborative industry-University research and development in new and emerging technologies to benefit the economic vitality of the state of Washington. Current research areas include advanced materials and manufacturing, biotechnology, computer systems and software, microelectronics, and human-interface technology. The WTC promotes faculty collaborations with industry within the state, and co-sponsors applied research at the state's research universities directed toward the needs and interests of state industries. Its statewide headquarters are located in Fluke Hall at the UW.

The Center for Bioengineering is the home of pioneering work in diagnostic ultrasound, which enables physicians to image in detail the internal features of a patient without having to perform surgery. In addition, important strides continue to be made in understanding how to design man-made materials that are compatible with the human body. Working together in the University of Washington Engineering Biomaterials (UWEB) project, a group of UW researchers hopes to develop a new generation of medical implants that mimic the biology of the body parts they replace, thus fooling the body into accepting foreign materials.

The Department of Computer Science and Engineering is known for its catalytic role in bringing tools for designing microchips to engineers and industrial firms in the Pacific Northwest, and for its pioneering work to address critical safety issues in software systems. Recently, UW researchers have been recognized for work leading to a three-dimensional photography system as well as for the development of Internet and World Wide Web searching tools called software robots ("softbots").

The tremendous flexibility and power of Geographic Information Systems are being brought to bear on a wide range of research activities across the campus. In a fusion of GIS, computer-aided design, and virtual reality, efforts are underway to link GIS capabilities with visualization tools to allow users to display and move around in a virtual three-dimensional representation of a GIS database. For example, city planners may be able to use GIS systems to navigate through a cityscape to visualize key features or to evaluate different planning options. This is the focus of the Community and Environmental Design and Simulation Laboratory at the University, a partnership between the College of Architecture and Urban Planning and the Human Interface Technology (HIT) Lab of the WTC.

In another project at the HIT Lab, researchers have developed a process to display electronic images directly on the human retina. They anticipate the retina display may replace computer screens and video monitors in the future.

The University is part of the Pacific Earthquake Engineering Research Center (PEER), a \$20-million effort funded by the National Science Foundation. Its goal is to identify and mitigate potential earthquake hazards along the Pacific Coast. The UW joins eight California universities in the project. Amid mounting historical evidence that the Pacific Northwest is at risk for devastating tremors, the center will study new ways to assess earthquake resistance, as well as seismic retrofitting options for major structures.



Biological Sciences

Research programs in the biological and zoological sciences take research teams to sites in the Pacific Northwest region and beyond, to remote corners of the world. Research in zoology has focused on the neurological basis of behavior and the origin of circadian rhythms, the physiology of insect development and the role of hormones in metamorphosis, and the ecology of intertidal communities. Pioneering field studies of the male red-winged blackbird conducted by UW zoologists have helped to explain the phenomenon of territorial dominance in animals.

A multidisciplinary team of UW scientists has been intensely involved in the study of the recovery of life in the blast zone that resulted from the eruption of Mount St. Helens in 1980. Findings from that effort are changing how scientists understand and study the recovery of volcanic sites around the world.

In order to study the tops of trees and tips of branches where most budding, branching, and photosynthesis occur, and to understand what makes forests thrive, the UW has erected a construction crane in the Gifford Pinchot National Forest in southwest Washington. The crane's gondola can be moved in a 550-foot circle, giving researchers access to nearly six acres of old-growth canopy. The crane is the largest forest research crane in the world and the only one located in a temperate forest.

Forest nutrition studies initiated decades ago by UW researchers have produced one of the largest databases in the world on the growth characteristics of Douglas fir and western hemlock, and spawned a highly successful research cooperative comprising over 35 organizations. Today, the Stand Management Cooperative integrates research in forest nutrition, silviculture, wood quality, and modeling.

UW microbiologists have pioneered genetic engineering techniques for plants. A UW group applied the latest gene mapping techniques to the problem of how much genetic change is required in order for a new species to evolve, one of the central mysteries of evolutionary biology. Investigators from the College of Forest Resources and the Departments of Biochemistry and Botany have teamed up in this effort.

Researchers in the Department of Genetics in the College of Arts and Sciences have conducted basic research in yeast genetics that has led to a vaccine against Hepatitis B.

Health Sciences

Since its establishment many decades ago, the UW Health Sciences Center has become well known for its teaching, research, and patient care. University physicians and staff members pioneered the first successful long-term kidney dialysis techniques, which have led to lifesaving treatments for tens of thousands of people. Continuing research is leading to the production of simpler and more portable devices for patients suffering from kidney failure.

University physicians have been leaders in the development of bone marrow transplantation, which offers the hope of curing several forms of leukemia. E. Donnall Thomas, former head of medical oncology at the University (now professor emeritus and director emeritus of clinical research at the Fred Hutchinson Cancer Research Center), received the Nobel Prize in 1990 for developing bone marrow grafting techniques.

Fundamental research in biochemistry is unlocking the secrets of life processes at the molecular and cellular level. The discovery of protein phosphorylation—the reactions that regulate energy use, growth, and transformation of cells—by UW scientists Edmond Fischer and Edwin Krebs was recognized with the Nobel Prize for Medicine in 1992.

In 2001, Dr. Lee Hartwell, professor of genetics at the University of Washington and director of the Fred Hutchinson Cancer Research Center, received the Nobel Prize. His pioneering work in yeast genetics provided the foundation for understanding how normal cells divide and the mechanisms leading to the uncontrolled growth of cancer cells.

Building on work over the past three decades to understand the structures of ion channels in the cellular membrane, new efforts are directed toward the relationship between ion channel abnormalities and various diseases such as cystic fibrosis, certain bacterial infections, and forms of muscular dystrophy.

UW scientists have made important progress in understanding the causes of atherosclerosis, in understanding and isolating blood growth and blood clotting factors, and in studying the processes involved when white blood cells engulf and destroy bacteria. On another front, a UW team has developed a novel method to measure bone loss and to monitor the effectiveness of therapies to treat osteoporosis; the technology is being commercialized by a Seattle company.

In the School of Public Health and Community Medicine, a center in ecogenetics explores the genetic basis for cellular responses to environmental insults or other stresses. Research programs at the UW in the study of heart disease, diabetes, and sexually transmitted diseases have achieved international recognition.

Genetic engineering techniques leading to the transgenic mouse and the use of transgenic animals in the study of new treatments for disease have been pioneered at the University.

The School of Pharmacy has a strong program in pharmacokinetics, the study of how drugs are metabolized and the rate at which they affect target organs and are eliminated by the body. Research is aimed at the analysis and prediction of dangerous drug interactions.

The University's Center on Human Development and Disability is recognized for its pioneering work in the causes, prevention, and treatment of diseases and disorders leading to mental retardation and other developmental disabilities.

The UW School of Dentistry is renowned for its work in periodontology, the study of infectious diseases of the tissues surrounding the teeth. The School has the largest clinical service in the world dedicated to the challenges of treating patients with dental fears and phobias.

Social Sciences

Interactions among individuals and groups determine the texture of society. The study of these interactions is the province of social scientists, whose work ranges from basic research on perception to the effect of interest groups on public policy.

Nationwide attention has been given to the work of UW investigators studying couples and the common factors that underlie successful relationships. In related research, several investigators are examining the processes of interaction in small groups, from families to work teams.

The award-winning Social Development Research Group in the School of Social Work conducts innovative research on the causes and prevention of violence, crime, drug use, school dropout, and other problems that affect children and families.

Important research in leadership and motivation, in human memory, and in alcoholism and addictive behavior is being carried on in a number of academic disciplines. Alcoholism studies range from physiological experiments to model counseling programs for pregnant women to participant-observer studies of addictive behavior. The focus for this effort is the Alcohol and Drug Abuse Institute.

Social scientists have performed provocative studies on the changing role of urban neighborhood organizations. Another group has concentrated on deviant behavior, including juvenile delinquency and possible prevention strategies. Its work is part of a larger effort by faculty members and graduate students to explore the ways that society's institutions react to deviant behavior.

Anthropologists are studying the changes in fertility, medical history, and cultural adaptation of the Japanese-American community in the Pacific Northwest, and the challenges faced by immigrants from Vietnam and Laos. Other faculty members are pursuing problems in distant locales and times, such as the beginning of agriculture in the Nile Valley.

Geographers are studying regional issues, such as the economic linkages between the Pacific Northwest and other parts of the country, the design and financing of efficient and equitable transit systems, the recent surge in population of nonmetropolitan areas and its policy implications, and the geography of access to health care.

Economists continue working on models to predict the results of federal monetary and fiscal policy. A group of researchers is breaking ground in a relatively unexplored area, the economics of natural resources, comparing the costs and benefits of different patterns of usage. These investigations are designed to help policy makers evaluate alternatives.

Social scientists at the University have a special interest in international relations. The University has been a pioneer in research concerning the Near and Far East. In the Henry M. Jackson School of International Studies, scholars in political science, anthropology, sociology, and the humanities study the role of culture in international affairs. Economists and geographers study development, resource management, and international economics. Historians complement the work of social scientists in exploring the basis of current thought, and scholars in languages and literature provide essential knowledge of original texts and the relationship of language to culture.

Humanities and the Arts

Research in the humanities often fulfills a primary mission of humanistic study—the preservation of the literary and artistic achievements of mankind. One aspect of this research is textual scholarship, involving the identification and authentication of original texts and artifacts. New knowledge is also generated through reassessment of earlier texts and works of art.

Texts that form part of Egypt's Nag Hammadi Library, found more than a quarter of a century ago but only recently translated from Coptic, may lead to a reinterpretation of early Christianity. Located near the upper Nile, the library contains documents from little-known monastic groups, previously unknown Christian gospels, and both familiar and unfamiliar sayings of Jesus. A UW scholar studying these texts expects them to have as great an impact as the discovery of the Dead Sea Scrolls. The texts also will shed more light on the heretical Gnostic movement, which offers a radically different interpretation of Genesis.

The earliest history of Buddhism is largely lost, because the first documented efforts to commit Buddhist scriptures to writing did not occur until 400 years after the death of the Buddha. This gap has been filled in part by the recent discovery of 57 fragments of Buddhist texts, the earliest yet found. UW professors and graduate students from the Department of Asian Languages and Literature are engaged in a joint project with the British Library to transcribe and interpret the texts, which are expected to help clarify the early development of Buddhist doctrine and literature.

Research often is meant to describe exclusively the generation of new knowledge, but in the humanities a growing number of faculty members explore the theoretical basis underlying our knowledge and the means of transmitting it. The focus for these studies has been a colloquium in theory involving faculty members and graduate students. Discussions on problems in the theory of narrative, for instance, may span literature, history, science, and psychoanalysis—in fact, wherever the written word is used. The colloquia have acted as catalysts for several scholarly articles and may lead to an expanded program encompassing other disciplines.

Theoretical studies also form an important component of research in the arts. Some faculty in the School of Music conduct extensive research in the scientific analysis of sound, known as systematic musicology. Studies in this field include the influence of vibrato on judgments of vocal blend; context and time in musical perception; and rhythmic responses of preschool children. Other faculty members are exploring new ways of creating music, including the use of computers.

The concept of scholarly achievement in the arts often is synonymous with performance or exhibition. The UW School of Music has on its faculty a number of nationally recognized composers, including two long-time recipients of research funds from the American Society of Composers, Authors, and Publishers (ASCAP). The awards are designed to encourage and assist writers of serious music. The School of Music also is home to one of the finest opera programs in the country.

The School of Art faculty includes nationally and internationally known artists and scholars in nearly every one of its ten studio, art history, and design disciplines. Studio artists carry on the age-old quest for aesthetic quality but also pursue stylistic innovation, as well as developing new techniques in such diverse areas as non-toxic water-soluble printing and computer-generated imagery. Many of the School's art historians have helped reshape this young discipline through their studies of art as cultural expression.

The UW School of Drama houses the famous Professional Actors' Training Program, which, besides teaching basic acting skills, provides an intensive introduction to the practice of the theatre arts. The program attracts dedicated students who work for demanding, scrupulous visiting directors from the commercial stage as well as for permanent faculty members with extensive professional experience. Graduate research in the history and practice of theatre forms an integral part of the School's diverse program.

The University's program in creative writing is one of the oldest in the country. It achieved prominence in the 1950s and 1960s, when its faculty included Theodore Roethke, winner of the Pulitzer Prize in 1953. The tradition of excellence continues, with current University poets and authors receiving critical acclaim throughout the nation, including Professor Charles Johnson, who was awarded the 1990 National Book Award for Fiction. This concentration of talent has made the University a center for literary activity in the Pacific Northwest.

The Center for advanced Research Technologies in the Arts and Humanities (CARTAH) supports and promotes computer-based research and creative work in the arts and humanities. The center helps foster liaisons between the research community and the University's arts and humanities departments, and provides state-of-the-art computing and media resources. CARTAH has become known internationally as an important center for producing new digital art and plays a key role in developing educational technology at the UW.



UW Extension

Office of Educational Outreach (UW Extension, Summer Quarter, Evening Degree Program, and Distance Learning)

Vice Provost

David P. Szatmary



www.outreach.washington.edu

Established in 1912, UW Extension brings the University's resources to the community by providing access to quality educational programs which meet ongoing professional and personal needs.

This section describes the various programs currently part of UW Extension. The quarterly UW Extension catalog contains details of the program offerings. It is mailed without charge to residents of western Washington, who may also receive it by calling 1-800-543-2320, by email at uweo@u.washington.edu or by writing to UW Educational Outreach, 5001 25th Avenue N.E., Seattle, WA 98105-4190. Catalogs can also be requested at UW Extension's Web site, www.outreach.washington.edu.

Evening Degree Program

Many credit courses are offered each quarter for students pursuing a degree, as well as those who are not formally admitted to the University. The classes are intended for non-traditional degree seekers as well as for postbaccalaureate individuals pursuing new skills and knowledge. All evening credit courses are taught by University faculty members and lecturers, approved by the appropriate academic units. UW credit is awarded and the grades earned are included in GPA calculations. Matriculated students enrolling in these courses pay course fees in addition to regular tuition.

Graduate Nonmatriculated Program

Individuals not admitted to a graduate program who wish to enroll in a graduate-level course may apply for graduate nonmatriculated student (GNM) status. Credits earned as a GNM may be applicable toward a degree upon subsequent admission to a graduate program. Application forms are available from participating departments. The Graduate School: Graduate Study section of this catalog offers more details.

UW Extension Distance Learning

UW Extension Distance Learning delivers approximately 230 credit courses and over a dozen credit certificate programs. Courses are delivered by print, video, audio, and the World Wide Web, and typically consist of assigned texts, study guides, assignments, and examinations. Most courses use interactive Web sites, email and voice mail to enhance interactions with instructors as well as other students. Certain noncredit courses required for University entrance are available to those who wish to qualify for admission. Other courses provide subject matter for professional continuing education.

Courses are open to persons who prefer an alternative to on-campus classroom meetings. Matriculated University students often find distance learning a convenient way to earn credits during summers or during the evening, or a way of taking courses that would otherwise be unavailable due to schedule conflicts.

Formal admission to the University is not required for enrollment in distance learning certificate programs and UW Extension courses. Students may register at any time for most courses and have between three and six months to complete the work. As many as 90 credits earned through distance learning may be applied to a University baccalaureate degree. Upon successfully completing a course, the grade and number of credits earned are recorded on an official University transcript. Grades earned, however, are not computed in the University GPA, which is based solely on courses taken in residence. (This policy is currently under review.) UW Extension offers certificate programs to students at a distance through various technologies (see the Certificate Programs section of this catalog).

UW Distance Learning catalogs may be obtained by telephone, 206-543-2320; by e-mail at uweo@u.washington.edu or by writing to UW Educational Outreach, 5001 25th Avenue N.E., Seattle, WA 98105-4190. Additional information is available through the UW Extension Distance Learning Web site, www.outreach.washington.edu/dl/.

English Language Programs

The English Language Programs (ELP) Department provides non-native speakers of English who are interested in improving language skills with the following services and resources:

The Academic English Program

The Academic English Program offers courses designed to help University of Washington non-native speaking students improve their academic English language skills. Some of these courses are offered online.

Although AEP courses do not carry credit for graduation, the courses are graded and are computed into the student's GPA. These courses require an additional fee separate from regular tuition.

All non-citizen applicants, including transfer students, are evaluated during the University admissions process to determine compliance with the minimum English proficiency standards based on test scores submitted by the applicants. For admission without English language requirements, the University of Washington requires a Test of English as a Foreign Language (TOEFL) computer-based score of 237 or higher, an SAT verbal score of 490 or higher, an ACT score of 20 or higher, or a Michigan Test of English Language Proficiency (MTELP) score of 90 or higher. Admission may be granted to international students with TOEFL scores in the range of 207-233 or MTELP scores in the range of 80-89.

ESL Extension Courses

The ELP offers many other ESL programs, courses and certificates for non-native speakers, including online learning, evening, conversation, grammar, business English, TOEFL preparation, and many more. These courses do not require admission to the University of Washington, and are offered throughout the year.

For more information about ESL services, including complete listings and descriptions of current ESL course offerings, contact the ELP office directly at UW English Language Programs, Box 354232, Seattle, WA, 98195-4232, 206-543-6242, or on the web at www.uwelp.net.

Noncredit Classes

UW Extension offers a broad range of courses, certificate programs, institutes, conferences, and seminars for adults, students, and children. Noncredit classes offer opportunities for professional development and personal enrichment. Specific programs are announced quarterly in the UW Extension catalog. To receive a catalog, call 206-543-2320.

Advising and Recruitment

UW Extension is committed to providing needed resources and skills to the Puget Sound community. Through its Advising and Recruitment department, companies are contacted and customized training programs are provided. Information meetings on various courses are held at companies, on campus, and in downtown Seattle. Advisers are available to answer questions on any of UW Extension's credit or noncredit courses or certificate programs. They may be reached at 206-543-6160.



University of Washington, Bothell

The University of Washington, Bothell (UW Bothell) admitted its first students in autumn quarter 1990 and has grown rapidly since. UW Bothell is fully accredited as part of the University of Washington and awards a University of Washington degree. In addition, professional programs are accredited by their respective accrediting bodies.

All programs give particular attention to the development of skills appropriate to an advanced level of study, to writing and oral communication, to the analysis and assessment of information, and to collaborative work with other students. At present the following programs are offered: Bachelor of Arts in Liberal Studies, Bachelor of Arts in Business Administration, Bachelor of Science in Nursing, Bachelor of Science in Computing and Software Systems, Bachelor of Science in Environmental Sciences, Master of Education, Master of Business Administration, Master of Nursing, Master of Public Policy Studies, and a post-baccalaureate Teacher Certification Program for elementary school teachers. Minors are currently offered in computing, business, and education. A Master of Science in Computing and Software Systems is being planned for the 2003-2004 academic year. As state funding permits, options will be added in existing programs and additional undergraduate and graduate degree programs will be considered.

UW Bothell is committed to increased access to higher education for residents of north, northwest, and northeast Puget Sound. To serve a diverse student population, most programs offer part- and full-time study options, with day, late afternoon, and evening classes. The teacher certification program requires full-time study. Financial aid and a tuition installment plan are available.

UW Bothell is located on the former Truly Farms site, at the intersection of Interstate 405 and State Route 522. The campus is also home to the largest wetlands restoration project in the United States.

Degree Programs

Detailed descriptions of the academic programs offered at UW Bothell may be obtained by calling the Office of Admissions at 425-352-5000 or 1-800-736-6650. A brief overview of the programs is provided below. Undergraduate programs are offered at the upper-division level; students are expected to have completed their first two years (80 to 90 quarter credits) of college study prior to entry, and then to complete at least 90 additional credits at the upper-division level to earn the bachelor's degree. The teacher certification program is offered as a postbaccalaureate program. The Master of Education degree requires a minimum of 45 credits, and the Master of Business Administration degree requires a minimum of 60 credits.

Interdisciplinary Arts and Sciences: The IAS program is an innovative and interdisciplinary program combining the methods, materials, and intellectual tools of the humanities, social sciences, and sciences. Because the ability to think, write, and speak effectively is a vital part of a liberal studies education, the program is designed to improve competence in these essential skills. The program leads to a Bachelor of Arts in Liberal Studies with degree options in American studies; society, ethics, and human behavior; culture, literature, and the arts; global studies; and science, technology, and the environment. Pending approval and funding, a Bachelor of Science in Environmental Science will begin in autumn 2002.

Business Administration: The business administration program offers an integrated approach to the study of business. The program emphasizes effective oral and written communication, teamwork in a diverse workforce, entrepreneurial management, high technology and the global business environment. With close ties to the greater Seattle business community, a "real world, hands on" approach is offered. In addition, business students complete courses in liberal studies to better understand the larger social and cultural context in which business functions. The undergraduate curriculum focuses on essential business core courses and currently offers options in marketing; management; innovation and technology management; finance; and international environment.

At the graduate level, the business program offers a Master of Business Administration degree with a focus on technology-oriented businesses and is designed for working professionals. The program covers advanced topics in finance, accounting, marketing, project management, and organizational behavior, within the context of the unique opportunities and challenges facing high-tech companies today.

Both the Bachelor of Arts in Business Administration and the Master of Business Administration degrees are credited by the American Assembly of Collegiate Schools of Business (AACSB).



Computing and Software Systems: The Bachelor of Science in Computing and Software Systems (CSS) program features an innovative and broad approach to the design of applications software. Within the major, there are three options: applications programming, systems analysis, and information engineering. Students gain essential knowledge and skill in state-of-the-art computing theory, application development, problem solving, communication, and management. Through industry partnerships, students have the opportunity for "real-world" experience. Designed in collaboration with representatives of high-tech industries, the CSS program prepares students for employment, graduate education, and life-long learning in this dynamic field. Pending approval and funding, a new Master of Science in Computing and Software Systems is planned for autumn 2003.

Nursing: The Bachelor of Science in Nursing program at UW Bothell is specifically designed for registered nurses who have at least 90 transferable college credits. Through a credit by examination mechanism, nursing students may earn their junior-year credits. The program prepares professionals for the broader scope of current nursing practices and evolving future opportunities. Critical thinking, decision making, and oral and written communication are emphasized. The Bachelor of Science in Nursing program at UW Bothell is accredited by the CCNE accrediting body of the American Association of Colleges of Nursing (AACN) and is affiliated with the UW School of Nursing. The program begins annually in summer quarter and may be completed in four quarters; electives may be taken prior to summer quarter.

Education: The UW Bothell teacher certification program leads to Washington state teacher certification for grades K-8. Two options are available. Option I is a full-time, 12 month postbaccalaureate program designed for those who already hold a bachelor's degree. This option begins summer quarter. Option II is an extended two-year program that begins autumn quarter with three quarters of part-time study followed by three quarters of full-time course work. Through collaborative partnerships with area schools, the teacher certification program integrates courses and structured field experiences in a variety of school settings. This unique program incorporates the most current and thoughtful perspectives on preparing dedicated professionals for classrooms and schools. UW Bothell also offers a Master of Education degree. This program encourages educators to think deeply about the complex work of teaching, to explore questions central to their professional growth, and to develop sustained, collegial relationships with peers from across the region. The program challenges students' thinking and celebrates their accomplishments. Critical reflection, leadership, and the generation and use of research to improve classrooms and schools are emphasized throughout the program.



University of Washington, Tacoma

The University of Washington, Tacoma, whose campus has won national awards for urban design and historic preservation, is changing the face of its region—architecturally and economically, as well as intellectually and culturally. Located on 46 acres in Tacoma's historic warehouse district, across from the Washington State History Museum and Union Station, UWT was established in 1990 as a non-residential campus to offer innovative upper-division, postbaccalaureate, and master's-level programs that serve people in the South Puget Sound region. In 2001 an Institute of Technology at the University of Washington, Tacoma was launched to address a workforce shortage of bachelor's and master's level professionals available to Washington's high-tech industry and to expand the access of citizens, especially women and people of color, to outstanding professional high-tech education and careers. The UW Tacoma now enrolls more than 1,500 students and is expected to see continued dramatic growth in academic offerings, enrollment, and facilities. (A new science building with science and computing labs and an auditorium building opened in 2002 and five more buildings are scheduled to open in 2004.) An impressive faculty of scholars and researchers devote themselves to UWT students through quality teaching and to the community through service and partnership.

UWT's undergraduate programs are designed to be the next academic step for community college and transfer students who wish to complete a baccalaureate degree. UWT enjoys tremendous community support, which has generated substantial support for scholarships, facilities, and programs. UWT's master's programs have been tailored to serve specific demand in the South Puget Sound area. The one-year, postbaccalaureate teacher certification program has recommended alumni for more than 287 K-8 teaching certificates since 1994. A five-quarter educational administrator program opened in 2001. With day, evening, and Saturday classes, UWT serves the needs of students who work or who have families and cannot travel long distances to further their education.

Graduate Degree and Certificate Programs

Students seeking admission to master's degree programs should check with the specific program. Detailed information about the academic programs offered can be obtained by calling the UWT Office of Admissions at 253-692-4400 or 1-800-736-7750; TDD 253-692-4413; or visit UWT's Web site at www.tacoma.washington.edu.

Master's Degree in Foundations of Public Action: This graduate program, leading to a master's degree, prepares students for an enhanced capacity for roles of responsibility and leadership. The program includes four closely integrated core courses: Models and Critical Inquiry; Culture and Public Problems; Evidence and Action; and Values and Action. Elective courses, internships, and a final project or thesis will provide opportunity for extended reflection on the application of the themes of the core to the student's particular area of interest. Program information is available at www.tacoma.washington.edu/ias/concentrations/MA.htm.

Business Administration: The Master of Business Administration degree at UWT is designed for working professionals who want to enhance their ability to manage and lead organizational change. The primary goal is to prepare current and future business managers with the knowledge and skill set they need to succeed in a dynamic and complex environment. Students develop a strong mix of leadership, technological, financial, analytical, relational, and communication skills. The program's objective is to offer a high-quality program that is immediately relevant to practicing managers.

For additional information, visit the program's Web site at www.tacoma.washington.edu/business.

Education: The education program at UWT prepares reflective, collaborative practitioners who are grounded in best practices and sensitive to diversity issues. The Master of Education program is a graduate program intended to build upon the skills, knowledge, and commitment of certificated, experienced teachers. The degree program is founded on a deep respect for practicing educators. It is committed to strengthening and revitalizing teaching. Underlying the education program is a vision of the teacher as one who is broadly educated and continuing to learn, skilled and committed to the craft of teaching, and entrusted to nurture the greatest human potential in every learner.

The Master of Education degree is a graduate course of study for experienced teachers at all levels of education, preschool through adult. Five study options are available: at-risk learner, integrated curriculum, science education, special education, and technology.

UWT also prepares educational administrators for their role in school and district leadership. Unique features of the four-quarter educational administrator program include a cohort of potential leaders from local schools and districts; integrated curriculum grounded in best practice as determined by theory, research, and school-based, experienced faculty; the design and implementation of strategies to improve student achievement; curriculum taught in time synchrony with the school's administrator calendar; leadership in implementation of national and state school reform; and weekly reflective seminars. All quarters of the program include integration of university-based learning and field-based learning.

Nursing: Affiliated with the top-ranked University of Washington School of Nursing at the Seattle campus, UWT's nursing program is accredited by the Commission on Collegiate Nursing Education. The nursing program focuses on the discovery and dissemination of knowledge that promotes health. The curriculum emphasizes and fosters the integration of teaching, inquiry, and service among a community of learners. Partnerships with the community provide learning environments in which students build upon their skills and knowledge to strengthen their understanding of local, national, and global health issues.

The Master of Nursing program prepares RNs for advanced practice. The program offers the following graduate emphases: communities, populations, and health; health care leadership and management; and a blending of the two program emphases. Within the emphases, students may elect to take coursework in nursing education, health, business, or arts and sciences. The core curriculum includes scholarly inquiry, health systems, health policy, diversity, and social issues related to health. The program is designed for both full-time and part-time students.

For additional information, call the program office at 253-692-4470 or visit the program's Web site at www.tacoma.washington.edu/nursing/.

Social Work: The Social Work Program is accredited by the Council on Social Work Education as the *Alternative* Master of Social Work for the University of Washington, Seattle School of Social Work. The MSW program prepares students to function in a wide variety of settings, including health-care agencies, child and family services, public social service organizations, the criminal justice system, and public schools. The advanced curriculum provides an in-depth education employing the classroom and practicum settings to prepare graduates for advanced specialized practice.

The *Alternative* MSW is currently a three-year, part-time evening program offering one concentration in the area of Children, Youth, and Families. Topics include applied research, social policy, and advanced content in social work practice models and methods.

For more information or to request application materials, please visit the program's Web site at www.tacoma.washington.edu/social/.

Computing and Software Systems: The Master of Science in Computing and Software Systems prepares graduates for high-tech careers as system analysts, support specialists, computer engineers, database administrators, software developers, and project managers, as well as for many positions with related titles. The Bureau of Labor Statistics within the U.S. Department of Labor reports that starting salaries for graduates with a master's degree in CSS are approximately 25 to 30 percent greater than starting salaries for graduates with a bachelor's degree in CSS.

The M.S. in Computing and Software Systems program accommodates both students who have a baccalaureate degree in computing (such as computer science, computing and software systems, and computer engineering) as well as those whose baccalaureate degree was awarded in non-computing-related disciplines. To accommodate such a diverse population of students, as well as those students who may not have the necessary background to immediately matriculate into a master's program, multiple paths of entry, transition, progression, and completion are available within the degree program.

For more information, visit the program's Web site at www.tacoma.washington.edu/tech/.

The symbols, abbreviations, and conventions below are used in the listings of program descriptions, faculty members, and course descriptions. Colleges and schools are presented in alphabetical order; departments and programs are listed alphabetically within the appropriate college or school. If you are unable to locate a department or program, consult the index.

Faculty

Entries include appointment to the Graduate School faculty (indicated by *); year of appointment to the University; graduate or professional degree, date, and institution. Entries also may indicate Acting, Adjunct, Affiliate, Clinical, Emeritus, or Research faculty; and area(s) of interest.

Course Descriptions

Each course listing includes prefix, course number, title, and credits. Each listing also may include general-education designator(s), name(s) of instructor(s), description of the course, prerequisite(s), and quarter(s) offered.

Specific information on courses offered in a particular quarter, including descriptions of courses approved since the publication of this catalog, appears in the quarterly *Time Schedule*.

Course Numbers

400-499 Upper-division courses primarily for juniors, seniors, and postbaccalaureate (fifth-year) students. Graduate students may enroll in 300- and 400-level courses. When acceptable to the major department and the Graduate School, approved 400-level courses may be applied as graduate credit in the major field and approved 300-level courses may be applied in the supporting field(s).

500- Restricted to graduate students. (Courses numbered in the 500 and 600 series with a P suffix denote professional courses for students in the schools of Dentistry and Medicine; such courses may not be applied as graduate credit in the Graduate School.) Undergraduate, postbaccalaureate, and nonmatriculated students who wish to register for 500-level courses must obtain permission from the instructor of the class, departmental chair, or other designated person.

Graduate courses numbered 600, 601, 700, 750, or 800 are restricted to students in the Graduate School. They appear by number and title only where applicable under the departmental course listings in this catalog. Descriptions for these courses are listed below.

(PREFIX) 600 Independent Study or Research (*)

Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite: permission of supervisory committee chair or graduate program adviser.

(PREFIX) 601 Internship (3-9, max. 9)

Internship required of students in a graduate degree program. Permission of supervisory committee chair or graduate program adviser is a prerequisite.

(PREFIX) 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 chair or graduate program adviser.

(PREFIX) 750 Internship (*)

Internship required of all graduate students in the Doctor of Arts degree program.

(PREFIX) 800 Doctoral Dissertation (*)

Research for the doctoral dissertation and research preparatory or related thereto. Limited to graduate students who have completed the master's degree or the equivalent, or Candidate-level graduate students. Premaster students initiating doctoral dissertation research should register for 600. Prerequisite: permission of supervisory committee chair or graduate program adviser.

Credit Designation

ART 500 (5) 5 credits are received for the quarter.

ART 501- (5-) or ART -502 (-5) Hyphenated course. Credit is earned, but may not be applied toward graduation until the entire sequence is completed. (An *N* grade may be given the first quarter and the final grade the second quarter.)

ART 500- (5-) Course may take longer than one quarter to complete. Repeated registration may be necessary. An *N* grade is received until the final grade is submitted.

ART 500 (2, max. 8) 2 credits per quarter; course may be taken up to four times to earn a maximum of 8 credits.

ART 500 (1-5, max. 15) Up to 5 credits may be taken in a given quarter. Course may be repeated to a maximum of 15 credits.

ART 500 (*, max. 10) Credit to be arranged per quarter; course may be repeated to a maximum of 10 credits.

ART 500 (3/5) 3 or 5 credits are earned in a given quarter. Specific amount is determined by school or college offering the course. The *Time Schedule* may indicate 3 credits, 5 credits, or 3 or 5 credits. Credits may vary by section.

ART 500 (3/5, max. 15) 3 or 5 credits are earned in a given quarter. Course may be repeated to earn a maximum of 15 credits.

ART 700 (*) Credit is to be arranged with school or college offering the course. No maximum stated. Only 600-, 700-, and 800-level courses do not require a maximum.

Undergraduate General Education Requirement Designators

The following general education requirement designators (on 400-level courses) are for purposes of undergraduate graduation and do not apply to graduate or professional students: VLPA, I&S, NW, QSR.

Background Required

Prerequisites Courses to be completed or conditions to be met before a student is eligible to enroll in a specific course.

Quarters Offered

A,W,Sp,S Indicates the quarter(s) the course is offered. A = Autumn, W = Winter, Sp = Spring, S = Summer.

Example:

ART 500 AWSp ART 500 offered autumn, winter, and spring quarters.



College of Architecture and Urban Planning

224 Gould

Dean

Robert Mugerauer

Associate Deans

Katrina Deines
Gail L. Dubrow
Vikram Prakash



General Catalog Web page:
www.washington.edu/students/gencat/academic/CAUP.html



College Web page:
www.caup.washington.edu/html/

The College of Architecture and Urban Planning (CAUP) comprises four departments that are directly concerned with the design and development of the physical environment: Architecture, Construction Management, Landscape Architecture, and Urban Design and Planning.

The College offers a variety of programs and degrees focusing on the environmental design disciplines within a liberal arts education. The undergraduate programs of the departments of Construction Management and Landscape Architecture lead to the professional degrees that serve as the educational credentials for careers in their respective fields. The pre-professional undergraduate degree in architectural studies prepares students for professional programs as well as related roles in society. Master's degrees are also offered in the College: Master of Architecture, Master of Science in Construction Management (evening degree), Master of Urban Planning, and Master of Landscape Architecture. Master's students may elect to work toward the Certificate in Urban Design or the Certificate in Preservation Planning and Design. An interdisciplinary doctoral program in urban design and planning is available through the Graduate School. All curricula encompass an appropriate level of design and technical understanding and include broader social, economic, and cultural issues fundamental to understanding, preserving, and enriching our built and natural environments.

As part of a major university and metropolis in the Pacific Northwest, the College is able to reinforce its program by using its setting as a laboratory for study. It works closely with its various professional communities to build curricula and a faculty attuned to the understanding and creation of an appropriate physical environment.

Research centers include:

- Center for Real Estate and Community Development
- Center for Environment, Education, and Design Studies
- Institute for Hazard Mitigation Planning and Research

- Urban Ecology Laboratory

Educational programs include:

- Certificate programs
- Urban design
- Preservation planning and design
- Continuing education/extension programs
- Architecture
- Facilities management
- Real estate

Institute for Hazard Mitigation Planning and Research

Robert Freitag, Director

The Institute for Hazard Mitigation Planning and Research was established in 1999 as a vehicle for research, teaching, and public service that address the mitigation of natural and man-made hazards through planning and design, and through the integration of mitigation principles into a wide range of disaster and risk-management opportunities. The institute's approach is interdisciplinary, with close links to other academic research units in the University and to risk management organizations in government and industry.

The research agenda is aimed at developing practical mitigation solutions that can be incorporated into local government land-use planning, development regulation, infrastructure, and emergency management; state and federal response to disasters; planning for business continuity; and planning for post-disaster recovery and reconstruction.

The institute is also pursuing curriculum development to incorporate mitigation principles and methods into existing and new courses in the College's degree programs.

Preservation Planning and Design Certificate Program

410 Gould

Gail L. Dubrow, Director
Neile Graham, Program Coordinator

The College of Architecture and Urban Planning administers a special graduate-level program that leads to the Certificate of Achievement in Preservation Planning and Design. This 45-50 credit interdisciplinary program is available to students accepted for graduate work by the departments of Architecture, Landscape Architecture, or Urban Design and Planning. There are two options in this program: one for students in architecture and one for students in landscape architecture and urban planning. The curriculum offered by the 15-member faculty, which is drawn from the College along with visiting lecturers from the preservation community, provides students with a grounding in the history, theories, methods, and practices of historic preservation planning and design.

Urban Design Certificate Program

410 Gould

George Rolfe, Director
Neile Graham, Program Coordinator

The College of Architecture and Urban Planning administers a special graduate-level program that leads to the Certificate of Achievement in Urban Design. Since 1968, this interdisciplinary program has provided a collective framework that allows stu-

dents to specialize in the study and design of the urban environment as part of their professional education.

The 14-member faculty offers backgrounds in urban design as well as in architecture, landscape architecture, and urban planning. In addition, the communities of the Puget Sound region provide a unique learning laboratory for students to experience the issues and professional activities of urban design. A core curriculum and mandatory course work in four substantive areas provide the student with a firm grounding in theory, methods, and practical skills. The program is normally seven quarters in length, concurrent with the master's program.

Students accepted for graduate work by the departments of Architecture, Landscape Architecture, or Urban Design and Planning are eligible for the program if they possess the necessary design abilities prior to enrollment in advanced studios.

International Programs

224 Gould

The departments of the College offer many opportunities for foreign study in which participants earn academic credit while studying abroad. Programs in Rome, the Italian Hill Towns, and Mexico are sponsored on a regular basis. In addition, various study and exchange opportunities exist in such locations as Germany, the Scandinavian countries, Colombia, Mexico, India, and Japan. Faculty exchanges with foreign institutions occur regularly.

University of Washington Rome Center

95 Piazza del Biscione, Rome, Italy

Katrina Deines, Director

The College maintains a permanent year-round facility in Rome. Studio and classroom spaces, a library, administrative offices, and housing accommodations for faculty are located in the Palazzo Pio on the Campo de Fiori. The Rome Center is used by UW programs in classics, Romance languages, art, art history, English, creative writing, and comparative history of ideas, as well as by the departments of the College of Architecture and Urban Planning. The Rome Center fosters interaction among students from the University and other institutions, together with practicing professionals residing in or visiting Rome. Several major universities regularly share studio critics and lecturers.

Remote Sensing Applications Laboratory

12 Gould

Frank Westerlund, Director

The Remote Sensing Applications Laboratory (RSAL) is a facility for teaching, research, and public service applications of remote sensing and geographic information technologies in environmental planning and design. Remote sensing includes aerial photography and satellite systems that record earth-surface data in image or digital form for subsequent interpretation by visual or computer techniques and incorporation into geographic information systems. Research applications have included land-use mapping, urban form analyses, growth-management studies, development siting, natural-resource inventories, and environmental analysis. RSAL houses an extensive collection of air photo, satellite data, map, and documentary resources. In addition to optical photo interpretation equipment, the laboratory utilizes UNIX and NT workstation-based software systems such as ERDAS image processing and ArcInfo GIS.

Facilities

Computing

Mark Baratta, Director

The CAUP Office of Computing provides a wide variety of specialized computing resources and support services for the College's students, faculty, and staff. These resources include the following:

- several networked Windows and Macintosh computing labs with a wealth of software, including CAD, GIS, multimedia, 2D/3D graphics, rendering, animation, scheduling, estimating, bid analysis, project management, modeling, design, spreadsheet, and document preparation packages;
- slide and document scanning facilities;
- printing and large-format color plotting;
- digital still and video cameras and processing software;
- Student Computing Loaner Program, which provides checkout of laptop computers, digital still and video cameras, and video/computer projectors to CAUP students;
- consulting office for in-person support, along with support via phone and email.

Additionally, students receive UWNNetID computing accounts from the University's central computing organization, Computing and Communications. The UWNNetID allows attachment to the campus network (either locally or via dial-up) and access to email, disk space for file storage and Web pages, and many computing, course scheduling, bibliographic, and library resources.

Lighting Applications Laboratory

The Lighting Applications Laboratory includes a variety of facilities for use by students and faculty members in conjunction with lighting classes, design-studio courses, and research work. Equipment in the lighting workshop includes lamps and lighting fixtures, sample models and model-building materials, a mirror-box artificial sky, a direct-beam sunlight simulator, assorted light meters and data loggers, cameras, and demonstration displays.

The Department of Architecture is a co-sponsor of the Lighting Design Lab. This lab, a 10,000-square-foot, half-million-dollar facility, was designed to demonstrate the energy conservation potential of state-of-the-art architectural lighting technology. It is operated by Seattle City Light in downtown Seattle. Students can take various positions in the lab as interns. It is also available to assist in their lighting design and testing, as it does with regional architectural offices.

Photography Laboratory

A large photography laboratory is provided with studio and darkroom facilities for use by photography classes, design-studio classes, special instruction, and independent activity.

Shop

A fully staffed and equipped wood-, plastic-, and metal-working shop provides students with an opportunity to design and build selected projects. The shop is used as an instructional facility in conjunction with studio, structures, and materials classes. Thesis and other individual activity also can be accommodated.

Library

The Architecture-Urban Planning Library, 334 Gould, is a branch of the UW Libraries. It is the primary loca-

tion for materials on architecture, landscape architecture, construction management, and urban design and planning. The collection contains 42,500 volumes, 7,500 microforms, and 300 currently received serial subscriptions. Access to its collection is provided through the UW Libraries Information Gateway, a single World Wide Web location which encompasses all of the library's print and electronic resources as well as tools, services, and the ability to search the library's catalog and a wide range of Internet resources. The Gateway is available in all UW libraries and on the Web at www.lib.washington.edu.

Slide Collection

Heather Seneff, Director

The slide collection consists of approximately 100,000 images covering architectural, landscape, design and planning, and construction subject matter, supporting the curricular and research needs of the College. New materials for lectures and projects are continually added.

Student Organizations

Chapters of American Institute of Architects Students, American Society of Landscape Architects, Associated General Contractors, Planning Students Association, and the Historic Preservation Association provide opportunities for undergraduate and graduate students to meet informally and to participate in a variety of projects and events.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CEP 446 Internship (5, max. 10) Connects core and individual courses with field work. Group and individual readings develop understanding of how students' internships and field placements constitute particular element of community and environmental planning. Explores how what we do for a living is part of our lives as citizens and public service. Credit/no credit only. Offered: AWSp.

CEP 460 Planning in Context (5) I&S Examines theory against backdrop of practice for broad, historical understanding of social, political, environmental planning. Critique from viewpoints, e.g., planning history, ethics, ecofeminism, environmental justice, class and capitalism, planning and global economy. Develop personalized history reflecting individual experience, professional experience, and philosophical heritage of planning profession. Credit/no credit only. Offered: A.

CEP 461 Ethics and Identity (5) I&S Examination of personal, societal, vocational, environmental, planning ethics. Readings and discourse on ethical foundations for public life. Individual and group readings on values, human potential. Develops understanding of ecological context, moral responsibility, self-awareness. Constructs positive, diverse view of humanity, environment regardless of race, gender, ethnicity, beliefs. Credit/no credit only. Offered: W.

CEP 462 Community and Environment (5) I&S Capstone quarter merges core seminars, disciplinary courses in major, community field experiences for mastery of personal knowledge and skills. Reflection and synthesis of themes in major; engagement with contemporary issues. Compares theoretical definitions of community and environment with individual philosophies and knowledge within

thoughtful, applied context. Credit/no credit only. Offered: Sp.

CEP 498 Special Topics (1-9, max. 15) I&S Systematic study of specialized subject matter.

CEP 499 Undergraduate Independent Study or Research (1-5, max. 10) Individual reading, research, fieldwork, other special project approved and supervised by faculty adviser most appropriate for the project proposed. Report on the purposes, procedures, and results of study is required. Credit/no credit only. Offered: AWSpS.

Architecture

208 Gould



General Catalog Web page:

www.washington.edu/students/genecat/academic/Archit.html



Department Web page:

www.caup.washington.edu/html/arch/

The Department of Architecture offers one undergraduate degree, the Bachelor of Arts (B.A.) degree in architectural studies, and two graduate degrees, the Master of Architecture (M.Arch.) degree (an accredited professional degree) and the Master of Science (M.S.) in Architecture degree (an advanced research-oriented degree). The B.A. in architectural studies is a pre-professional degree that prepares candidates for admission to professional architectural programs with advanced standing, as well as for other roles in society in related fields—in research, government, development, management, planning, etc. While many of these occupations do not require a professional license, they do require an understanding of and exposure to a professional education. The professional program (the M.Arch.) is based on the architect's need to be a generalist well-rounded in the liberal arts, with a full command of the discipline of architecture, who can assume an enlightened, responsible, and creative role in society.

The curricula of the B.A. and M.Arch. include both broad and focused courses that cover the many and various aspects of architecture: design, graphics, computing, structural engineering, building sciences, history, theory, ecology, sociology, psychology, cultural studies, law, and professional practice. The faculty comprises a large and diverse group of teachers, practitioners, scholars, and researchers who represent a wide spectrum of backgrounds, experiences, and viewpoints. Approximately thirty permanent faculty members are supplemented by dozens of part-time professional practitioners from the region and around the country, as well as by exchange scholars from foreign institutions.

Priorities stressed by the faculty reflect changing ideas and concepts of architecture. Studios in the B.A. and M.Arch. programs are sequenced, beginning with fundamentals and demanding an increasing independence at advanced levels. The defined studio sequence not only helps clarify the student's experience, but also ensures that students get a broad and coherent cross section of design problems and instructors.

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board (NAAB): (1) the Bachelor of Architecture, which requires a minimum of five years of architectural study (this degree is not offered at the University of Washington), and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years

following a related pre-professional bachelor's degree. These professional degrees are structured to educate those who aspire to registration and licensure to practice as architects.

Architectural education at the University of Washington requires a minimum of six years of higher education to attain the first professional degree, the Master of Architecture. The curriculum is divided into three two-year segments of course work with a pre-professional Bachelor of Arts degree (with a major in Architectural Studies) awarded at the completion of the second two-year segment. The professional degree, Master of Architecture, is awarded only upon completion of the third segment. (Students with bachelor's degrees in unrelated fields take an additional year of course work—see below.)

Students must also complete a master's thesis, extending over one or more additional quarters, on design problem or a research topic of their choice. Admission to the professional program requires admission to the Graduate School of the University of Washington.

The Master of Science (M.S.) in Architecture degree is an advanced research-oriented degree for those who already hold a professional or pre-professional degree in architecture or an allied discipline. Currently the M.S. in Architecture is offered in only a single area of specialization, design computing. (Those interested in professional careers in architecture should apply to the accredited professional program, the Master of Architecture.)

Graduate Program

Graduate Program Coordinator
208 Gould, Box 355720
206-543-4180
archinfo@u.washington.edu

Master of Architecture

The Master of Architecture degree is the only professional degree offered by the Department of Architecture. Completion of the requirements of this nationally accredited degree program satisfies the educational requirement for licensing (registration) as an architect. The accredited M.Arch. program accommodates two groups of undergraduate degree holders: (1) persons holding a pre-professional four-year degree, such as a Bachelor of Arts in Architecture (or equivalent), who normally will require seven or eight quarters of study; (2) persons with an undergraduate degree in an unrelated field, who normally will require ten or eleven quarters, over a period of at least three years, to complete the requirements for the degree. This three-year program may vary somewhat in duration and specific course work required, depending on selection of concentration/study areas and prior academic and professional experience.

Candidates with a pre-professional four-year degree, such as a Bachelor of Arts (in architecture) or the equivalent, usually undertake six full-time quarters of study plus completion of a thesis for the M.Arch. degree. This program typically requires 99 credits of course work, including 36 credits of design studio, 36 credits of approved core courses, 9 credits of thesis, and 18 credits of electives. Special interests and certificate programs often can be accommodated within the 18 credits of electives and design-studio options.

Persons holding degrees in other fields normally take three quarters of preparatory course work to develop knowledge and skills equivalent to those of students who enter the program from undergraduate architecture programs. Upon completion of preparatory

course work, the students merge with students in the two-year program described above.

The department offers an advanced M.Arch. degree program for persons holding an accredited professional five-year Bachelor of Architecture degree (and those already holding an accredited Master of Architecture degree). For these candidates the program represents a specialization or in-depth study of a specific area or interest in the field. Each student's program is developed on an individual basis in consultation with faculty advisers. The approved program of study becomes the student's curriculum, which must be completed for award of the degree. Typically this program involves a minimum of 45 credits of required course work, including a thesis, and can be completed in four or five quarters. Those seeking advanced study of design computing should apply to the Master of Science (M.S.) in Architecture degree program, not the post-professional M.Arch.

The Master of Science (M.S.) in Architecture program offers an advanced and specialized graduate degree in architecture. The M.S. in Architecture is currently offered with a single area of specialization, design computing. Applicants should hold a degree in architecture or an allied design discipline. Candidates from a wide range of disciplinary backgrounds who are interested in pursuing education in research and applications of design computing that include design methods, cognition and computation, design collaborations, human/computer interface in design, visual architecture, physical computing, and related areas are encouraged to apply.

The M.S. in Architecture program with a focus in design computing involves a minimum of 45 credits of required coursework, including a thesis, and may be completed in four or five quarters.

The M.S. in Architecture program is not accredited by the National Architectural Accrediting Board (NAAB). Candidates seeking to pursue careers in the professional practice of architecture who do not already hold a professionally accredited degree in architecture should apply to the accredited program (the M.Arch.).

The M.S. in Architecture program with a focus in design computing makes intensive use of department, College, and University computing capabilities and equipment. All enrolled students pay a special program fee in addition to tuition.

Admissions

Students are admitted in autumn quarter only. All application materials should be received by the department no later than the preceding January 15. Notices of admission are mailed by April 15. Admission to the Master of Architecture program is a competitive process, with priority given to those students whose apparent abilities, as determined by the Department of Architecture Admissions Committee, will enable them to complete the program expeditiously and with a high level of achievement. In evaluating applicants, the Admissions Committee considers the following: a portfolio of work in visual arts and/or design, a Statement of Purpose, Graduate Record Examination general test scores, transcripts of previous degree programs and of additional academic study (with a 3.00 GPA requirement), three letters of recommendation, and the applicant's background and experience in architecture and/or related fields. Incomplete applications and those received after January 15 are not considered by the Admissions Committee.

Master of Science (M.S.) in Architecture students are normally admitted in autumn quarter. Application deadlines are similar to the Master of Architecture. The M.S. in Architecture admissions committee considers materials similar to those for the Master of

Architecture, but with a greater emphasis on demonstrated skills, aptitude, and interest in computing.

Certificate Programs

Graduate students may elect to participate in the College-wide certificate programs in urban design and preservation planning and design. (See program descriptions in the preceding College section.) The department also offers a certificate program in lighting design.

International Studies

The department offers the Architecture in Rome program at the University of Washington Rome Center, and the Design/Build Mexico program in Cuernavaca, Mexico. Other programs have included summer study of the Italian Hill Towns and in Portugal and Scandinavia, and numerous exchanges including Scandinavia, England, Germany, Hong Kong, Colombia, Japan, and Australia.

Financial Aid

Each spring quarter the department awards scholarships and assistantships for the following academic year. These are more typically available to students already enrolled in the architecture program at the time of the awarding, although some financial aid is offered to newly entering students. Other financial aid and assistantship possibilities may be found through the Graduate School Fellowship Division and the Office of Student Financial Aid in Schmitz Hall.

Faculty

Chair

Jeffrey K. Ochsner

Professors

Badanes, Steven P. * 1990; MArch, 1971, Princeton University; sustainable building technology; public art; community-based design/build; design.

Bonsteel, David * 1964, (Emeritus); MArch, 1964, University of Washington; design process, computer applications, research.

Bosworth, Thomas L. * 1968, (Emeritus); MA, 1954, Oberlin College, MArch, 1960, Yale University; design process, history, professional practice.

Ching, Francis D.K. * 1985; BArch, 1966, University of Notre Dame; design drawing, process and principles.

Clausen, Meredith L. 1979; MA, 1972, PhD, 1975, University of California (Berkeley); nineteenth- and twentieth-century architecture.

Dietz, Robert H. * 1975, (Emeritus); MArch, 1944, Massachusetts Institute of Technology; design, housing.

Emery, Ashley F. * 1961, (Adjunct); MS, 1958, PhD, 1961, University of California (Berkeley); experimental design, heat transfer, HVAC, thermal stress/fracture, bioengineering.

Finrow, Jerry V. * 1995; MArch, 1968, University of California (Berkeley); housing architecture.

Hildebrand, Grant * 1964, (Emeritus); MArch, 1964, University of Michigan; history, preservation design.

Jacobson, Phillip L. * 1962, (Emeritus); MArch, 1969, Finnish Institute of Technology (Finland); design, professional practice.

Johnston, Norman J. * 1985, (Emeritus); PhD, 1964, University of Pennsylvania; urban design, history.

Kiyak, H. Asuman * 1977, (Adjunct); MA, 1974, PhD, 1977, Wayne State University; geriatric dentistry, behavioral aspects of health care.

Kolb, Keith R. * 1952, (Emeritus); MArch, 1950, Harvard University; design, professional practice.

Lovett, Wendell H. * 1983, (Emeritus); MArch, 1948, Massachusetts Institute of Technology; architecture.

Miller, David E. * 1989; MArch, 1972, University of Illinois; design, design development, systems integration.

Millet, Marietta * 1976, (Emeritus); MArch, 1972, Massachusetts Institute of Technology; illumination, environmental controls.

Mugerauer, Robert 2000; PhD, 1973, University of Texas (Austin); built and natural environments.

Nyberg, Folke E. * 1969, (Emeritus); MArch, 1960, Yale University; theory, urban design, professional practice.

Ochsner, Jeffrey K. * 1987; MArch, 1976, Rice University; design, history, preservation design, urban design.

Pyatok, Michael * 1990; MArch, 1967, Harvard University; design of affordable housing for lower income communities - urban and suburban regions.

Seligmann, Claus * 1964; DIPARC, 1950, London Polytechnic (UK); design, design process, theory.

Small, Robert * 1965, (Emeritus); MArch, 1955, University of Oregon; design, community practice, barrier-free design, housing, site planning, design process.

Staub, Christian 1967, (Emeritus); Cert, 1944, Institute for Industrial Design, Arts, and Crafts; photography.

Streatfield, David C. * 1974, (Adjunct); MLA, 1965, University of Pennsylvania; regional landscape planning, environmental history, landscape studies.

Streissguth, Daniel M. * 1983, (Emeritus); MArch, 1949, Massachusetts Institute of Technology; design process.

Sutton, Sharon E. * 1998; MArch, 1973, Columbia University, PhD, 1982, City University of New York; the effect of the environment on learning and community well-being.

Thiel, Philip * 1961, (Emeritus); MS, 1948, University of Michigan; visual design, design process, person-environment relations, experiential notation.

Vernez Moudon, Anne * 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Zarina, Astra * 1970; MArch, 1955, Massachusetts Institute of Technology; design, foreign studies.

Associate Professors

Albrecht, Robert G. * 1960, (Emeritus); MSCE, 1960, University of Massachusetts; structures.

Curtis, J. William * 1962, (Emeritus); MA, 1969, University of Washington; design process, professional studies.

Deines, Katrina * 1985; MA, 1975, University of Minnesota, MArch, 1979, University of Washington; design theory and foreign studies, history.

Donnette, James J. * 1966, (Emeritus); MArch, 1969, University of Washington; graphics, design.

Dubrow, Gail Lee * 1989; MA, 1979, University of Oregon, PhD, 1991, University of California (Los Angeles); the social history of the built environment; historic preservation; issues of race, class and gender.

Goldblatt, Steven M. 1982, (Adjunct); JD, 1977, Golden Gate University; construction law, labor relations, and accounting.

Gross, Mark D. * 1999; PhD, 1986, Massachusetts Institute of Technology; design and planning methods, architecture, computational models, human computer interaction.

Heerwagen, Dean Reese * 1975; MS, 1967, MArch, 1971, Massachusetts Institute of Technology; environmental controls (passive and active).

Hill, Kristina * 1997, (Adjunct); MLA, 1990, PhD, 1997, Harvard University; human dimensions of landscape change; urban ecology; urban design related to water and biodiversity.

Jones, Susan H. 2001, (Affiliate); MArch, 1988, Harvard University; architectural design; the conceptual and tectonic ideas of making space.

Latourelle, Elaine Day * 1975; MArch, 1964, Yale University; architecture, landscape and urban design, professional practice.

Lebert, Edgar A. 1965; MS, 1967, University of Washington; structures.

Loveland, Joel E. * 1986; MArch, 1980, University of California (Los Angeles); energy conservation, design, lighting design and research.

Minah, Galen F. * 1970; MArch, 1968, University of Pennsylvania; design process, design, color and light, professional practice.

Mohler, Richard Ernest J. * 1986; MArch, 1984, University of Pennsylvania; design, architecture and community, design of housing and urban public open space.

Palleroni, Sergio A. * 1992; MS, 1987, Massachusetts Institute of Technology; design, design/build, cultural studies, cross-cultural education.

Prakash, Vikramaditya * 1996; MA, 1989, PhD, 1994, Cornell University; Non-western, Asian, Indian Architecture; cultural and postcolonial studies; LeCorbusier; modernism.

Rohrer, John * 1948, (Emeritus); BArch, 1937, University of Washington; graphics, design.

Rolfe, George R. * 1984, (Adjunct); MArch, 1968, MCP, 1968, University of Pennsylvania; urban development process, finance, feasibility and market analysis, urban design processes.

Rosner, Arnold S. * 1966, (Emeritus); MSCE, 1949, California Institute of Technology; design process, building technology, computers.

Ryan, Dennis M. * 1974; PhD, 1976, University of Pennsylvania; educational democracy, theory and practice of interdisciplinary education; urban design and planning.

Sasanoff, Robert * 1963, (Emeritus); MCP, 1968, University of California (Berkeley); design process, person-environment relations.

Winterbottom, Daniel M. * 1993, (Adjunct); MLA, 1988, Harvard University; urban landscape architecture, cultural landscapes, therapeutic and healing landscapes, landscape cons.

Assistant Professors

Anderson, Alex Thomas * 1998; MArch 1990, PhD, 1997, University of Pennsylvania; history and theory of architecture and decorative arts.

Crisman, Phoebe A. 2000; MArch 1991, Harvard University; design, urban design, theory.

Do, Yi-Luen Ellen * 1999; MDes, 1991, Harvard University, PhD, 1998, Georgia Institute of Technology; diagramming and freehand sketching, creativity, computer-aided design, cognitive studies.

Heerwagen, Juidth 2001, (Affiliate); PhD, 1982, University of Washington; workplace ecology and human factors of sustainable design.

Johnson, Brian Robert * 1978; MArch, 1981, University of Washington; computing in architectural design, 3D modeling and rendering, Web-based collaboration.

McLaren, Brian 2001; MSc, 1986, Columbia University, PhD, 2001, Massachusetts Institute of Technology; architectural history, theory and design.

Strauss, David 2002, (Affiliate); MArch, 1985, University of Washington, PhD, 1999, University of Pennsylvania; design, architectural practice.

Senior Lecturers

Onouye, Barry S. * 1967; MSCE, 1969, University of Washington; integration of structural technology into architectural design education.

Vanags, Andris 1969; BFA, 1968, University of Washington; design, building science, design and materials, furniture; craft in design.

Zuberbuhler, Douglas * 1967; MArch, 1968, University of Washington; graphics, design, building technology.

Lecturers

Dee, Jennifer 1982; MArch, 1984, University of Washington; theory, design.

Nicholls, James Keith 1995; BArch, 1986, University of British Columbia (Canada); design, industrial design, construction technology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ARCH 400 Architectural Design IV (6) Offers studio problems in non-residential building design to advance student's understanding of the ideas and technologies of architecture. Prerequisite: ARCH 302.

ARCH 401 Architectural Design V (6) Offers studio problems in non-residential building design to advance student's understanding of the ideas and technologies of architecture. Prerequisite: ARCH 400.

ARCH 402 Architectural Design VI (6) Selection of studio sections that introduce advanced architectural design theories and methods. Focus and format vary. Prerequisite: ARCH 401.

ARCH 403 Architectural Problems (6)

ARCH 412 Architectural Illustration and Presentation (3) Issues, conventions, and tech-

niques used in architectural renderings, including line drawings, shaded drawings, use of color, composition, organization, advanced perspective, scale figures, entourage, reflections, and media. Prerequisite: ARCH 315.

ARCH 413 Architectural Photography Projects (3) Students develop in-depth photo essays relating to architecture, the urban movement, or landscape design following the principles introduced in ARCH 313. Lectures, seminar, and discussion. Prerequisite: ARCH 313.

ARCH 415 Architectural Sketching (3) 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. Recommended: either ARCH 210 or ART 104.

ARCH 416 Freehand Drawing and the Digital Realm (3) VLPA *Stevens* Explores the potential role of freehand drawing in digital media. Students use stylus and tablet to draw in print and photo-imaging programs, combining the flexibility of digital tools with the rich traditions of freehand drawing. Focus alternates between Internet as context for image making and printed output. Offered: AW.

ARCH 417 Advanced Topics in Digital Drawing (3) VLPA *Stevens* Provides a context for developing an individual project exploring drawing or painting in digital media. Explores advanced issues in digital image creation and production through a book, film, or Web project. Each student completes and publishes a project during the quarter. Prerequisite: ARCH 416. Offered: Sp.

ARCH 418 Watercolor Drawing (3) Introduction to the principles and practice of using transparent watercolor for the naturalistic representation of objects, people, and interior and exterior space. Recommended: either ARCH 210 or ART 104.

ARCH 420 Structural Design I (4) NW Reinforced concrete fundamentals; establishes basics of reinforced concrete behavior and introduces methods of design used in current engineering practice. Basic mechanics of structural concrete introduced in examining bending, shear, and axial forces. Topic areas include beams, slabs systems, columns, foundations, retaining walls, and an introduction to prestressed concrete. Prerequisite: ARCH 322.

ARCH 421 Structural Design II (4) Design of steel structures.

ARCH 426 Structural Unit Masonry (3) *Lebert* Structural behavior and design of reinforced brick, tile, and unit masonry structures. Prerequisite: CEE 381. Offered: jointly with CEE 455.

ARCH 430 Materials and Processes (3) *Vanags* Lectures, field trips, and laboratory sessions directed toward the nature, potentials, and limitations of a variety of materials (wood, metal, plastics, inorganic cementing materials, minerals, rocks, and clay) and the processes involved with their production, fabrication, and system compatibility.

ARCH 431 Environmental Control Principles (3) *Heerwagen* Daylighting of buildings, reducing noise and enhancing sound for communication, and regulating heat transfer for occupant thermal comfort; description of passive means for environmental control, including presentation of scientific explanations and design guidelines for utilizing these means; design guidelines are intended for use in the preliminary schematic design phase. Offered: AW.

ARCH 432 Construction Materials and Assemblies II (3) Lectures and readings pertaining to a survey of materials, assemblies, and techniques of assembly of concrete and steel frame, commer-

cial exterior envelope, and interior partitioning building constructions systems. Prerequisite: either ARCH 400 or CM 313.

ARCH 433 Active Control Systems for Building Operation (3) NW *Heerwagen* Electrical, mechanical (HVAC), plumbing, and fire safety systems for buildings. Descriptions of what these systems do, where they are used, how they are integrated into the overall building design; rules of thumb, design strategies, and short cuts for anticipating system design and use. Prerequisite: either ARCH 331 or ARCH 431.

ARCH 434 Color and Light (3) *Millet* Lectures, demonstrations, exercises, and projects focusing on the use of color applied to the three-dimensional architectural context. Color theory is explored with the multiple effects of changing light.

ARCH 435 Principles and Practices of Environmental Lighting (3) *Millet* Perception-based approach to principles of natural and artificial lighting. Practical considerations of lighting involving environmental evaluations, calculations and the use of lamps and fixtures. Sketch and model studies for applications. Impact of lighting design on energy conservation. Relation of lighting design process to architectural design concepts. Prerequisite: either ARCH 331 or ARCH 431.

ARCH 436 Building Acoustics (3) NW *Heerwagen* Description of principles and practices for manipulating and enhancing sound in buildings. Information about sound behavior and the organization of architectural elements (deployment of design features, including various geometries and materials) for the control of sound in enclosed spaces and between adjacent spaces.

ARCH 437 Passive Thermal Controls (3) NW *Heerwagen* Devices for achieving energy-efficient buildings, analytic methods for evaluating likely thermal performances of buildings and building envelopes, resistance and capacitance of building materials, air flow through and around buildings, energy codes and industry standards, and strategies for integrating analytic techniques and guidelines into the architectural design process. Prerequisite: either ARCH 331 or ARCH 431.

ARCH 439 Light Frame Building Assemblies (3) *Vanags* Fundamentals of light-frame construction from soils examination, foundation systems to framing systems, and the integration of electrical, plumbing, and heating/cooling into the structure. Prerequisite: either ARCH 332 or CM 313.

ARCH 443 Iberoamerican Architecture I: Meso-America (3) VLPA *Palleroni* Advanced introduction to precolombian, colonial, and postcolonial architecture and urbanism of Mexico and Meso-America. Using methodologies drawn from culture studies, covers approximately four distinct periods spanning from Teotihuacan to the late twentieth century.

ARCH 444 Iberoamerican Architecture II (3) VLPA *Palleroni* Advanced introduction to postcolonial and modern architecture and urbanism of the Iberian peninsula and Latin America. Using methodologies drawn from culture studies, covers the cultures of Spain, Portugal, and Latin America after the period of colonialization and the nature of their continued relationship.

ARCH 445 South Asian Architecture I (3) VLPA *Prakash* Advanced introduction to precolonial architecture and urbanism of South Asia. Using methodologies of culture studies, examines select Hindu, Buddhist, and Islamic case studies on a comparative genealogy.

ARCH 446 South Asian Architecture II (3) VLPA *Prakash* Advanced introduction to colonial and postcolonial architecture and urbanism of South Asia.

Using methodologies of culture studies, covers 1800 to present, emphasizing the past 50 years since India's independence in 1947.

ARCH 447 Universal Design (3) I&S *Kiyak* Addresses implications of recent social trends and legislation (e.g., American with Disabilities Act, extended lifespan, elimination of mandatory retirement, changing workforce) on design; emphasizes importance of integrating accessibility design concepts, including related laws and codes, into diverse design projects, in order to make environment usable by broad cross-section of people. Offered: A.

ARCH 450 Modern Architecture and the Decorative Arts (3) VLPA *Anderson* History/theory seminar investigates parallel and interactive developments in European architecture and the decorative arts from 1870 to 1930. Examines the production of designers as well as the economic, political, and cultural circumstances that affected their work.

ARCH 451 Traditional Chinese Architecture and Gardens (3) I&S/VLPA Introduction to Chinese architecture (palaces, homes, temples, tombs), urban planning, and gardens; each area examined in terms of techniques of production, visual styles, historical development, and relationship to traditional Chinese cultural values. Recommended: some background in Chinese art, history, language, or literature. Offered: jointly with ART H 411.

ARCH 452 Characteristics of Puget Sound Architecture and Towns (3) I&S *Hildebrand* Puget Sound architectural and town environment in terms of its historical development, but specifically including recent and pending changes affecting this environment in significant ways.

ARCH 454 Greek Architecture (3) VLPA *Langdon* Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with ART H/CL AR 446.

ARCH 455 Special Studies in Gothic Art and Architecture (3) VLPA *Hildebrand* Detailed study of Gothic architecture and its accompanying sculpture and stained glass, with special emphasis on the twelfth and thirteenth centuries in France and England. Offered: jointly with ART H 455.

ARCH 456 Nineteenth-Century Architecture (3) VLPA *Clausen* From late eighteenth-century French rationalists, Neoclassicists, to *fin de siècle* Vienna and Paris. Includes theorists such as Ruskin, Viollet-le-Duc, and Semper; major movements, such as the Arts and Crafts, and the French Ecole des Beaux-Arts method of design. Offered: jointly with ART H 490.

ARCH 459 Architecture Since 1945 (3) VLPA *Clausen* Theories and forms in architecture from the end of World War II to present. Includes new wave Japanese architects, recent Native-American developments, and non-Western as well as Western trends. Offered: jointly with ART H 493.

ARCH 460 Design Theory and Analysis (3) I&S/VLPA *Dee, Seligmann* Problematical nature of philosophies of architecture; interaction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism.

ARCH 461 Recent Developments in Architectural Theory (3) I&S/VLPA Concentrates particularly on developments that spring from recent work in the epistemology of science and in philosophy.

ARCH 462 Spatial Composition in Architecture (3) *Palleroni* Advanced introduction to compositional strategies in architecture. Drawing on a historical survey of the development of Western Architecture, the seminar investigates different compositional strate-

gies and their relationship to cultural values and systems of meaning. Intended as complement to the design studio.

ARCH 463 Theories of Representation (3) *Anderson* Seminar focusing on the development of representational techniques in western architecture from antiquity to the present which seeks to discover how these techniques have affected the realization and interpretation of architecture. Prerequisite: ARCH 350; ARCH 351; ARCH 352.

ARCH 476 Design and the Uniform Building Code (3) Lectures, case studies, and exercises to provide a detailed review of non-structural sections of the Uniform Building Code (UBC) including designer responsibility, code background, purpose, and requirements based on occupancy, construction type, and building design features. Prerequisite: either ARCH 302 or CM 313.

ARCH 478 CAD and Working Drawings (4) Intensive introduction to computer-aided design systems for developing construction documentation (working drawings). Lectures and exercises focus on learning the methodology for using CAD to efficiently prepare working drawings, as well as discussions regarding industry recognized standards and current technology used in the preparation of documentation. Prerequisite: ARCH 380; CM 313. Offered: ASpS.

ARCH 481 3D Modeling and Rendering (3) *Johnson* Lectures and weekly exercises focus on understanding and applying the underlying principles of 3D computer graphics and rendering software. Topics include user-interface, data creation and modeling, lighting models, smoothing, texture mapping, ray tracing, radiosity, animation, and solid modeling. Prerequisite: ARCH 380. Offered: ASp.

ARCH 482 Web Weaving (3) *Gross, B. Johnson* Examines the function, limitations, and uses of primary World Wide Web technologies and fundamental Web site design and implementation. Participants develop hands-on design/build expertise for Web site design, implementation, and maintenance using readily available tools and techniques. Looks beyond today and explores emerging Internet technologies. Offered: A.

ARCH 483 Design of Virtual Environments (3) Explores through a blend of technical exercises constructing computational artifacts, readings, and discussions of relevant literature, the possibilities of online virtual environments. Incorporates a term project or paper based on exercises and readings. Offered: W.

ARCH 484 Design Computing Seminar (3) *E. Do* Weekly colloquium and discussion forum. Discusses design computing research and report on ongoing project progress, with demonstrations and guest speakers. Explores design computing, design thinking and design process, and inventing new computer aided tools for design. Offered: W.

ARCH 485 Digital Craft Workshop: Advanced Projects in CAD (3) Advanced topics for students who have completed one or more design computing courses and wish to develop a project further. Offered: W.

ARCH 486 Computer Graphics Programming for Design (3) *Do, Gross* Introduction to fundamental concepts of computer programming for design applications with an emphasis on interactive graphics. Basic control and data structures for interactive graphics programming; weekly exercises with term project. Significant lab time required. Offered: ASp.

ARCH 488 American Architecture (3) *VLPA Clausen* American architecture from indigenous

native American traditions to the present. Offered: jointly with ART H 488.

ARCH 493 Rome Preparation Seminar (2) Seminar dealing with history, culture, topography, and customs of Rome, Italy. Required for students enrolling in 495, 496, or 497.

ARCH 495 Architectural Studies Abroad (9) Urban history and development of the city of Rome through first-hand studies of its topography and morphology. City's more recent quarters become subject of group research relative to problems and potentials of growth and future development. Students may be registered concurrently in an appropriate studio section. Prerequisite: ARCH 493.

ARCH 496 Architectural Studies Abroad (9) Studio-oriented projects and application of experience gained during preceding program. Seminars held in collaboration with Italian students, professionals, and educators. Prerequisite: ARCH 495.

ARCH 497 Italian Hilltowns (9) *I&S/VLPA Zarina* Introduction to origins and development of built forms prevalent in the hilltowns of central Italy, a comparative analysis of domestic architecture in the agricultural context of the confluence zone of Tuscany, Umbria, and Latium and a historical survey of fortresses, castles, palaces, villas, and gardens of upper Latium. Prerequisite: ARCH 493.

ARCH 498 Special Projects (1-12, max. 12) Instructor-initiated and department-approved systematic study and offering of specialized subject matter. Topics vary and are announced in preceding quarter.

ARCH 499 Undergraduate Research (1-6, max. 6)

Courses for Graduates Only

ARCH 500 Architectural Design Studio (6) Architectural design, with emphasis on development of professional skills in design synthesis. Specific focus on preservation design. Majors only.

ARCH 501 Architectural Design Studio (6) Architectural design, with emphasis on development of professional skills in design synthesis. Specific focus on urban design. Majors only.

ARCH 502 Architectural Design Studio (6) Architectural design, with emphasis on development of professional skills in design synthesis. Specific focus on design development. Majors only.

ARCH 503 Architectural Design Studio Options (6) Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

ARCH 504 Architectural Design Studio Options (6) Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

ARCH 505 Architectural Design Studio Options (6) Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

ARCH 506 Advanced Architectural Studies (6) Advanced experimental studies dealing with significant architectural relationships that involve scholarly investigation, development, and presentation of results.

ARCH 520 Advanced Wood Structures Design (3) *Albrecht* Design methods related to wood structures. Nature of wood as a building material, plywood, glued laminated wood structures, timber piles and pile foundations, pole buildings, and conventional wood building framing.

ARCH 535 Graduate Seminar: Study Topics in Environmental Lighting (3) *Millet* Focus on individual student projects involving research and design for lighting.

ARCH 540 Evolution and Aesthetics (3) *Hildebrand* Exploration of new views toward the theory and philosophy of architectural aesthetics in which responses are seen as driven, in part, by predilections contributive to biological survival and evolution.

ARCH 551 Scandinavian Architecture of the Nineteenth and Twentieth Centuries (3) *Nyberg* Introduction to the contribution of Scandinavian architecture to early functionalism with emphasis on its relationship to neoclassicism and vernacular architecture.

ARCH 553 Special Studies in Architecture in the Ancient World (3) *Bosworth* Study and critical analysis of a selected topic from classical or preclassical periods. Prerequisite: ARCH 350.

ARCH 556 History of Chicago School Architecture (3) *Pundt* Study and critical investigation of the contribution of major architects in Chicago, the Midwest, and the West Coast from circa 1870 to 1920.

ARCH 558 Seminar in Twentieth-Century Architecture (3/5) *Clausen* Specific focus changes from quarter to quarter. Prerequisite: graduate standing with background in architecture, architectural history, or permission of instructor. Offered: jointly with ART H 591.

ARCH 559 American Utilitarian Architecture (3) *Hildebrand* Significant American environmental design efforts arising from utilitarian needs, e.g., factories, bridges, skyscrapers, and associated technical building innovations.

ARCH 560 Graduate Seminar on Architectural Theories (3) *Dee, Nyberg, Seligmann* Recent developments in architectural theory, urban design theory, criticism, and the methodology of criticism.

ARCH 561 Urban Design Theory (3) Study of development of nineteenth- and twentieth-century urban design theories and parallel developments in architecture and urban planning. Theoretical premises are related to current practices of urban design in various sociopolitical contexts, European as well as American. Evolutionary nature of theory emphasized. Prerequisite: URBDP 479 or permission of instructor.

ARCH 562 Regionalism (3) *Nyberg* Exploration of design ideas that address the cultivation of regional character by acknowledging the commonplace, including both the landscape and its buildings. The many disruptive forces that threaten the possibilities of local culture are also considered from a political, social, and economic point of view.

ARCH 563 Graduate Seminar in Architecture and Cultural Theory (3) *Prakash* Study of contemporary cultural studies and postcolonial writings in terms of their impact on architectural theory and practice. Topical seminar based on reading and individual research. Offered: W.

ARCH 570 Design Development (3) *Miller* Lectures and case studies emphasizing the design development phase of architectural practice.

ARCH 571 Project Feasibility (3) Social, political, and economic factors affecting the location, design, financing, construction, and marketing of buildings.

ARCH 572 Specifications and Contracts (3) *Brown* Detailed organization and composition of contracts, specifications, and related contract documents.

ARCH 573 Professional Practice (3) *Rees* Operation of an architectural office and professional practice.

ARCH 574 Design and Construction Law (3) Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Emphasis on Washington state law. Offered: jointly with CM 500.

ARCH 576 Community Leadership Practices (3) *Sutton* Examines how to facilitate community design processes. Explores theories and methods of participation and applies them to creating community visioning tools. These tools are put to use during the spring charrette when city officials, neighborhood residents, K-12 students, and others create a shared vision for their community. Offered: W.

ARCH 577 Ethical Practice (3) *Sutton* Helps students develop ethical reasoning skills. Examines the sociology of professional practice leading to and understanding of the dilemmas associated with serving a diverse society. Reviews exemplary case studies in ethical practice. Communication skills developed through writing and dialogue, and creation of an exhibit exploring an ethical issue. Offered: W.

ARCH 581 Historic Preservation of Architecture, USA (3) *Pundt* American achievements in historic preservation and restoration of architecture. Prerequisite: specialization in preservation design or permission of instructor.

ARCH 582 Technical Issues in Preservation Design (3) *Sivinski* Issues, practices, and procedures involved in preservation and reuse of old and historic buildings. Technical and esthetic means by which practicing professionals approach the analysis, interpretation, and resolution of problems such work raises. Emphasis on recent and local projects and related experiences.

ARCH 583 History of Historic Preservation in Europe (3) *Pundt* European achievements in historic preservation and restoration of architecture. Prerequisite: specialization in preservation design or permission of instructor.

ARCH 587 Theory of Design Computing (3) *Gross* Examines the relationship between theory of design and computational tools for practice. Explores how the emergence of computers as a mainstream tool in design has already changed architectural practice. Discusses how, as with other technologies that revolutionized the practice of architecture, information technologies carry hidden implications about design process and products. Offered: A.

ARCH 588 Research Practice (3) Provides the opportunity for a guided preliminary exploration and refinement of a research topic, prior to thesis proposal. Weekly seminar meetings focus on student work with regular presentations and discussions. Offered: W.

ARCH 599 Thesis Preparation (3) *Do* Explores development of a proposal for thesis-level research. Participants identify a research area, find relevant literature and prepare an annotated bibliography, articulate a specific question within the research area, and write, present, and defend a proposal. Participants may use this course to develop a thesis proposal. Offered: Sp.

ARCH 590 Urban and Preservation Issues in Design (3) Introduction to recent theory and prac-

tice in the fields of urban design and historic preservation primarily in North American urban contexts, including examples of recent projects presented by practicing professionals.

ARCH 591 Architecture in the Landscape (3) *Loveland* Advanced introduction to the relationships between buildings and places in the landscape with an emphasis on western concepts of nature. A taxonomy of place as nature is developed. Ways in which the architect can design places that landscape taxonomy are explored.

ARCH 593 Residential Design: Methods and Practices (3) Review of approaches to housing people in growing metropolises and cities, nineteenth century to present. Emphasis on Western Europe, North and South America. Focus on selected contemporary issues in neighborhood and dwelling design, methods, and practices. Offered: jointly with URBDP 574.

ARCH 596 Fieldwork in Professional Practice (*, max. 9) On-location study under the supervision of a practicing professional involved in an aspect of environmental design. Credit/no credit only.

ARCH 598 Special Topics for Graduate Students (1-6, max. 6) Systematic study and offering of specialized subject matter. Topics vary and are announced in the preceding quarter. May be repeated for credit.

ARCH 600 Independent Study or Research (*) Credit/no credit only.

ARCH 700 Master's Thesis (*) Credit/no credit only.

Construction Management

116 Architecture



General Catalog Web page:
www.washington.edu/students/gencat/academic/Construction_Management.html



Department Web page:
depts.washington.edu/cmweb/

The construction industry requires highly qualified professionals to manage its increasingly complex technical and management operations. The Department of Construction Management offers high-quality education and training to meet this demand. The interdisciplinary curriculums contain a mix of technical, managerial, and business courses to provide graduates with the essential skills needed to be successful in the construction industry. Oral and written communication skills are strengthened through written requirements and student presentations.

Construction Management is one of four departments within the College of Architecture and Urban Planning. The department was originally established as the Building Technology and Administration program in 1964; it began offering a Bachelor of Science in Building Construction degree in 1968 and a Master of Science in Construction Management degree in 1994. The mission of the Department of Construction Management is to offer a high-quality education in building construction and to conduct construction-related research.

The major objectives of the department's educational programs are:

1. To provide a valuable education that can prepare individuals to assume technical- and management-level positions in the construction industry.

2. To serve society and the construction industry each year by graduating 45 students who can obtain employment in the construction or related industries.
3. To conduct research that benefits the construction industry and the community.
4. To ensure that the undergraduate program remains in full accreditation status by the American Council for Construction Education.
5. To maintain positive relationships with the construction and related industries.
6. To encourage service projects that benefit the community.

Emphasis is on course work that enables graduates to develop (1) technical skills necessary to define and solve practical construction problems; (2) self-discipline, analytical, and reasoning skills; (3) managerial skills necessary to make and implement sound and timely decisions in a prudent and professional manner; (4) broader perspectives of the humanities and social and natural sciences; and (5) the ability to effectively communicate verbally and in writing.

The department's faculty consists of a mix of permanent full-time professors and part-time lecturers. The full-time faculty members have construction experience. The part-time lecturers are mostly industry practitioners and include general contractors, specialty contractors, architects, engineers, and attorneys.

Graduate Program

Graduate Program Coordinator
116 Architecture Hall, Box 351610
206-685-4440

Master of Science in Construction Management

The evening Master of Science in Construction Management degree program makes high-quality graduate education accessible to working professionals. All graduate courses are offered during the evening to accommodate people who work during the day. The curriculum was developed with industry input to provide graduates with the skills desired by the construction industry. The graduate curriculum has been structured to build upon the educational foundation gained in an undergraduate building-construction or construction-management curriculum. Students with different educational backgrounds will need to take prerequisite courses, as discussed below. Admission is competitive and students are admitted in autumn, winter, and spring quarters. Applications must be submitted by July 1 for autumn quarter, November 1 for winter quarter, and February 1 for spring quarter.

Admission Requirements: Admission to the Graduate School is granted by the Dean of the Graduate School. Application for admission is made to the Office of Graduate Admissions. The prospective student must hold a baccalaureate degree from an accredited college or university in the United States or its equivalent from a foreign institution. The applicant must submit a completed UW graduate application form and official transcripts from all previously attended colleges, universities, and institutes. A prospective student must present recent scores (within the past five years) from the Graduate Record Examination (GRE) that indicate a potential for successful completion of a Master of Science in Construction Management degree. The applicant should have at least a 3.00 GPA in the last 90 graded quarter hours, or last 60 graded semester hours. International applicants should refer to the Graduate

School section of this catalog for English language testing requirements. In addition, the Department of Construction Management requires a statement of personal goals and three letters of reference. All applications are reviewed by the department's Graduate Admissions Committee who make a recommendation regarding each applicant to the Dean of the Graduate School.

Prerequisite Requirements: All students admitted to the program who do not possess an undergraduate degree in building construction or construction management must complete the following prerequisite courses prior to admission into the graduate program or during their graduate studies: CM 333, 410, 411, 421, 422. All these prerequisite courses are offered during the day on a space-available basis with undergraduate students, or during the evening in the Construction Management Certificate Program offered by UW Extension. Three of the 400-level prerequisites may be counted toward elective requirements, if the student has been admitted to the graduate program prior to taking the prerequisites.

All students who do not have undergraduate degrees in building construction, construction management, engineering, or architecture must take the following prerequisites in addition to those previously listed: ARCH 320, 321, 322; CM 310, 313, 320, 321, 322, 323, 331, 332. Most of these prerequisites must be completed prior to admission into the graduate program.

Prerequisite courses may be validated if similar courses are reflected on the student's undergraduate transcript or if the student desires to take a validation examination. Students desiring to take a validation examination should contact the department's graduate program coordinator.

Graduation Requirements: The Master of Science in Construction Management degree program requires completion of a minimum of 45 credits of course work with at least a 3.00 cumulative GPA and satisfactory completion of either a thesis or report/project. A maximum of 6 credits may be earned for a report/project, and a maximum of 9 credits may be earned for a thesis.

Faculty

Chair

John Schaufelberger

Professor

Daniali, Saeed 1997; PhD, 1975, University of Lille (France); PD Koon endowed professor; structural and forensic engineering.

Associate Professors

Goldblatt, Steven M. 1982; JD, 1977, Golden Gate University; design and construction law, construction labor law and policy.

Nemati, Kamran M. * 1998; PhD, 1994, University of California (Berkeley); civil engineering materials, concrete technology, mechanical behavior of concrete.

Rolfe, George R. * 1984; MArch, 1968, MCP, 1968, University of Pennsylvania; urban development process, finance, feasibility and market analysis, urban design processes.

Schaufelberger, John E. * 1994; MSCE, 1970, PhD, 1971, University of Illinois; construction project management, construction business management, contract procurement.

Assistant Professors

Pace, Clark B. * 1994; MS, 1989, Colorado State University, MEng, 1991, PhD, 1999, University of California (Berkeley); real estate development, advanced cost analysis, labor projections, construction safety.

Rojas, Eddy M. 2001; MS, 1995, MA, PhD, 1997, University of Colorado (Boulder); modeling, simulation and visualization of construction processes, construction economics.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CM 410 Construction Estimating II (4) *Rojas* Principles and techniques for estimating commercial construction projects including a mock bid day exercise on a commercial construction project. Offered: A.

CM 411 Project Planning and Control (3) *Pace* Introduction to the basic principles, techniques, and practices used as tools by contractors to plan, schedule, and control costs on building construction projects. Offered: A.

CM 412 Construction Practice (3) *Rojas* Integration of classroom theory with practical experience through a direct, on-the-job internship and industry guest speakers. For majors in construction management with 135 credits completed. Offered: Sp.

CM 413 Competitive Business Presentations (1) *Schaufelberger* Study and development of skills needed to develop and deliver professional construction management presentations. Includes a series of workshops and practical exercises in construction presentation skills, teamwork, and leadership. Offered: A.

CM 415 Heavy Construction Practices (3) *Schaufelberger* Introduction to heavy construction with emphasis on highway and bridge construction. Topics include: contract analysis, work breakdown, equipment selection, unit-price cost estimating, site logistics planning, and project scheduling. Offered: A.

CM 420 Temporary Structures (3) *Nemati* Study of temporary structures used to support construction operations such as concrete formwork, scaffolding systems, shoring systems, cofferdams, underpinning, slurry walls, and construction dewatering systems. Offered: Sp.

CM 421 Project Management I (3) Introduction to the organization, management, and administrative functions on construction projects including a hands-on and extensive case study of a commercial construction project, cost control, and introduction to the concepts of Value Engineering, partnering, and Total Quality Management. Offered: W.

CM 422 Computer Applications in Construction (3) *Nemati* Introduction to microcomputer applications in construction industry. Discussion of available hardware and software is combined with practical assignments using estimating and scheduling programs designed for contractors, architects, and developers. Offered: W.

CM 423 Construction Law (3) *Goldblatt* Legal issues arising from design and construction services, focusing on risk management and liability aware-

ness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Washington state law is emphasized. Entry code required. Open to nonmajors on space-available basis. Offered: Sp.

CM 425 Concrete Technology (3) *Nemati* Introduction to the properties and behavior of concrete. Focuses on uses of concrete as a building material and new techniques for concrete construction. Offered: W.

CM 431 Project Management II (4) Capstone project using case studies to apply skills, knowledge, techniques, and concepts developed in prior courses. Emphasis on the concept of integrated project management, including cost estimating and bidding, scheduling, cost control, safety, project organization, and documentation. Offered: Sp.

CM 432 Soils and Foundations (3) *Daniali* Origin, classification, and physical properties of soil as used in engineering and construction applications, together with loads and stresses of soil on, and from, the more common types of engineering structures. Offered: AS.

CM 433 Construction Labor Relations (4) *Goldblatt* Introduction to construction labor topics, including labor-management organization, legislation, and regulation, collective bargaining, and job site administration. Offered: W.

CM 454 Introduction to Real Estate Finance (4) *Rolfe* Introduction to the financing of real-estate development projects, including a survey of capital markets, banking regulations, interest/discounting theories, debt instruments, and project financing. Offered: jointly with URBDP 454.

CM 455 Introduction to Real Estate Development Processes (5) *Rolfe* Introduction and survey of processes and people involved in developing real estate, including issues of site control, public/private approvals, feasibility analysis, project financing, design/construction, marketing, and asset management. Offered: jointly with URBDP 455.

CM 456 Real Estate Investment Seminar (4) *Rolfe* Analysis of private and public real estate investment decisions using case studies of individual development projects. Focuses on application of principles introduced in 453, 454, and 455. Prerequisite: CM 455/URBDP 455. Offered: jointly with URBDP 456; W.

CM 498 Special Topics (1-10, max. 20)

CM 499 Undergraduate Research (*, max. 12) Individual or small-group studies in which students may select topics with approval of faculty sponsor and department.

Courses for Graduates Only

CM 500 Design and Construction Law (3) *Goldblatt* Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Emphasis on Washington state law. Offered: jointly with ARCH 574. Offered: Sp.

CM 505 Advanced Integrated Computer Applications (3) *Rojas* Study of management information systems used in the construction industry. Emphasis on the utilization of current state-of-the-art integration of Computer Aided Design (CAD), scheduling (including advanced concepts such as resource leveling, schedule compression, and cash flow projections), and estimating programs. Offered: S.

CM 510 Advanced Construction Techniques (3) *Nemati* Study of techniques and practices used in complex construction projects, including industrial and high-rise structures, building renovation, and tenant improvements. Offered: A.

CM 515 Innovative Project Management Concepts (3) *Schaufelberger* Study of innovative concepts and trends in project management such as partnering, construction automation, and their application to construction projects. Total Quality Management, effective communication principles, leadership and team building are also examined. Offered: W.

CM 520 Construction Procurement Systems (3) *Schaufelberger* Study of the different methods used in the procurement and delivery of projects in the construction industry including lump sum, unit price, cost-plus, design-build, and construction management contracts. Offered: A.

CM 525 Cost Analysis and Management (3) *Pace* Study of cost management procedures applicable to the building process from the conceptual phase through owner operations, including conceptual estimating, project cost analysis and control, and value engineering and life-cycle costing. Offered: W.

CM 545 Real Estate Development (3) *Leahy* A study of the technical issues involved in developing real-estate projects. Tracks project development from initial conception through closing of the sale. Emphasizes the steps and processes involved in pursuing, analyzing, and closing a real-estate purchase. Offered: A.

CM 550 Residential Project Development (3) *Leahy* Study of the financial, technical, and management activities and environmental impact regulations and studies associated with the development of residential projects, including business and construction practices and marketing strategies for continued profitable operation of a residential construction firm. Offered: Sp.

CM 555 Construction Firm Management I (3) *Schaufelberger* Management of construction company including organization, corporate structure, operation procedures, marketing, and human resources management. Emphasis on safety and loss prevention management, insurance and risk management, financing, accounting, marketing construction services, and bonding requirements for construction company. Other topics include individual and corporate planning and process of strategic planning. Offered: W.

CM 560 Construction Firm Management II (3) *Huppert* Examination of the business practices, including market feasibility studies, related to use of Management Information Systems (MIS) in a construction company. Offered: Sp.

CM 565 Managing International Projects (3) *Schaufelberger* Study of processes involved in the selection, acquisition, and management of international construction projects. Emphasis is placed on examining common problems associated with managing construction projects outside the United States, identifying risks involved, and discussing possible solutions. Offered: Sp.

CM 570 Facilities Management (3) *Emam* Major issues involved in facilities management: facilities planning, financial planning, real estate management, interior space planning and management, facilities operation and maintenance, and emergency preparedness. Offered: A.

CM 598 Special Topics (1-6, max. 6) Systematic study and offering of specialized subject matter. Offered: AWSpS.

CM 600 Independent Study or Research (*, max. 6) An in-depth independent investigation of some facet of construction management. Offered: AWSpS.

CM 700 Master's Thesis (*, max. 10) Offered: AWSpS.

Landscape Architecture

348 Gould



General Catalog Web page:
www.washington.edu/students/genecat/academic/Landscape_Arch.html



Department Web page:
www.caup.washington.edu/html/larch/

Graduate Program

Graduate Program Coordinator
448 Gould Hall, Box 355734
206-543-2564, 206-616-3582
cauplarc@u.washington.edu

Master of Landscape Architecture

The Master of Landscape Architecture program, accredited by the American Society of Landscape Architects, is a professional program that offers training in design and inquiry. The design studios form the core of this program, which is supported by rigorous independent investigation in seminars and in a thesis project. Students are expected to develop a specialty within the discipline, under the professional guidance of the faculty. The curriculum emphasizes the following:

Urban Ecology. The rapidly changing environment of the Pacific Northwest offers an excellent opportunity for courses and thesis projects to explore the connections between culture and nature and to test ideas for how social and spatial conflicts between development and conservation might be addressed. The faculty are particularly interested in the changing roles of familiar urban and suburban landscapes, as these areas are increasingly expected to function as part of an ecological infrastructure. At the same time, diverse human cultural communities have developed with differing perceptions of and values for these changing landscapes. This department offers students the opportunity to study the rich cultural resources of these human communities as they develop new relationships to their environments, and to participate in this overlap between natural and cultural processes. The department currently offers students exposure to the social, cultural, and natural environment of central Mexico as an international example of community development and design.

Design Leadership. The faculty is committed to training students to be leaders in design practice and education. This includes the education of both children and adults to understand the consequences of human transactions with the natural environment. Courses are offered and research is being conducted on designing outdoor educational environments. Graduate students are also encouraged to develop independent leadership skills which will provide them with self-confidence and adaptability in a rapidly changing professional world. The primary areas in which students are encouraged to develop leadership abilities are in the definition and practice of design as a basis for interdisciplinary work, environmental education and the application of ecological concepts to urban design, the use of communication technology to develop creative solutions to cultural

and environmental conflicts, and international design-build projects in which students confront the global nature of contemporary development issues.

The graduate program considers applicants with and without previous design education, and encourages applications from persons with diverse academic and professional backgrounds. The faculty is experienced in teaching mature students and seeks to admit students with a range of ages, backgrounds, and interests. Students are encouraged to benefit from the location of the department within a broad and excellent research university by adding elective courses in other disciplines to their core curriculum. In addition, graduate students may elect to participate in College-wide certificate programs in Urban Design, and Preservation Planning and Design. See program descriptions in the preceding College section.

Program Requirements

Specific program requirements are arranged to fit each student's individual background. Seminar and field courses are selected to help students achieve their educational goals and develop a credible specialty area within landscape architecture. Students with a previous degree in landscape architecture begin course work with the Required Graduate Curriculum studios, while students from other educational backgrounds begin with the Basic Core design studios. The Required Graduate Curriculum sets the academic work required for the degree at 72 approved credits. In addition, a specialization must be developed in the area of a student's individual interests, which is worth 12 credits. This encourages students to deepen their knowledge in a particular area, while maintaining substantial flexibility for each individual.

A thesis is required of all master's degree program students. This is a creative, scholarly project which includes a rigorous written component. The thesis process allows students to develop greater intellectual maturity through independent inquiry, and to demonstrate mastery of a specialized subject area. Students select an appropriate methodology for the thesis in cooperation with their thesis adviser, and present the final product in either written and graphic form, or only in written form.

Admission Requirements

Candidates applying to the Master of Landscape Architecture program must apply both to the Graduate Admissions Office and to the Department of Landscape Architecture by January 15 to be considered for admission the following autumn quarter.

Admission to the Graduate School requires (1) a baccalaureate degree from an accredited U.S. college or university, or its equivalent in a foreign institution; (2) a GPA of 3.00 or higher in the last 90 graded quarter hours or the last 60 graded semester hours; and (3) a Graduate Record Examination (GRE) score taken within the past three years.

Admission to the Master of Landscape Architecture program is a competitive process with priority given to applicants whose abilities, as determined by the department's admissions committee, will enable them to complete the program expeditiously and with a high level of achievement. Please contact the department for additional information.

Faculty

Chair

Iain M. Robertson

Professors

Beyers, William B. * 1962, (Adjunct); PhD, 1967, University of Washington; regional science, economic geography, location theory, regional analysis.

Bradley, Gordon A. * 1972, (Adjunct); MLA, 1972, University of California (Berkeley), PhD, 1986, University of Michigan; forest land use planning, Conservation area planning and design.

Haag, Richard 1958, (Emeritus); MLA, 1952, Harvard University; theory and perception of landscapes, master planning, urban recreation, recycling landscapes.

Johnston, Norman J. * 1985, (Emeritus); PhD, 1964, University of Pennsylvania; urban design, history.

Ochsner, Jeffrey K. * 1987, (Adjunct); MArch, 1976, Rice University; history, preservation design, urban design.

Schauman, Sally * 1979, (Emeritus); MS, 1971, University of Michigan; visual resource analysis and evaluation, resource planning and conservation of stressed landscapes.

Streatfield, David C. * 1974; MLA, 1965, University of Pennsylvania; regional landscape planning, environmental history, landscape studies.

Sutton, Sharon E. * 1998, (Adjunct); MArch, 1973, Columbia University, PhD, 1982, City University of New York; the effect of the environment on learning and community well-being.

Vernez Moudon, Anne * 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Associate Professors

Alberti, Marina * 1996, (Adjunct); PhD, 1992, Massachusetts Institute of Technology; environmental planning, urban ecology, impact assessment, geographic information systems.

Booth, Derek B. * 1980, (Adjunct Research); PhD, 1984, University of Washington; environmental geology, particularly human influences on hillslopes, runoff, and rivers.

Dubrow, Gail Lee * 1989; MA, 1979, University of Oregon, PhD, 1991, University of California (Los Angeles); the social history of the built environment; historic preservation; issues of race, class and gender.

Ewing, Kern * 1990, (Adjunct); MS, 1978, PhD, 1982, University of Washington; wetland plant ecology, restoration ecology, ecosystem management.

Gross, Mark D. * 1999, (Adjunct); PhD, 1986, Massachusetts Institute of Technology; design and planning methods, architecture, computational models, human computer interaction.

Hill, Kristina * 1997; MLA, 1990, PhD, 1997, Harvard University; human dimensions of landscape change; urban ecology; urban design; urban hydrology.

Horner, Richard R. * 1981; PhD, 1978, University of Washington; effects of human activities on water resources in urban areas.

Loveland, Joel E. * 1986, (Adjunct); MArch, 1980, University of California (Los Angeles); energy conservation, design, research.

Palleroni, Sergio A. * 1992, (Adjunct); MS, 1987, Massachusetts Institute of Technology; design, design/build, cultural studies, cross-cultural education.

Robertson, Iain M. * 1982; MLA, 1975, University of Pennsylvania; designing with plants, planning and design of botanical gardens/arboreta.

Winterbottom, Daniel M. * 1993; MLA, 1988, Harvard University; urban landscape architecture, cultural landscapes, therapeutic and healing landscapes.

Assistant Professors

Do, Yi-Luen Ellen * 1999, (Adjunct); MDes, 1991, Harvard University, PhD, 1998, Georgia Institute of Technology; diagramming and freehand sketching, creativity, computer-aided design, cognitive studies.

Hou, Jeffrey * 2001; PhD, 2001, University of California (Berkeley); community design, cultural landscape, grassroots actions, environmental planning and activism.

Johnson, Julie M. * 1995; MCP, 1988, Massachusetts Institute of Technology; community design, urban parks, children's outdoor learning and play environment.

Manzo, Lynne C. * 2001; PhD, 1994, City University of New York; place attachment, place identity, politics of space, community development.

Rottle, Nancy D. * 2001; MLA, 1987, University of Oregon; ecological and sustainable design; educational and interpretive landscapes.

Wolf, Kathleen L. 1994, (Adjunct Research); MLA, 1987, PhD, 1993, University of Michigan; urban and community forestry, environment and behavior, urban landscape visual assessment.

Lecturer

Hamilton, Roxanne 1990; MLA, 1992, University of Washington; cultural landscapes; native American community design; therapeutic, restorative landscapes.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

L ARCH 401 Urban Recreation Design (1-6) I&S/VLPA Special studies in metropolitan, urban, and neighborhood recreation areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial areas. Design projects dealing with the play environment for all ages. Open to nonmajors.

L ARCH 402 Site Design/Cluster Housing (1-6, max. 6) 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 ARCH 403 Cultural Landscape Studio (1-6, max. 6) Studies of the landscape at various scales and in diversified contexts. Offers better understanding of visual components of landscapes, designer's capacity to evaluate and change these components, and resultant interaction with, and effect on, landscape user.

L ARCH 406 Individual Design Studio (6) Senior projects in landscape architecture; projects vary according to the student's particular emphasis and needs.

L ARCH 411 Landscape Graphics (3) Delineation techniques for landscape perspectives, sections, rendering of plant materials. Historical and contemporary examples of landscape drawing.

L ARCH 412 Landscape Communications (2) Multimedia and video production techniques and presentation methods suitable for public hearings, citizen groups, design commissions, and private clients. Individual projects and case-study examples.

L ARCH 423 Planting Design Studio (3) Utilization of plants as design elements to manipulate space and modify the landscape for various activities and resolutions of site problems. Factors that determine the appropriate use and arrangement of plant materials in an urban context. Composition, plant selection, planting techniques, and maintenance requirements are major components of this class.

L ARCH 425 Advanced Planting Design Studio (1-6, max. 6) Advanced seminar/studio in planting design. Provides opportunity to explore ecological, technical, and esthetic principles for selecting plants to meet specific site conditions. Project types include historical sites, multifamily housing projects, plazas, landfills, and reclamation sites.

L ARCH 433 Large-Scale Site Construction (4) 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.

L ARCH 440 Computers in Landscape Architecture (1-3, max. 3) Laboratory, lecture, and demonstration classes to introduce software applications specific to required landscape architecture courses. Credit/no credit only.

L ARCH 450 History of Environmental Design in the Pacific Northwest (3) VLPA Development of landscape architecture, architecture, and urban planning in the Pacific Northwest from nineteenth century to the present, with major emphasis on twentieth century. Open to nonmajors.

L ARCH 473 Professional Practice (3) Professional practice in private office, academic institutions, and public agencies. Evolution of landscape architecture as a profession, possible scenarios for future, variety of practice types and their relationships, ethical and legal/contractual responsibilities of a professional.

L ARCH 474 Project Design (1-6, max. 6) Detailed design studies of small-to-medium-scale projects. General focus on public landscape areas and social/psychological uses of site. Specific focus on design development and professional office presentation.

L ARCH 475 Advanced Project Design Studio (1-6, max. 6)

L ARCH 476 Professional Operations (3-6, max. 6) Practicum course for landscape architecture majors for internship and exposure to the profession with working experiences at various levels of professional endeavor. Student apprenticeship in selected private offices and public agencies. Credit/no credit only.

L ARCH 495 Landscape Architectural Studies Abroad (1-10, max. 30) Studies conducted under faculty supervision in various locations outside the United States.

L ARCH 498 Special Projects (1-10, max. 30) Special projects as arranged. Open to nonmajors.

L ARCH 499 Undergraduate Research (1-9, max. 9) Individual or small-group studies pertaining to special problems, theories, or issues of landscape architecture and environmental issues.

Courses for Graduates Only

L ARCH 501 Landscape Design and Planning I (1-6) Enhances perceptual awareness and design sensitivity to natural and man-made landscapes. Basic skills necessary for more advanced course work required in the Master of Landscape Architecture degree program. Examination of landscape environment through problem-solving techniques that acknowledge holistic approach to the environment.

L ARCH 503 Landscape Design of Communities (1-6) Methods and techniques for developing physical design solutions and implementation strategies in neighborhoods and small communities. Social, economic, political, and individual forces affecting community development and growth. Comparison of several communities, identifying pertinent landscape issues, potential design solutions, and methods for achieving design goals through the political process.

L ARCH 504 Regional Landscape Planning (1-6) Studio in applied regional landscape planning in metropolitan regions to examine conflicting land-use pressures of urban/rural fringe. Ecosystematic approach emphasizes maintenance of landscape quality. Computer applications in design.

L ARCH 505 Regional Landscape Design (1-6) Theory/techniques of regional design to analyze, evaluate, plan, design, and manage the resources of the regional landscape continuum.

L ARCH 506 Landscape Visual Resources (1-6) Survey of existing theory/techniques and the generation of new methods to analyze, evaluate, plan, design, and manage the visual resources of the landscape.

L ARCH 507 Landscape Art (1-6) Public art placed in, or developed for, specific landscape settings. Various aspects and benefits of public art, including materials, technologies, philosophies of landscape imagery and meaning. General planning criteria for location for maximum public benefit and identification of objectives for a specific site and artwork.

L ARCH 511 Visual Learning (3) Seminar/laboratory to develop visual learning processes and skills for applying these processes to landscape architecture. Related visualization concepts.

L ARCH 523 Landscape Technology (1-6) Studio on rehabilitation of stressed urban landscapes. Focus varies but often deals with an analysis of the potentials in urban watershed and the study of alternative site designs for enhancing a range of landscape functions related to water quality. Taught by an interdisciplinary team.

L ARCH 550 History and Theory of Modern Landscape Architecture (3) Lecture/seminar on history and theory of landscape architecture from the eighteenth century to the present. Relation to theory in related environmental design disciplines such as architecture and urban planning and other disciplines such as geography.

L ARCH 561 Regional Landscape Planning and Design (2) Seminar on objectives, philosophy, history, and theory of regional landscape planning and design. Overview of the context of regional land-

scape planning, examination of critical issues in the Pacific Northwest, and opportunities and role of the landscape architect in addressing these issues.

L ARCH 570 Scholarship and Research in Landscape Architecture (3) Seminar on the trends and results of research related to landscape architecture. Introduction to important scholars and researchers. Open to nonmajors with permission of instructor.

L ARCH 571 Seminar on Landscape Architecture Research (3) Introduction and exploration of problems and opportunities of several basic research methods currently employed in landscape architecture research. Emphasis on how researchers identify research topics and develop appropriate research methods. Introduce analysis and interpretation of research results.

L ARCH 590 Seminar in Landscape Architecture (1-3, max. 12) Advanced topics in landscape architecture with focus on unpublished areas of research.

L ARCH 598 Special Topics (1-6, max. 9) Systematic study of specialized regional landscape subject matter, including history, technology, implementation, and other topics depending on current interest/needs. Topics vary and are announced in the preceding quarter.

L ARCH 600 Independent Study or Research (*)

L ARCH 601 Internship (3-9, max. 9) Credit/no credit only.

L ARCH 700 Master's Thesis (*)

Urban Design and Planning

410 Gould



General Catalog Web page:
www.washington.edu/students/genecat/academic/Urban_Des.html



Department Web page:
www.caup.washington.edu/html/URBDP/

Urban design and planning deals with critical issues of human settlement and urban development. It provides communities with an informed basis for coordinated public- and private-sector action. Urban design and planning constitutes a professional field of growing complexity, responding to the urban complexities of this century and the next. The Department of Urban Design and Planning fosters an integrative approach to education and research in planning the physical environment. The academic program includes the social, behavioral, and cultural relationships between people and the form and quality of their built and natural environment; the financial, administrative, political, and participatory dimensions of planning, design, and development; and the informational base for making deliberate decisions to shape urban areas and regions, bringing analysis together with vision.

Departmental faculty are active participants in interdisciplinary research units of the College of Architecture and Urban Planning, including the Center for Community Development and Real Estate and the Institute for Hazard Mitigation Planning and Research. Faculty also participate in the Puget Sound Regional Synthesis Model (PRISM) University Initiative Fund program. The department also administers the Remote Sensing Applications Laboratory, concerned with applications in urban planning of remote sensing and geographic information systems (GIS) technology and the Urban Ecology Research

Laboratory. In addition, the College has a wide array of facilities for computer-based instruction related to design, including CAD, GIS, and visualization technology, and runs a joint program in advanced computer technology and virtual reality with the Human Interface Technology Laboratory of the Washington Technology Center.

Graduate Program

Graduate Program Coordinator
410 Gould, Box 355740
206-543-4190

The department offers the Master of Urban Planning (M.U.P.) degree and its faculty participate in the interdisciplinary Doctor of Philosophy (Ph.D.) in Urban Design and Planning. The M.U.P. is the professional degree, while the Ph.D. is primarily for students planning to enter research and teaching positions in urban planning and design.

The graduate program focuses on planning the physical environment and its socioeconomic and political determinants. Advanced students are encouraged to conduct research and studies in one of the following specializations:

- urban design dealing with physical form, character, and quality issues
- community development and real estate including public/private development processes
- preservation planning and design
- land-use planning, including its environmental, socioeconomic, legal, information systems, and administrative aspects.

Graduate students may elect to participate in the College-wide Certificate Programs in Urban Design, and Preservation Planning and Design. See program descriptions in the preceding College section.

Master of Urban Planning

The Master of Urban Planning degree is the usual educational qualification for professional practice of city and regional planning, including generalist planning, research, urban design, and administrative positions in a wide variety of public agencies and private consulting firms. It is a two-year, or six-quarter, program requiring a minimum of 72 credits.

Requirements for graduate-level study include a satisfactory academic record and undergraduate training in one of a variety of disciplines, including urban planning and environmental design or in other appropriate fields, such as geography, economics, or other social sciences; English and other humanities; civil engineering and environmental studies; or architecture and landscape architecture. Students planning to enter the program should have completed at least one college-level course in each of the following areas: economics, mathematics, statistics, American government, environmental systems, and cultural diversity. Students without sufficient background must take these prerequisite courses concurrently with their graduate studies.

The primary objective is to educate professional planners with a broad range of competence in planning and design; a second objective is to provide opportunities for individual studies in selected professional areas. Core course requirements include 32 credits covering the history and theory of planning and urban design, urban form, communication methods, quantitative methods, processes and methods of land use planning, planning law, research methods, and a planning studio. Also required are 17 credits of restricted electives, including a course in advanced methods and a second studio; both may

be in an area of specialization. In addition, a course in land-use planning, in urban development economics, and in history/theory of planning is required. A 9-credit thesis or professional project is required upon completion of all other degree course work. Of the 72 minimum credits required for the degree, 14 credits may be in open electives.

The core provides a foundation in urban design and planning for all students. An internship is encouraged for those without previous professional experience. A specialization in one area of planning is required. Six major specialized areas offered in the department include land-use planning and growth management, community development and real estate, urban design, preservation planning, environmental planning, and transportation planning.

Students are admitted to the M.U.P. program primarily in autumn quarter and all application material should be received by the department no later than the preceding February 1 (November 1 for international applicants). Graduate Record Examination general test scores, three letters of recommendation, transcripts of previous degree programs and any additional academic study, and a statement of purpose are required. TOEFL is required for international applicants.

Doctor of Philosophy

Some of the departmental faculty are part of an interdisciplinary faculty group which offers doctoral study in urban design and planning. The program is located administratively within the Graduate School. For a description of the program, see the Interdisciplinary Graduate Degree Programs section of the catalog.

Faculty

Chair

Hilda J. Blanco

Professors

Amoss, Harold L. 1963, (Emeritus); MA, 1947, University of New Mexico, PhD, 1951, University of California (Berkeley); planned social change, community organization.

Bell, Earl J. * 1966, (Emeritus); PhD, 1965, University of California (Berkeley); application of operations research methods to urban and regional planning problems.

Beyers, William B. * 1962, (Adjunct); PhD, 1967, University of Washington; regional science, economic geography, location theory, regional analysis.

Bradley, Gordon A. * 1972, (Adjunct); MLA, 1972, University of California (Berkeley), PhD, 1986, University of Michigan; forest land use planning, Conservation area planning and design.

Grey, Arthur L. * 1963, (Emeritus); PhD, 1954, University of California (Berkeley); scope of urban planning, land and development policy, uses of remote sensing in urban planning.

Hancock, John L. * 1969, (Emeritus); PhD, 1964, University of Pennsylvania; planning history, urban history, planning theory, social analysis and social evaluation methods.

Johnston, Norman J. * 1985, (Emeritus); PhD, 1964, University of Pennsylvania; urban design, history.

Ludwig, Richard L. * 1971; PhD, 1971, University of Pittsburgh; housing development planning, social factors in development planning.

Miller, Donald H. * 1970; PhD, 1972, University of California (Berkeley); urbanization processes, urban spatial structure, planning theory and evaluation.

Ochsner, Jeffrey K. * 1987, (Adjunct); MArch, 1976, Rice University; history, preservation design, urban design.

Rutherford, G. Scott * 1981, (Adjunct); PhD, 1974, Northwestern University; transportation planning and engineering, transit planning, demand forecasting.

Streatfield, David C. * 1974; MLA, 1965, University of Pennsylvania; regional landscape planning, environmental history, landscape studies.

Sutton, Sharon E. * 1998; MArch, 1973, Columbia University, PhD, 1982, City University of New York; the effect of the environment on learning and community well-being.

Untermann, Richard K. * 1971, (Emeritus); MLA, 1967, Harvard University; urban design and site planning, housing, recreation, nonmotorized circulation.

Vernez Moudon, Anne * 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Associate Professors

Alberti, Marina * 1996; PhD, 1992, Massachusetts Institute of Technology; environmental planning, urban ecology, impact assessment, geographic information systems.

Blanco, Hilda J. * 1996; MRP, 1984, PhD, 1989, University of California (Berkeley); factors influencing urban sprawl; the implications of cognitive science and evolutionary theory for.

Booth, Derek B. * 1980, (Adjunct Research); PhD, 1984, University of Washington; environmental geology, particularly human influences on hillslopes, runoff, and rivers.

Dubrow, Gail Lee * 1989; MA, 1979, University of Oregon, PhD, 1991, University of California (Los Angeles); the social history of the built environment; historic preservation; issues of race, class and gender.

Kasprisin, Ronald J. * 1989; MUP, 1968, University of Washington; community design studios, town planning, planning/design communications, urban design principles.

Norton, Thomas J. * 1968, (Emeritus); MUP, 1960, University of Washington; urban community facilities, planning administration.

Rolfe, George R. * 1984; MArch, 1968, MCP, 1968, University of Pennsylvania; urban development process, finance, feasibility and market analysis, urban design processes.

Ryan, Dennis M. * 1974; PhD, 1976, University of Pennsylvania; educational democracy, theory and practice of interdisciplinary education; urban design and planning.

Waddell, Paul A. * 1997; PhD, 1989, University of Texas (Dallas); urban policy, regional planning, growth management, land use, transportation, GIS.

Westerlund, Frank * 1971; PhD, 1977, University of Washington; remote sensing applications, energy development and conservation, regional environmental planning.

Assistant Professors

Bae, Christine * 1996; MRP, 1986, State University of New York (Albany), PhD, 1994, University of Southern California; transportation; environmental planning; land use; planning methodologies.

Campbell, Christopher D. 2000; MA, 1996, PhD, 2002, University of California (Los Angeles).

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

URBDP 407 Urban Planning Studio (5) I&S/PLA
Synthesis of urban design and planning problems and methods in a laboratory section.

URBDP 420 Database Systems and Planning Analysis (3) Applications of relational database management systems in urban design and planning. Emphasis on practical aspects of database design and use. Design, create, and modify databases and database applications, including spatial databases. Introduction to GIS. Use of personal computers linked to desktop mapping packages and relational database management systems.

URBDP 422 Urban and Regional Geospatial Analysis (5) *Alberti* Principles of GIS applied to problems in urban design and planning, landscape architecture, and environmental and resource studies. Practical problem-solving approaches using contemporary desktop mapping packages and vector and raster GIS systems. Siting, environmental evaluation and inventories, and modeling. Prerequisite: 3.0 in URBDP 420. Offered: W.

URBDP 451 Housing (3) I&S *Ludwig* Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priorities. Prerequisite: 3.0 in URBDP 300.

URBDP 454 Introduction to Real Estate Finance (4) *Rolfe* Introduction to the financing of real estate development projects, including a survey of capital markets, banking regulations, interest/discounting theories, debt instruments, and project financing. Offered: jointly with CM 454.

URBDP 455 Introduction to Real Estate Development Processes (5) *Rolfe* Introduction and survey of processes and people involved in developing real estate, including issues of site control, public/private approvals, feasibility analysis, project financing, design/construction, marketing, and asset management. Offered: jointly with CM 455.

URBDP 456 Real Estate Investment Seminar (4) *Rolfe* Analysis of private and public real-estate investment decisions using case studies of individual development projects. Focuses on application of principles introduced in 453, 454, and 455. Prerequisite: CM 455/URBDP 455. Offered: jointly with CM 456; W.

URBDP 457 Housing in Developing Countries (3) *Ludwig* Emphasis on role of the design and planning professional in housing delivery in developing countries. Exploration of issues of culture, political environment, social context, economic circumstances, and other factors which define and limit the manner in which the professional planner and designer can and should function.

URBDP 460 History of City Development (3) I&S/VLPA *Dubrow* Analysis of city forms and designs, emphasizing their relation to the culture of each period.

URBDP 465 Land Use (3) I&S *Westerlund* Land use as a substantive focus for urban and regional planning and growth management. Consideration of data collection, analysis, plan development, and implementation methods. Seminar and group project sections.

URBDP 466 Infrastructure and Community Facilities (4) Blanco Issues and methods associated with planning for parks, schools, drainage, sewerage, utilities, libraries, solid waste and transportation. Covers their relationship to comprehensive plans, project permitting and impact assessment. Financing, regulating, and relationships to social, environmental, and economic goals are discussed.

URBDP 467 Urban Planning Uses of Remote Sensing (3) Westerlund Using aerial photographs and satellite image data in urban planning. Urban change analysis, land-use and land cover classification, and environmental planning applications. Scale and resolution considerations. Development of proficiency through laboratory exercises and use of image-processing software.

URBDP 470 Introduction to Urban Design (3) I&S/VLPA *Rolfe* Definitions and examples of urban design; heritage of urban design; theories of city building; the role of urban design in the fields of architecture, landscape architecture, and urban planning.

URBDP 471 History of Urban Design (3) I&S/VLPA *Streetfield* Aspects of form, pattern, and space that mark efforts of individuals and groups to express their values and goals in the design of their cities. Special attention given to both historical and modern examples.

URBDP 479 The Urban Form (3) VLPA *Moudon* Elements, patterns, and evolution of urban form. The forces that shaped cities in history. Contemporary trends. Methods of urban morphological analysis as related to urban design and planning practices. Required for MUP graduate students.

URBDP 481 Metropolitan Planning and Development in Developing Countries (3) I&S *Ludwig* Examination of the nature and causes of urban planning and management problems in developing countries and exploration of alternative approaches to solve some of these problems.

URBDP 494 Alaska Field Study (2) Kasprisin, Westerlund Travel to Alaskan communities for interpretation of natural systems, history, cultures, settlement patterns, and current issues of planning and economic development. Meetings with community leaders and planners. Students either select a topic for field and documentary research, or participate in intensive charrette-type projects or quarter-long projects in communities. Offered: Sp.

URBDP 498 Special Topics (1-9, max. 15) Systematic study of specialized subject matter. Topics for each quarter vary, depending upon current interest and needs, and are announced in the preceding quarter.

URBDP 499 Special Projects (1-12, max. 12) Independent/tutorial study for undergraduates. Individual reading, research, fieldwork, 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.

Courses for Graduates Only

URBDP 500 Survey of Urban Planning (3) Miller Concepts and logic of planning as a professional activity. Evolution of guiding ideas in relation to changing social, economic, and environmental conditions within the American political framework. Major procedures used by planners. Critical appraisal. Open to graduate students in urban design and planning and to graduate students in architecture seeking the urban design certificate.

URBDP 503 Communication and Analysis (4) Kasprisin Development of communication skills understanding within the planning and design process. Presentation of communications as a design process with mental, visual, oral, written, and kinesthetic cognitive actions combined to form communications thinking. Offered: W.

URBDP 507 General Urban Planning Laboratory (5) Studio/field project in applied professional planning of a comprehensive nature, 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.

URBDP 508 Specialized Planning Laboratory (5, max. 10) Blanco, Dubrow, Kasprisin, Moudon, Rolfe, Westerlund Studio/field project on a specialized planning problem. Several options are offered each year, such as regional-environmental planning, housing, metropolitan planning, and urban design. Prerequisite: ARCH 500 and ARCH 507. Additional prerequisite for some sections: urban planning seminar or lecture courses.

URBDP 510 Theories and Methodologies of Planning I (4) Bae Survey of the philosophy, methods, and analytical techniques used in planning public actions and policies, with emphasis on the logic and assumptions upon which these are based. Various planning surveys and methods. Open to graduate students in urban design and planning and to graduate students seeking the urban design certificate. Prerequisite: URBDP 500.

URBDP 511 Theories and Methodologies of Planning II (4) Blanco

URBDP 520 Quantitative Methods in Urban Design and Planning (4) Bae Methods of statistical and mathematical analysis in design and planning. Emphasizes the use of computer packages for analyzing urban data. Regression, matrix methods, cohort-survival populations models with examples solved on microcomputers. Prerequisite: college mathematics and basic course in probability and statistics.

URBDP 525 Evaluation in Urban Planning (3) Miller Methods and techniques for a priori assessment of physical improvement plans, program designs, public policies. Includes cost effectiveness and matrix or goal achievement, as well as more conventional cost-benefit and cost-revenue forms of analysis. Emphasis on understanding the reasoning and issues in evaluation, and gaining a working competence in at least one of the methods treated.

URBDP 530 Land-Use/Transportation Models (3) Waddell Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land-use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered: jointly with CEE 588.

URBDP 546 Practicum (4, max. 8) Rolfe Off-campus experience under academic supervision in situations useful to the education of planners, such as planning

offices, public bureaucracies, projects related to the environment, cross-cultural matters, and decision making. Assistance in identifying appropriate projects. Credit/no credit only. Prerequisite: permission of instructor.

URBDP 547 Professional Project (1-9, max. 9) Independent development of client oriented project involving application of professional planning/design methods and approaches. Professional-quality report relates project to larger professional context, addresses alternative approaches/methods and includes an evaluation of the project. Master of Urban Planning students only, taken in lieu of 700. Not recommended for those continuing into Ph.D. program. Credit/no credit only.

URBDP 560 Urban Affairs (3) Explores national/local urban policy concerning the major problems confronting cities and metropolitan regions today. Economic globalization, income inequality, and metropolitan decentralization shape the urban agenda, the context for urban policy, and the analytic focus of the course. A project allows the exploration of strategies for intervention. Offered: jointly with PB AF 560.

URBDP 561 Urban Economics and Public Policy (3) Examines the rationale for and consequences of public intervention in urban land, housing, and transportation markets through land use regulations such as zoning and urban growth boundaries, infrastructure investments, and fiscal policies to manage urban development and traffic. Prerequisite: PB AF 516 or equivalent. Offered: jointly with PB AF 561.

URBDP 562 Introduction to Neighborhood Planning and Community Development (3) Provides introduction to basic practices in neighborhood planning and community development, including theoretical/historical bases; developing neighborhood plans/projects; indicators and evaluation of neighborhood quality; community participation; institutional framework, ethical dilemmas, and professional roles. Addresses current issues, including Seattle's experience, NIMBYism, security, neighborhood character, housing segregation, environmental racism. Offered: jointly with PB AF 562.

URBDP 563 Seminar in Urban Planning and Policy (1) Seminar for students in the MPA/MUP concurrent degree program. Explores topics that intersect urban planning and policy, through exchange with faculty and professionals working in this arena. Focuses on developing thesis topics that explore this intersection. Offered: jointly with PB AF 563.

URBDP 570 Urban Design Process (3) Rolfe The study of concepts, methods, and processes basic to planning, design, and effectuation. Credit/no credit only. Prerequisite: specialization in urban design or permission of instructor.

URBDP 571 Research and Analytical Methods for Urban Design (3) Moudon Conceptual framework for an epistemology of urban design and physical planning. Review of relevant research in related fields and disciplines. Prerequisite: specialization in urban design or permission of instructor.

URBDP 572 Case Studies in Urban Design and Development (3) Kasprisin Wide range of urban design and development projects recently completed. Effective urban design implementation, including design process, decision making, administration, management. Tools and techniques such as design analysis, policy making, regulation, design review, taxation, financing. Prerequisite: URBDP 510 and URBDP 580 and/or permission of instructor.

URBDP 574 Residential Design: Methods and Practices (3) Dubrow Review of approaches to housing people in growing metropolises and cities, nineteenth century to present. Emphasis on Western

Europe, North and South America. Focus on selected contemporary issues in neighborhood and dwelling design, methods and practices. Offered: jointly with ARCH 593.

URBDP 580 Legal and Administrative Framework for Planning (4) *Blanco* 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.

URBDP 585 Introduction to Historic Preservation Planning (3) *Dubrow* Theories, methods, and practices associated with historic preservation planning. Overview of preservation planning programs at federal, state, and local levels. Introduction to tools and methods needed to identify, document, evaluate, and plan for protection of historic properties. Provides opportunity to learn fundamentals of preservation planning through practical experience. Offered: Sp.

URBDP 586 Implementation in Preservation Planning (4) Analysis of recent case studies in imple-

mentation of preservation planning and urban design in terms of planning and design products and related processes, decision making, administration, management. Tools and techniques include design analysis, policy-making, regulation, design review, taxation, financing, public participation. Prerequisite: introductory course in preservation or urban design.

URBDP 587 Preservation and the Vernacular Environment (3) *Dubrow* Exploration of theoretical, methodological, and practical issues related to the preservation of vernacular architecture and cultural landscapes in the United States. Offered: W.

URBDP 591- Doctoral Seminar I (4-) 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. Prerequisite: master's degree or equivalent in a planning discipline.

URBDP -592- Doctoral Seminar II (-4-) 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. Prerequisite: master's degree or equivalent in a planning discipline.

URBDP -593 Doctoral Seminar III (-4) 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. Prerequisite: master's degree or equivalent in a planning discipline.

URBDP 598 Special Topics (1-6, max. 15) Systematic study of specialized subject matter. Topics vary for each quarter, depending upon current interest and needs, and are announced in the preceding quarter. Prerequisite: permission of instructor.

URBDP 600 Independent Study or Research (*)

URBDP 700 Master's Thesis (*)

URBDP 800 Doctoral Dissertation (*)



College of Arts and Sciences

Dean

David C. Hodge
050 Communications

Divisional Deans

Michael R. Halleran—Arts and Humanities
Craig J. Hogan—Natural Sciences
Susan Jeffords—Social Sciences
Julie K. Stein—Research



General Catalog Web page:
www.washington.edu/students/genocat/academic/arts_sci.html



College Web page:
www.artsci.washington.edu

The departments and schools of the College of Arts and Sciences offer graduate study leading to master's and doctoral degrees. Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must meet the general requirements of the Graduate School as outlined in 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.

Afro-American Studies

See American Ethnic Studies.

American Ethnic Studies

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat/.

American Ethnic Studies

AES 461 Comparative Ethnic Race Relations in the Americas (5) I&S Sketches the ethnocratic systems operating in American society. Studies these systems as systems and examines their institutional and interpersonal dynamics. Compares ethnocratic systems in order to arrive at empirical generalizations about race/ethnorelations in the Americas. Offered: jointly with SOC 461.

AES 462 Comparative Race and Ethnic Relations (5) I&S *Scott* Race and ethnicity are examined as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa,

Asia, and the Americas. Offered: jointly with SOC 462.

AES 489 Ethnicity, Gender, and Communication (5) I&S Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with COM 489/WOMEN 489.

AES 494 Community Practicum and Internship (3-5, max. 10) Faculty supervised practicum and internship experience in variety of settings and agencies, e.g., ethnic specific agencies, government and civic community-based offices. Students contribute skills and knowledge to respective communities and gain experience by working with professionals and community organizers. Credit/no credit only.

AES 495 Senior Seminar (5) I&S Focus on a central comparative theme for individual research topics.

AES 496 Senior Seminar II (5) I&S Second of a two-part senior seminar sequence required of all majors. Research and writing of a senior paper under supervision of an appropriate faculty adviser. Prerequisite: AES 495. Offered: AWPoS.

AES 498 Special Topics in American Ethnic Studies (1-5, max. 15) I&S Designed to provide the student an opportunity to concentrate on one specific aspect of American Ethnic Studies through a comparative, interdisciplinary approach.

AES 499 Independent Study or Research (1-5, max. 10) Independent readings and/or research under the supervision of a faculty member.

Afro-American Studies

AFRAM 401 Intermediate Swahili (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: either AFRAM 308 or AFRAM 309.

AFRAM 402 Intermediate Swahili (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: AFRAM 401.

AFRAM 403 Intermediate Swahili (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: AFRAM 402.

AFRAM 437 Blacks in American Law (5) I&S *Walter* Historical continuity for changing relationship between American jurisprudence and Black Americans, 1640-1986. Statutory and case law which determined role of Blacks in American society, and use of law by Blacks to gain civil and personal rights.

AFRAM 498 Special Topics in African American Studies (3-5, max. 15) I&S Topics in which students and faculty have developed an interest as a result of work done in other classes or as a result of the need to investigate in greater depth Afro-American Studies issues. Topics vary.

AFRAM 499 Independent Study and Research (1-5, max. 10) Identification and investigation of the problems and needs of the Black community. Methods and alternatives of approaching these problems and needs. Students designate their areas of interest and subsequently pursue research and problem solving.

Asian-American Studies

AAS 401 Asian-American Literature to the 1940s (5) VLPA Asian-American literature from nineteenth-century immigrants to the 1940s. Emphasis on Chinese, Japanese, and Filipino writings detailing the experience and sensibility of first generation immigrants. Early twentieth-century writing focus on

the development not only of Asian-American community, but also of second generation American-born Asian-American writers. Recommended: AAS 205 or AAS 206.

AAS 402 Contemporary Asian-American Literature (5) VLPA Asian-American literature from the 1940s to the present. Emphasis on the development of attitudes and identities in contemporary Asian-American literature, the role of the writer in a minority culture, and the relationship of literature to self and society.

AAS 498 Special Topics (5, max. 10) I&S

AAS 499 Undergraduate Independent Study (1-5, max. 10)

Chicano Studies

CHSTU 405 Advanced Chicano Studies (5) I&S *Gamboa* Chicano culture as related to current values and health practices, Mexican labor and immigration in both historical and contemporary setting. Chicano politics 1848 to present. Recurrent problems of Chicanos in society; social movement for acceptance and for self-determination.

CHSTU 416 Comparative Social Movements: Mexico and the United States (5) I&S *Pena* Historical, ethnographic, and theoretical perspectives in the study of Mexican-origin communities in social movements in Mexico and the United States with a focus on workers, immigrants, peasants, women, indigenous peoples, and students as forces of collective mobilization and social, cultural, and political change. Offered: jointly with ANTH 416; A.

CHSTU 498 Special Topics in Chicano Studies (3-5, max. 10) I&S *Gamboa, Olguin, Salas* Interdisciplinary course concentrating on one or more aspects of the Chicano experience.

CHSTU 499 Independent Study and Research (1-6, max. 10) *Gamboa, Olguin, Salas* Students work individually or in teams.

American Indian Studies

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat/.

AIS 425 Indians in Western Washington History (3) I&S *Harmon* Relations of Indians and non-Indians in the Puget Sound region, from the 1790s to the present, with emphasis on evolving ideas about Indian identity. Offered: jointly with HSTAA 417.

AIS 431 History of American Indian Education (5) I&S Traditional and European-introduced methods of schooling, the federal role in Indian education, and contemporary Indian education issues. Special attention to Indian concepts of learning; boarding school education; the role of the Bureau of Indian Affairs; current trends in bilingual and bicultural education for Indians.

AIS 440 Reading Native American Women's Lives (5, max. 10) I&S *Jacobs, Ross* Seminar based on social science writings, autobiographies, biographies, and fiction written by, with, or about indigenous women of the United States and Canada.

Prerequisite: either WOMEN 342, WOMEN 423, AIS 201, AIS 330, or AIS 423. Offered: jointly with WOMEN 440.

AIS 442 Images of Natives in the Cinema and Popular Cultures (5) I&S/VLPA Ross Cultural examination of images of native people in cinema and popular culture based on social science writings and films by or about natives in the United States and Canada. Prerequisite: AIS 330; WOMEN 200. Offered: jointly with WOMEN 442.

AIS 444 Criminality and "Deviance" in Native Communities (5) I&S Seminar based on social science writings and biographies written by and about incarcerated natives and "deviance" in Native communities in the United States and Canada. Prerequisite: AIS 330; WOMEN 200; WOMEN 310.

AIS 450 American Indian Song and Dance Tradition: Performance (3) VLPA Performance of various American Indian social dances, songs, and games. In-depth study of various American Indian vocal styles.

AIS 469 Special Studies in American Indians (3, max. 6) I&S Delineation and analysis of a specific problem or related problems in American Indian Studies. Offered occasionally by visitors or resident faculty.

AIS 475 Special Topics in Indian Studies (1-5, max. 15) I&S Current research and readings in American Indian Studies content areas.

AIS 499 Independent Study (1-5, max. 15) Readings and/or research under faculty supervision.

Courses for Graduates Only

AIS 590 Special Topics (1-5, max. 15) Offered by visitors or resident faculty as a one-time, in-depth study of special interest.

Anthropology

M32 Denny



General Catalog Web page:
www.washington.edu/students/genocat/academic/anthropology.html



Department Web page:
www.anthro.washington.edu/

Anthropology is a discipline committed to describing, interpreting, and explaining the historical, biological, and cultural diversity of the human species. This covers our species' evolutionary origins as well as our continual evolution through many millennia of biocultural microevolution. It also covers more recent sociocultural changes up through the current global flux in population, genes, languages, practices, and identities. Anthropology's unique contribution to the human sciences and humanities is its expansive scope—temporally and spatially—in studying the human species.

In studying anthropology, students can learn about the range of human situations in the world today. They can better understand how to find ways to live together in today's world of some six billion people, respecting profound human differences of outlook while building upon common human values. A degree in anthropology can be of value in many ways. A graduate degree prepares a student for college or university teaching, research, or work for government and non-government agencies, museums, and social and human services.

Graduate Program

Graduate Program Coordinator
M31 Denny Hall, Box 353100
206-685-1562

The department recognizes four principal subfields of anthropology within its faculty, programs, and curriculum: archaeology, biocultural anthropology, environmental anthropology, and sociocultural anthropology (including anthropological linguistics). The department offers four distinct Ph.D. programs within the subdisciplines. A Ph.D. program in sociocultural anthropology with emphasis in ethnomusicology is offered in cooperation with the School of Music. The M.A. degree may be earned within the Ph.D. programs. Graduate students are admitted to, and specialize in, their chosen subfields from the beginning of their graduate studies.

Admission Requirements

Applicants are admitted to begin study only during autumn quarter and are advised to have their application materials completed by the beginning of the prior January. A complete application file includes the Graduate School Application, official transcripts, the Supplementary Information Form, three recommendations, a statement of purpose, and scores from the Graduate Record Examination (GRE). International students are required to take the TOEFL exam as well as the GRE.

Program Requirements

For each of the respective graduate programs, completion of the core requirements and a reading knowledge of one foreign language are required. Under the guidance of a supervisory committee selected from the appropriate subfield, the student shapes an individual program. The major areas emphasized in the faculty and curriculum are the United States, Mexico, Africa, South Asia, Southeast Asia, China, Oceania, and the post-Soviet states. The M.A. degree usually requires two years of graduate study; the Ph.D. programs usually require at least three years beyond the master's level, including a year of independent field research and a year to organize field materials and write a doctoral dissertation.

Financial Aid

One-year fellowships are awarded to one or two outstanding entering students. A limited number of teaching and research assistantships and hourly positions are offered primarily to advanced students. Some students may be qualified for a few National Resource Fellowships for Language Studies. Work-study positions may also be available for eligible graduate students.

Faculty

Acting Chair

Eugene S. Hunn

Professors

Close, Angela E. * 1995; MA, 1974, PhD, 1976, Cambridge University (UK); archaeology; lithic analysis; prehistory of North Africa; human origins.

Dunnell, Robert C. * 1967, (Emeritus); PhD, 1967, Yale University; archaeological theory, field method, eastern North America.

Grayson, Donald K. * 1975; PhD, 1973, University of Oregon; North American prehistory, paleoecology, vertebrate faunal analysis, history of archaeology.

Harrell, Stevan * 1974; PhD, 1974, Stanford University; family systems, demography, social evolution, religion, China, Taiwan.

Hunn, Eugene S. * 1972; PhD, 1973, University of California (Berkeley); cognitive anthropology, ethnobiology, cultural ecology and evolution, North American Indians.

Hutterer, Karl L. * 1990, (Affiliate); PhD, 1973, University of Hawaii; prehistory, ethnology of Southeast Asia, East Asia.

Jacobs, Sue-ellen * 1974, (Adjunct); PhD, 1970, University of Colorado (Boulder); women studies, socio-cultural and applied anthropology, anthropological studies of women.

Kahn, Miriam * 1986; PhD, 1980, Bryn Mawr College; museum exhibits, cultural representations, senses of place, tourism, Pacific Islands.

Keyes, Charles F. * 1965; PhD, 1965, Cornell University; interpretive anthropology, religion and political-economic change, ethnic group relations, sociology.

Miller, Marc * 1979, (Adjunct); PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology and social/cultural change.

Muecke, Marjorie A. * 1979, (Adjunct); PhD, 1976, University of Washington; community health, medical anthropology, reproductive health, Southeast Asia (Thailand).

Nason, James * 1970; PhD, 1970, University of Washington; sociocultural anthropology, museology, material culture, cultural heritage, Micronesia, North America.

Newell, Laura L. * 1957; PhD, 1967, University of Washington; primatology growth and development, human biology, evolutionary aspects of dermatoglyphics.

Nute, Peter E. * 1970, (Emeritus); PhD, 1969, Duke University; genetics and evolution.

Pena, Devon G. * 1999; PhD, 1983, University of Texas (Austin); agroecosystems (southwestern U.S.); environmental history; political ecology of complex systems.

Smith, Eric A. * 1980; PhD, 1980, Cornell University; ecology, evolutionary theory, hunter-gatherers, demography, Native Americans, Canadian Inuit.

Spain, David H. * 1968, (Emeritus); PhD, 1969, Northwestern University; psychocultural anthropology, African studies, research methods.

Stein, Julie K. * 1980; MA, 1976, PhD, 1980, University of Minnesota; New World archaeology, Northwest coast archaeology, geoarchaeology, shell middens.

Wenke, Robert J. * 1975; PhD, 1975, University of Michigan; archaeology of Egypt, the Middle East, and quantitative methods.

Winans, Edgar V. * 1957, (Emeritus); PhD, 1959, University of California (Los Angeles); politics, economics and law, Africa, the developing world.

Witherspoon, Gary J. * 1987; PhD, 1970, University of Chicago; language, art and history of the Southwest.

Associate Professors

Anagnost, Ann S. * 1990; PhD, 1985, University of Michigan; ethnography of the state, ideology and popular culture, peasant society; China.

Eck, Gerald G. * 1974; PhD, 1977, University of California (Berkeley); primate paleontology, especially African Pliocene-Pleistocene monkeys and hominids.

Ellingson, Terry J. * 1983, (Adjunct); PhD, 1979, University of Wisconsin, MA, 1979, University of Chicago; ethnomusicology, anthropology, religion, Tibet, Nepal, Buddhism.

Feathers, James K. * 1983; PhD, 1990, University of Washington; luminescence dating of sediments and pottery from archaeological sites.

Kyes, Randall C. * 1994, (Adjunct Research); PhD, 1989, University of Georgia; primate behavior and ecology, neural mechanisms of behavior.

Leonetti, Donna * 1978; PhD, 1976, University of Washington; biological and sociocultural interactions in population adaptation, epidemiology, Japanese Americans.

McGrath, Barbara B. * 1987, (Adjunct Research); PhD, 1993, University of Washington; ethnographic studies with U.S. Pacific Islanders on health issues, specifically, HIV/AIDS prevention.

Rhodes, Lorna A. * 1983; PhD, 1973, Cornell University; medical anthropology, symbolic anthropology, South Asia, religion, psychiatry.

Shell-Duncan, Bettina * 1995; MS, 1988, University of Wisconsin, PhD, 1994, Pennsylvania State University; health assessment in traditional societies, including immunity, nutrition.

Sorensen, Clark W. * 1989, (Adjunct); PhD, 1981, University of Washington; Korea, social change in East Asia, development, ethnic identity.

Assistant Professors

Bilaniuk, Laada M. 1997; PhD, 1998, University of Michigan; language politics, language ideology, ethnicity, nationalism, gender, Ukraine, former USSR.

Ferguson, G. (Jack) 1998; PhD, 1997, Stanford University; sociocultural anthropology.

Fitzhugh, J. Ben * 1997; PhD, 1996, University of Michigan; archaeology, anthropology, evolutionary ecology, complex hunter-gatherers, social evolution.

Holman, Darryl J. * 1999; MS, 1990, University of Wisconsin, PhD, 1996, Pennsylvania State University; human population biology, anthropological demography, paleodemography and statistical modeling.

Lowe, Celia 1999; PhD, 2000, Yale University; critical environmental studies, science studies, nationalism, post-colonial theory, identity, gender.

O'Connor, Kathleen A. * 1999; MS, 1987, PhD, 1995, State University of New York (Albany); biodemography, human reproductive biology and ecology, mortality, fertility.

Sivaramakrishnan, K. 1999; MS, 1991, MPhil, 1993, PhD, 1996, Yale University; environment, development and the State in south Asian agrarian societies.

Taylor, Janelle S. * 1999; PhD, 1999, University of Chicago; anthropology of medicine, science and technology, reproduction, gender, and consumption.

Senior Lecturer

Green, James W. * 1975; PhD, 1972, University of Washington; cross cultural, mental health, comparative aging, religion, West Indies, Pakistan, Islam.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

Anthropology

ANTH 401 West African Societies (3) I&S Social and cultural features of coastal and interior West African societies, including the Western Sudan. Detailed study of selected societies. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 402 Societies of Eastern and Southern Africa (5) I&S 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: one 200-level ANTH course or LING 203.

ANTH 404 South America (5) I&S Survey of anthropological research among the traditional peoples of South America. Historical background and contemporary life of cultural groups of the Amazonian Basin. Transformation of traditional life-styles through the process of European conquest and the aftermath of colonialism. Detailed study of selected societies. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 412 South Asian Social Structure (5) I&S Caste class, and community in modern India. Transitions from colonial typology to analysis of social change, diversity, stability, and caste hierarchy in rural society. Current debates on class and community in Indian society, rural and urban, explored through themes of identity, structure, and mobility. Prerequisite: one 200-level ANTH course. Offered: jointly with SISSA 412.

ANTH 416 Comparative Social Movements: Mexico and the United States (5) I&S *Peña* Historical, ethnographic, and theoretical perspectives in the study of Mexican-origin communities in social movements in Mexico and the United States with a focus on workers, immigrants, peasants, women, indigenous peoples, and students as forces of collective mobilization and social, cultural, and political change. Offered: jointly with CHSTU 416; A.

ANTH 418 Indian Heritage of Mexico and Central America (5) I&S Indian civilization of Mexico and Guatemala, their origins and ecological foundations. Contemporary communities of Mexico and Guatemala, focusing on creative adaptation of pre-Columbian traditions to modern national realities. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 420 Psychoanalysis and the Study of Culture (3) I&S *Spain* Anthropological use of theories developed by Freud to understand culture. Reviews psychoanalytic theory as a foundation for examining the work of Roheim, LaBarre, Devereaux, Kardiner, and Spiro, among others. Topics covered include the universality of oedipality and the utility of psychoanalysis in non-Western cultures.

ANTH 421 Belief, Ritual, and the Structure of Religion (5) I&S Systematic survey of concepts, models, and theories that characterize the anthropological study of religion. Consideration of the human universal basis of religion and of diverse ways in which religions are constructed and related to social experience. Prerequisite: either ANTH 321 or RELIG 201; RELIG 202.

ANTH 423 Traffic Across Cultural Boundaries (5) I&S Focuses on the movement of cultural patterns and processes across boundaries, examining the "contact zones" in colonial encounters, moving to borrowing and blendings along ethnic and national borders. Examines border crossing of immigration and diasporas. Ethnographic examples from the Americas and Africa. Prerequisite: one 200-level ANTH course.

ANTH 424 Hunter-Gatherer Societies (4) I&S Comparative examination of human foraging societies, emphasizing ethnographic cases and socioecological analysis. Foraging and human evolution; rationality of foraging societies; population and reproductive strategies; variability in social organization and land use; power relations between the sexes; ritual and belief; contemporary status of hunter-gatherer populations. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 425 Anthropology of the Post-Soviet States (5) I&S Analysis of Soviet and post-Soviet culture and identity. Historical transformations in Soviet approaches to ethnicity and nationality; contemporary processes of nationbuilding and interethnic conflict. Examination of culture through the intersection of social ritual, government policies, language, economic practices, and daily life. Regional focus will vary. Offered: jointly with SISRE 425.

ANTH 427 Anthropology in Urban Settings (3) I&S Cross-cultural examination of theoretical issues in anthropology as studied in urban places. Focuses on ethnic identity and the formation of urban ethnic groups; migration and its rural and urban consequences; family and kinship organization as an adaptation to urban complexity; the nature of urban voluntary associations; law and politics; and the developments in anthropological method. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 428 Anthropological Perspectives on Ethnicity (5) I&S Anthropological approaches to ethnicity and ethnic group relations with reference to other models including race, caste, class, regional groupings, nations, religion, and stratification. Data drawn from precolonial, colonial, and postcolonial periods. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 429 Expressive Culture (5) VLPA Anthropological view of one expressive aspect of culture: plastic and graphic arts, myth and folktale, music, dance, humor and tragedy, or play and games. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 430 The Anthropology of Music (3) I&S/VLPA Analysis of aspects of anthropological thought influential in ethnomusicology. Critical evaluation of dominant theoretical schools and modes of explanation, e.g., evolutionist, diffusionist, historical particularist, structuralist, functionalist, symbolist, and semiotic, through detailed examination of seminal texts. Offered: jointly with MUSIC 480; alternate years.

ANTH 432 Sociolinguistics I (5) I&S/VLPA Social variation in the phonology, morphology, syntax, lexicon of languages and dialects. Nonstandard language, diglossia, pidgins and creoles, gender differences, bi- and multilingualism, ethnography of speaking, pragmatics, and language attitudes. Prerequisite: either LING 200 or LING 400; recommended: prior or concurrent registration in ANTH 451 or LING 450. Offered: jointly with LING 432.

ANTH 433 Sociolinguistics II (3) I&S/VLPA *Wassink* Examines field methods linguists use in socially oriented studies of language variation and change. Students learn to target and design interviews appropriate for eliciting specific kinds of lin-

guistic data. Discussion of issues related to recording, ethics, and analysis of large bodies of data. Prerequisite: LING 432. Offered: jointly with LING 434.

ANTH 435 Economic Anthropology (5) I&S Chief features of nonmonetary and simple monetary economics. Impact of central or metropolitan market economy and industrial technology as peripheral systems, especially of small-scale and limited monetary circulation. Development and application in anthropology of economic concepts, including Marxian. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 436 Comparative Family Organization (5) I&S Function and structure of family developmental processes in band, tribal, peasant, and modern societies. Illustrates inter- and intrasocietal variation and provides data for construction of formal models of process and variation in family systems. Prerequisite: either one 200-level ANTH course, LING 203, or SOC 352.

ANTH 437 Political Anthropology and Social Change (5) I&S *Sivaramakrishnan* Study of politics from different anthropological perspectives, especially processual approaches to political change. Focused examination of cultural aspects of modern state formation in local and regional contexts. Themes: colonialism and nationalism, regime and transitions, local politics and global processes, social construction of bureaucracy. Prerequisite: one 200-level ANTH course.

ANTH 438 The Analysis of Kinship Systems (5) I&S Data, theories, and analytical technique used in the study of kinship systems, including our own, from around the world. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 440 Child Rearing, Culture, and Health (3) I&S 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. Offered: jointly with NURS 495.

ANTH 441 Psychological Anthropology (5) I&S Assessment of mutual relevance of cultural and psychological variables in anthropology. Historical development of principal topics, e.g., cognition, national character, enculturation, personality and social change, cross-cultural psychiatry, sex and temperament, deviance, and psychoanalytic studies of culture. Prerequisite: either PSYCH 101 or PSYCH 205.

ANTH 444 Politics of Representation in Modern China (5) I&S Focuses on issues of representation and power in twentieth century China. Combines substantive information on modern Chinese society and culture with recent debates in social theory and the politics of representation. Major themes include Chinese nationalism, body politics, popular culture, and everyday practice. Offered: jointly with SISEA 444.

ANTH 445 Literature and Society in Southeast Asia (5, max. 10) I&S/VLPA Focus on either Vietnam or Thailand. Provides students with opportunity to explore how those living in Southeast Asia have reflected on the radical social changes their societies have undergone through novels, short stories, and poetry. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with SISSE 445.

ANTH 446 Class and Culture in East Asia (5) I&S Examines the nexus between culture and systems of social stratification/class in East Asia, with an emphasis on Taiwan, Korea, Japan, and China. Topics include class formation, mechanisms of social mobility and reproduction, markers of status and hier-

archy, resistance, and the formation of class identity. Offered: jointly with SISEA 443.

ANTH 447 Religion in China (5) I&S Place of religion in Chinese society, examining the doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Prerequisite: either one 200-level ANTH course, ANTH 370, ANTH 403, LING 203, HSTAS 211, HSTAS 454, RELIG 202, SISEA 370, or SISEA 443. Offered: jointly with SISEA 445.

ANTH 448 Modern Korean Society (5) I&S Social organization and values of twentieth-century Korea. Changes in family and kinship, gender relations, rural society, urban life, education, and industrial organization since 1900. Differences between North and South Korea since 1945. Recommended: HSTAS/SISEA 212. Offered: jointly with SISEA 448.

ANTH 449 Social Transformation of Modern East Asia (5) I&S Comparative study of social change in China, Japan, Korea, and Vietnam since 1945. Concentration on small-scale social units in rural and urban areas under both communist and capitalist political systems. Recommended: two history or anthropology of East Asia courses. Offered: jointly with SIS 449.

ANTH 450 Language and Gender (5) I&S/VLPA *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis and other aspects of identity such as sexuality, class, and age. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with WOMEN 450/ LING 458.

ANTH 451 Comparative Historical and Social Ecology of the Tropics (5) I&S *Sivaramakrishnan* Historical and social aspects of tropical environmental change. Comparative analysis of resource management, conservation, and environmental regulation issues in Asia, Africa, and Latin America from cultural and political economic perspectives. Special focus on issues of state policy, expert knowledge, social conflict, and international politics. Offered: jointly with ENVIR 451. Prerequisite: ANTH 210.

ANTH 454 Women, Words, Music, and Change (5) I&S/VLPA Comparative analysis of use of myths, tales, music, and other forms of expressive culture to account for, reinforce, and change women's status and roles. Recommended: WOMEN 353. Offered: jointly with WOMEN 454.

ANTH 455 Areal Linguistics (3, max. 6) I&S/VLPA Issues involved in classification of languages. Systems of classification based on structure, word order, areal features. Ways in which languages may be classified for different purposes. Borrowing vocabulary specialization, lexical change, and language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with LING 455.

ANTH 456 Contemporary Ethnography (5) I&S Techniques and theories of ethnographic description for the anthropological analysis of contemporary life. Materials drawn from the contemporary United States, with a focus on issues and events in the Seattle area. Includes fieldwork projects. Prerequisite: either one 200-level ANTH course or LING 203.

ANTH 457 Ecological Anthropology (5) I&S Survey of anthropological research on interaction between human societies and their environments. Logic of different subsistence systems; intensification and transformation of subsistence strategies; population regulation; ecological aspects of human nutrition, dis-

ease, spatial organization, ethnicity, social stratification, conflict, and cooperation; historical roots of current ecological crisis.

ANTH 458 Ethnobiology: Plants, Animals, and People (5) I&S *Hunn* Culturally mediated relationships between human and natural environment studied in a comparative and evolutionary framework. How do peoples in diverse cultures recognize and name plants and animals and understand their relationship with nature? How is this traditional ecological knowledge applied in people's daily lives? Prerequisite: either BIO A 201, ARCHY 205, or one 200-level ANTH course.

ANTH 459 Culture, Ecology, and Politics (5) I&S *Pena* Critical studies of class, gender and race differences in environmental politics. The political-economic dimensions of ecological change. Contemporary environmental movements including the varieties of bioregionalism, deep ecology, ecofeminism, ecosocialism, environmental justice, and social ecology. Offered: jointly with ENVIR 459.

ANTH 460 History of Anthropology (5) I&S Sources and development of leading concepts, issues, and approaches in anthropology. Findings of anthropology in relation to scientific and humanistic implications and to practical application. Main contributors to field; their work and influence. Past, present, and future perspectives, including anthropology of modern life.

ANTH 464 Language Politics and Cultural Identity (3) I&S/VLPA *Bilaniuk* Theories and case studies of the power of language as how it is manipulated. Multilingualism, diglossia. Role of language and linguistics in nationalism. Standardization, educational policy, language and ethnicity. World languages, language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with LING 433.

ANTH 465 Critical Anthropology of Mass Culture (5) I&S Critical overview of theories of mass culture and their relationship to current anthropological practice. Analyses of the historical interconnections among capitalism and commodity fetishism, modernity and representation, and media and consumption.

ANTH 466- Anthropology Honors Thesis ([1-9]-, max. 18) I&S Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

ANTH 467 Anthropology of Education (5) I&S Uses a wide range of social theory and philosophy to investigate mechanisms which reproduce inequality and asymmetry in American education.

ANTH 469 Special Studies in Anthropology (3-5, max. 15) I&S Delineation and analysis of a specific problem or related problems in anthropology. Offered occasionally by visitors or resident faculty. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 470 Minority Peoples of China (5) I&S Interaction between China and the peoples of its periphery, including inner Asia, Tibet, northern mainland Southeast Asia, and aboriginal peoples of Taiwan. Emphasis on ethnicity, ethnic group consciousness, and role of the Chinese state. Prerequisite: one 200-level ANTH course; LING 203; either ANTH/SISEA 370 or HSTAS 454. Offered: jointly with SISEA 470.

ANTH 471 Colonialism and Culture (5) I&S Explores the cultural, political, and historical implications of the power to colonize. Readings include ethnographic, historical, and literary works on colo-

nialism, nationalist responses, and postcolonial positions.

ANTH 475 Perspectives in Medical Anthropology (5) I&S Introduction to medical anthropology. Explores the relationships among culture, society, and medicine. Examples from Western medicine as well as from other medical systems, incorporating both interpretive and critical approaches. Offered: jointly with HSERV 475.

ANTH 476 Culture, Medicine, and the Body (5) I&S Explores the relationship between the body and society, with emphasis on the role of medicine as a mediator between them. Case study material, primarily from contemporary bio-medicine, as well as critical, postmodern, and feminist approaches to the body introduced within a general comparative and anthropological framework.

ANTH 477 Medicine in America: Conflicts and Contradictions (3) I&S Introduction to the pragmatic and theoretical dilemmas of current biomedical practice with emphasis on social and cultural context. Case studies in technological intervention, risk management, and other health-related issues used to explore connections among patients' experiences, medical practices, and the contemporary social context.

ANTH 480 Introduction to Museology (3) I&S Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Offered: jointly with MUSEUM 480.

ANTH 481 Museum Collection Management: Ethnology (3) I&S Lecture and work experience in museum collection management in the ethnology collections of the Burke Memorial Washington State Museum, including identification, cataloging, fumigation, storage, cleaning, inventory, and specimen preparation for exhibition of archival and nonarchival museum specimens from North America, the Pacific, and Pacific Rim areas. Offered: jointly with MUSEUM 481.

ANTH 482 Museum Conservation (3) I&S Lecture and demonstrations in the recognition and treatment of museum conservation problems for specimens of all types. Application of basic principles to specific preventive and active conservation and restoration problems encountered by curatorial personnel. Offered: jointly with MUSEUM 482.

ANTH 484 Motherhood: Ideologies and Technologies (5) I&S *Twine* Examines how motherhood is culturally constituted, regulated, and managed within various ideological and technological milieus. Uses ethnographies from anthropology and case studies from feminist legal theory. Topics include slave mothers, surrogate mothers, lesbian mothers, transracial mothers, co-mothers, teen mothers. Prerequisite: WOMEN 200. Offered: jointly with WOMEN 458.

ANTH 485 Cultural Property: Legal and Ethical Issues (3) I&S Examines the complex history of legal and ethical issues affecting the acquisition, ownership, and disposition of cultural property, with special attention to modern indigenous peoples' requests for repatriation of collections from museums, as well as concerns with intellectual property rights, national patrimony policies, and related trade issues.

ANTH 486 Human Family Systems: Biological and Social Aspects (5) I&S Biological bases for human mating and reproduction and an examination of the range of cross-cultural variability in human systems of kinship and marriage; comparisons among a wide range of human and nonhuman species and between Western and non-Western human societies;

interplay of biological, ecological, and sociocultural factors in determining the structure and function of human family systems. Offered: jointly with SOC 486.

ANTH 488 Agroecology (5) I&S *Pena* Cross-cultural survey of agroecological research methods, theoretical problems, policy issues, and ethical debates. Local knowledge and ethnoscientific bases of alternative agriculture. Comparative political ecology of agroecosystems with a focus on indicators of social equity and ecological sustainability.

ANTH 489 Anthropology Practicum (3-9, max. 15) Faculty-supervised off-campus internships in organizations utilizing anthropological skills in nonacademic settings. Establishing educationally valuable individual projects for internships with faculty sponsor. Organizations include museums, social service and other governmental agencies, and private nonprofit service agencies.

ANTH 491 Honors Colloquium (2, max. 12) I&S Introduction to anthropological research. Students read original articles and papers and discuss them with authors. Research presenters include department faculty, visiting faculty, and advanced graduate students. Credit/no credit only.

ANTH 495 Advanced Problems in Ethnology (3-5, max. 10) I&S Current problems in ethnology. Seminar format.

ANTH 499 Undergraduate Research (*, max. 12)

Courses for Graduates Only

ANTH 500 Preceptorial Reading (6) For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the analysis and comparison of social and cultural systems. Not open to graduate students in the sociocultural anthropology program.

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

ANTH 507- Current Issues in Sociocultural Anthropology (2-) Biweekly presentations by participants and guest lecturers of current literature and ongoing research in topics pertaining to social, cultural, and linguistic anthropology. Credit/no credit only. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

ANTH -508 Current Issues in Sociocultural Anthropology (-2) Biweekly presentations by participants and guest lecturers of current literature and ongoing research in topics pertaining to social, cultural, and linguistic anthropology. Credit/no credit only. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

ANTH 509 Sociocultural Anthropology Problem Paper (4) All first-year graduate students in sociocultural anthropology select a topic for independent research, conduct that research, and prepare a paper of about 25-50 pages on the topic chosen. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

ANTH 510 Seminar on North American Indians (3) Advanced comparative treatment of selected aspects of the Indian cultures and societies of North America.

ANTH 514 Regional Seminar (3-5, max. 15) Comparative treatment of selected aspects of cultures and societies of a particular region or area.

ANTH 517 Seminar on South Asia (3) Advanced analysis of selected problems in South Asian ethnology and social structure. Prerequisite: ANTH 412.

ANTH 521 Seminar on the Anthropological Study of Religion (3, max. 9) Advanced seminar in the anthropological study of religion designed for students who have a background in the theory and applications of theory developed in the anthropological study of religion. Seminar topics vary each quarter. Prerequisite: ANTH 422 and graduate standing; permission of instructor for graduate students in Comparative Religion.

ANTH 525 Seminar in Culture Processes (3, max. 6) The concept of process and its application to the study of culture.

ANTH 527 Ethnicities, Nations, and Cultural Identities (3) Exploration of how cultural differences have been represented in ethnic and national narratives and how these narratives have shaped identities and social relations.

ANTH 535 Research Issues in Demography and Population Studies (1-2, max. 7) Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Credit/no credit only. Offered: AWP.

ANTH 536 Seminar in Visual Anthropology (3) Significance of anthropological cinema and photography placed in historical perspective. Screening of films to determine the role of the anthropologist as filmmaker, as well as the role of the filmmaker as anthropologist.

ANTH 537 Political Anthropology and Law (3, max. 6) Seminar on special topics in politics and law and their interrelationships. Prerequisite: ANTH 437, ANTH 439, or permission of instructor.

ANTH 538 Politics of Representation (3) Representations of power and the powers of representation. Critical approaches to representation in colonial and postcolonial worlds. Divine kings, exemplary centers, the New World Order, voting subjects, and the possibilities of transgression.

ANTH 541 Cultural Aspects of International Development (3) *Sivaramakrishnan* Emergence of development as an aspect of late colonialism and the decolonization process. Ways in which development came to visualize social change in sectoral terms like rural land use, cities, and education, while objectifying people in target groups. Relationships between development and modernity, and development and globalization.

ANTH 542 Seminar in Cognitive Anthropology (3) Examines the intellectual history of cognitive anthropology; assesses its major findings in kinship, folk biology, color classification, and decision and planning theory. Replicates key studies, using cognitive anthropological methods. Evaluates influences from linguistics, psychology, and artificial intelligence research. Practical applications and future prospects.

ANTH 550 Field Techniques in Ethnography (5) Techniques of collecting, ordering, and utilizing ethnographic data in the field. Problems of rapport, elicitation, observation, interpretation, and ethics. Credit/no credit only.

ANTH 551 Research Design (3) Principles of research design, including problem delineation and selection of appropriate methods, as applied to current issues in sociocultural anthropology. Prerequisite: permission of instructor.

ANTH 552 Practicum in Ethnographic Research (3) Techniques of data recording, analysis, and writ-

ing for the field ethnographer. Not recommended for non-anthropology graduate students. Prerequisite: ANTH 550 and ANTH 551.

ANTH 553 Analysis of Linguistic Structures (3, max. 6) Syntactic, semantic, or phonological analysis. Languages to be analyzed vary. Prerequisite: permission of instructor. Offered: jointly with LING 553.

ANTH 555 Discourses in Feminist Anthropology Seminar (5) *Jacobs* Exploration of feminist anthropological theories and the works of their critics. Ways of using feminist anthropology in preparation for and conducting fieldwork. Topics include foundations in feminist anthropology, grand theories, variation in feminist theoretical foci within the "four fields," responses to critics. Prerequisite: graduate standing. Offered: jointly with WOMEN 553.

ANTH 556 The Evolution of the Family (3) Biological evolution of species-specific behaviors and forms of sociality linked to human mating, reproduction, and parenting. Cultural evolution of human systems of kinship and marriage as fitness-maximizing adaptations to a wide range of habitats. Prerequisite: upper-division course in evolutionary theory, population genetics, behavioral ecology, primatology, or animal behavior. Offered: jointly with SOC 556.

ANTH 559 Seminar in Language and Culture (3, max. 9) Theoretical and methodological problems in language and culture.

ANTH 561 Seminar in Methods and Theories (3, max. 9)

ANTH 562 Clinically Applied Anthropology (3) Anthropology as it relates to interdisciplinary delivery of health care. Cultural variation in illness beliefs and behavior, types of healing practice, illness prevention, and social support networks. Prerequisite: graduate standing and permission of instructor. Offered: jointly with NURS 562.

ANTH 565 Theory of Sociocultural Anthropology (5) Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: graduate standing in anthropology or permission of instructor.

ANTH 566 Theory of Sociocultural Anthropology (5) Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: ANTH 565.

ANTH 567 Theory of Sociocultural Anthropology (5) Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: ANTH 566.

ANTH 570 Environmental Anthropology (5) Current issues in the study of human environment interaction from a cross-cultural perspective: ecological adaptation and maladaptation; ethnoecology and indigenous knowledge; anthropogenic environmental change; political ecology of "development;" interrelations of cultural and biological diversity; conflicts over indigenous land use and property rights, environmental justice, resource conservation, and sustainability.

ANTH 574 Socio-Cultural Perspectives of Public Health Genetics (3) Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using his-

torical, contemporary, and cross-cultural case study material. Offered: jointly with NURS 582/PHG 521.

ANTH 575 Cultural Construction of Illness: Seminar in Medical Anthropology (5) Historical and comparative examination of depression, neurasthenia, somatization, hypochondriasis, and hysteria. Anthropology of psychosomatics and psychiatry, including cultural analysis of selected biomedical, indigenous folk medical, and popular common-sense conceptualizations of illness.

ANTH 581 Dissertation Writing (3) Students experiment with different styles of anthropological writing. They apply writing techniques and styles to their own material. Students peer review for one another. Credit/no credit only.

ANTH 584 Ways of Speaking (5) Theory and literature of the ethnography of communication, with special emphasis on the descriptive-comparative approach to culturally patterned styles of communicative conduct. Offered: jointly with COM 584.

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

ANTH 591 Seminar in Museum Operations (3) Designing hypothetical museums and creating a first year of operations. Design elements include architectural plan, staffing plan, initial and recurring budgets, security system, records system, educational plan, and policy making. Recommended: 590. Offered: jointly with MUSEUM 591.

ANTH 592 Seminar in Museum Specimen Documentation (3) Seminar discussion of museum specimen documentation research approaches, including technological and raw material analyses, contextual studies, and esthetic studies. Documentation of a collection and reference work. Recommended: 590 and 591. Offered: jointly with MUSEUM 592.

ANTH 599 Effective Teaching of Anthropology (1) Class required of all graduate students who accept teaching assistantships: instruction in teaching methods and issues, e.g., professional ethics, preparing and delivering lectures, leading discussion groups, test writing and grading, diversity in the classroom. Credit/no credit only.

ANTH 600 Independent Study or Research (*)

ANTH 700 Master's Thesis (*) Credit/no credit only.

ANTH 800 Doctoral Dissertation (*) Credit/no credit only.

Archaeology

ARCHY 401 Archaeology of Human Origins (5) I&S *Close* Early part of the prehistoric archaeological record in Africa and Eurasia, from >2,000,000 years ago until the spread of modern human beings; development of stone and bone technologies; ways of making a living; cultural adaptations; intellectual and social development. Prerequisite: ARCHY 205. Offered: Sp.

ARCHY 465 Issues in Cultural Resource Management (3) I&S Examines practical application of archaeology to cultural resource management. Topics include role in environmental permitting, inventory and significance evaluation of resources, project impacts and design of mitigation measures, consultation with government agencies and Indian tribal organizations, and practical aspects of cultural resource management business operation.

ARCHY 466- Archaeology Honors Thesis ([1-9]-, max. 18) I&S Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

ARCHY 468 Issues in Cultural Resource Management (1) I&S Review of federal and state cultural resource management policies and the effects of these policies on the conduct of projects that may impact cultural resources on public lands. Survey of related issues in museum management. Credit/no credit only. Prerequisite: ARCHY 205; either one 200-level ANTH course or LING 203.

ARCHY 469 Special Studies in Archaeology (3-6, max. 18) I&S Consideration in detail of specific archaeological topics, either methodological or substantive in content, of current interest. Offered occasionally by resident, new, or visiting faculty. For advanced undergraduates and graduate students. Prerequisite: ARCHY 205.

ARCHY 470 The Archaeology of Extinction (5) I&S *Grayson* Uses archaeological and paleoecological data to examine the argument that prehistoric peoples caused vertebrate extinction, from the late Ice Age extinction of ground sloths and saber-toothed cats in North America to the extinction of moas in New Zealand some 500 years ago. Offered: even years; A.

ARCHY 477 Archaeology of the North (5) I&S *Fitzhugh* Archaeological history of the circumpolar arctic and subarctic from Pleistocene to the 19th century. Variability in human adaptation and social evolution in some of the world's most extreme environments such as Eurasian tundra, North Pacific rim, Beringia, and North American high arctic. Prerequisite: ARCHY 205. Offered: Sp.

ARCHY 478 Prehistory of the Arid West (5) I&S Archaeology of arid western North America, with particular emphasis on the earliest peoples of this region (and on the peopling of the New World in general), and on the prehistoric hunter-gathers of the Great Basin and Southwest. Prerequisite: ARCHY 205.

ARCHY 480 Advanced Archaeological Analysis: Ceramics (6) I&S Human technology in traditional societies. Ceramic tools as evidence for technological innovation, continuity, and change; and as evidence for ancient economic systems involving production, consumption, and distribution. Examines variety of approaches to the study of material culture—especially ceramics—including archaeological, ethnographic, experimental, and technical. Prerequisite: ARCHY 371.

ARCHY 481 Advanced Archaeological Analysis: Faunal Remains (6) I&S Seminar on techniques and methods employed in analysis of faunal remains from a wide range of Pleistocene and Holocene settings, including archaeological sites, coupled with a laboratory focusing on identification of faunal remains from these settings. Prerequisite: ARCHY 205.

ARCHY 482 Advanced Archaeological Analysis: Geoarchaeology (6) I&S Identification, analysis, and interpretation of sediments and soils associated with archaeological remains. Laboratories deal with sediment description and chemical analysis; field trips and student projects focus on archaeological applications of these subjects.

ARCHY 483 Analyses of Stone Artifacts (6) I&S *Close* Current approaches to lithic analysis, including types of information obtainable (technological, functional, social, ideological) and constraints affecting the formation and analysis of lithic assemblages. Lectures interspersed with application of methods under discussion to individual artifacts and to assemblages. Prerequisite: ARCHY 371.

ARCHY 490 Museum Curation Practicum (1-5, max. 15) Application of museological training in curation of ethnographic, archeological, geological, or zoological collection materials in the Burke Museum. Supervised work ranges from fundamental collection documentation and research to preventive conservation, storage, and other special curation projects. Offered: jointly with MUSEUM 490.

ARCHY 495 Quantitative Archaeological Analytic Techniques (5) I&S Introduction to quantitative approaches to archaeological problems; data screening, numeric methods of classification and identification, graphical and computer-based seriation techniques, and the analysis of spatial patterning in artifact distributions.

ARCHY 497 Archaeological Method and Theory I: Formal Theory (5) I&S Examination of theoretical constructs in the analysis of archaeological data. Terminology, typologies, and interregional comparisons. Prerequisite: ARCHY 205.

ARCHY 498 Archaeological Method and Theory II: Explanatory Theory (5) I&S Conceptual frameworks employed by archaeologists in obtaining explanation in the three major areas of culture history, cultural reconstruction, and explanatory prehistory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achieving these aims, and an introduction to the methods employed. Prerequisite: ARCHY 205; ARCHY 497.

ARCHY 499 Undergraduate Research (*, max. 12)

Courses for Graduates Only

ARCHY 501 Preceptorial Reading (6) For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the reconstruction of prehistory. Not open to graduate students in the archaeology program.

ARCHY 520 Principles of Archaeological Theory (5) Review of principles of archaeological theory. Student presentation of research on archaeological theory and seminar discussion or presentations. Open only to first-year graduate students in anthropology.

ARCHY 525 Archaeology of Island Southeast Asia and the Pacific (5) History of the human occupation of the South Pacific Islands, especially Indonesia, Philippines, Micronesia, Melanesia, and Polynesia. Focus on current debates about human migrations, long distance maritime trade, political structure, culture contact, and colonialism. Emphasis on the analysis of the primary archaeological and documentary data.

ARCHY 530 Prehistory of the Northwest Coast (5) Origins, development, and variation of Pacific Northwest cultures, focusing particularly on Washington. Adaptations to maritime and interior environments. Artifacts from a variety of archaeological sites. Technological, functional, and historical significance of Northwest artifacts.

ARCHY 560 Seminar in Archaeological Methods (5, max. 20) Basis, limitations, and applications of a particular archaeological analytical method, or closely related set of methods. Prerequisite: permission of instructor.

ARCHY 570 Seminar in Archaeological Theory (3-6, max. 18) Detailed consideration of a particular archaeological theory or closely related set of theories, including their methodological and epistemological bases. Prerequisite: ARCHY 497, ARCHY 498.

ARCHY 571 Field Course in Archaeology (5) Introduction to field acquisition of archaeological data through survey and excavation. Ongoing field

projects; instructional emphasis on recovery and recording techniques and on management of field projects. Prerequisite: permission of department.

ARCHY 572 Seminar in North American Archaeology (3, max. 6) Selected problems in the archaeology of America north of Mexico. Prerequisite: permission of instructor.

ARCHY 575 Archaeological Field Research Design (6) Nature of the archaeological record, and methods and techniques of field research, to illustrate range of data sources and modern techniques of general applicability. Practical experience in mapping, map interpretation, sampling design, remote sensing, photogrammetry, and research proposal writing. Prerequisite: permission of instructor.

ARCHY 576 Designing Grant Proposals (5) Design and writing of grant proposals for archaeological research at both dissertation and senior investigator levels, with particular emphasis on National Science Foundation structure and requirements. Prerequisite: upper-level graduate standing and permission of instructor.

ARCHY 591 Advanced Field Course in Archaeology (6-9) For students with previous field experience and graduate work in archaeology. Emphasis on decision making in field and project management. Prerequisite: ARCHY 497, ARCHY 498, ARCHY 571, and ARCHY 575 or permission of instructor.

ARCHY 600 Independent Study or Research (*) Prerequisite: permission of instructor.

ARCHY 601 Internship (3-10, max. 10) Credit/no credit only.

Biocultural Anthropology

BIO A 465 Nutritional Anthropology (3) I&S/NW Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related biobehavioral influences on human growth, development, and disease resistance. Prerequisite: BIO A 201. Offered: jointly with NUTR 465.

BIO A 466- Biocultural Anthropology Honors Thesis ([1-9]-, max. 18) NW Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

BIO A 469 Special Topics in Biocultural Anthropology (3-5, max. 15) NW Delineation and analysis of a specific problem or a more general area in biocultural anthropology. Offered occasionally by visiting or resident faculty.

BIO A 473 Biological Adaptability of Human Populations (5) NW *Shell-Duncan* Mechanisms enabling humans to maintain homeostasis in extreme environments: high altitude, heat, cold, nutritional deficiency, radiation. Adaptive process operating at levels of physiology, metabolism, and population, including the strategies of fertility and birth spacing. Prerequisite: BIO A 201.

BIO A 475 Environmental Impacts of Small Scale Societies (5) I&S/NW *Grayson, Smith* Examines the environmental impacts (positive and negative) among prehistoric and historic/ethnographic small-scale (hunter-gatherer and horticultural) societies world-wide, and debates these impacts, within a theoretical framework provided by evolutionary ecology and biogeography. Offered: jointly with ENVIR 475.

BIO A 476 Sociocultural Ecology and Health (3) NW *Leonetti* Sociocultural ecology of health/disease, focusing on humans as bioculturally integrat-

ed beings and on populations as biocultural units of adaptation. Examples of research on disease, both infectious and chronic, and patterns of morbidity and mortality, infant, maternal, old age, with particular attention to situations of sociocultural changes. Prerequisite: BIO A 201.

BIO A 477 Evolutionary Perspectives on Sex and Gender Roles (3) I&S/NW Critical examination of theories explaining the evolution of sex differences and associated gender roles. Consideration of gender differences in mate preferences, parental investment, subsistence, aggressiveness, and risk-taking. Stresses interactions between biology and culture. Prerequisite: BIO A 201.

BIO A 482 Human Population Genetics (5) NW, QSR *Holman* Micro-evolutionary changes in human populations. Effects of mutation, selection, inbreeding, gene flow, and genetic drift as causes of evolutionary change. Mathematics beyond high school not required. Prerequisite: BIO A 201.

BIO A 484 Human Life Cycle (5) NW *Newell* Human growth and physical/social development: fetal life to old age. Cultural, ecological, and evolutionary aspects of the life cycle. Population differences in age and sex related to morbidity and mortality. Prerequisite: BIO A 201.

BIO A 485 Research in Growth and Development (2, max. 8) NW Focus on topics relating to primate growth and development. Prerequisite: either BIO A 484, BIO A 495, or BIO A 496, any of which may be taken concurrently.

BIO A 486 Primate Socioecology (3) NW Focus on the variety of social systems exhibited by nonhuman primates and adaptive significance of these societies; social systems in terms of the present ecology and evolutionary past of the species; the function of communicatory gestures and vocalizations, tradition, kinship, and social roles in maintaining and structuring groups over generations; the relationship among mating systems, foraging strategies, ranging patterns, and ecological separation/resource partitioning and their contribution to species-typical social organization. Prerequisite: either BIO A 370 or PSYCH 418.

BIO A 491 Issues in Human Paleontology (5) NW *Eck* Addresses five major unanswered questions concerning human evolution as represented by the fossil record. Prerequisite: BIO A 389.

BIO A 495 Growth and Development: Infancy (5) NW *Newell* Genetic and environmental influences on growth and development from prenatal life through infancy. Includes exploration of methods for assessing development and comparisons of development in non-human primates with human development. Prerequisite: BIO A 370.

BIO A 496 Growth and Development: Adolescence and Reproductive Maturity (5) NW *Newell* Genetic and environmental influences on growth and development during adolescence. Emphasis on the interaction of biological and social factors in attainment of reproductive maturity. Compares conditions of non-human primates with human conditions. Prerequisite: BIO A 370.

BIO A 499 Undergraduate Research (*, max. 12)

Courses for Graduates Only

BIO A 502 Preceptorial Reading (6) For beginning graduate students who have not had adequate training in the study of primate principles and methods involved in the study of evolution, human genetics, and the evolution of modern populations. Not open to graduate students in the biocultural anthropology program. Offered: AWS.

BIO A 520 Human Behavioral Ecology (3-5) *Smith* Principles and methods of evolutionary behavioral ecology, and critical examination of their application to human behavior in such areas as resource utilization, mating, parenting, life history, cooperation, and competition.

BIO A 525 Biocultural Research Methods and Study Design (5) *Shell-Duncan* Survey of basic conceptual issues in the design of empirical research, with special attention to problems that arise during anthropological fieldwork. Topics include defining data needs, sampling strategies, problems with co-funding, proposal writing, human subjects approval, and basic ethical issues in human biocultural research.

BIO A 526 Quantitative Methods and Modeling for Biocultural Anthropology (5) Surveys the concepts, tools, and methods for developing quantitative models based on underlying biocultural processes. Introduces methods of testing models from observations collected in anthropological field studies. Oriented toward longitudinal research of fertility, mortality, disease dynamics, population genetics, and other biocultural processes.

BIO A 550 Skeletal Biology and Prehistoric Demography (5) *O'Connor* Composition and structure of calcified tissue. Analytical techniques and their contribution to interpretation of the archaeological record.

BIO A 568 Human Reproductive Ecology (3) A consideration of the determinants of fertility variation within and among traditional human societies. Biocultural and ecological perspectives on pubertal timing, nuptiality, duration of birth intervals, and reproductive senescence.

BIO A 569 Demographic Analysis in Biological and Social Anthropology (5) *Leonetti* Demographic analysis relevant to anthropological research on small populations. Use of data collected through local surveys, genealogical methods, and from other sources. Focuses on use of demography to analyze social and biological processes with adaptive and/or cultural-historical significance. Theoretical approaches emphasized.

BIO A 590 Current Issues in Human and Non-Human Primate Evolution (2, max. 18) Biweekly presentation by participants and guest lecturers of current literature and ongoing research in topics pertaining to human and nonhuman primate evolution, biology, anatomy, genetics variation, and behavior. Credit/no credit only.

BIO A 600 Independent Study or Research (*)

Applied Mathematics

408 Guggenheim



General Catalog Web page:
www.washington.edu/students/genocat/academic/applied_math.html



Department Web page:
www.amath.washington.edu/

The Department of Applied Mathematics is concerned with mathematical modeling and analysis of problems from the physical, biological, and social sciences, and from engineering. The department offers both undergraduate and graduate courses for all interested students at the University, as well as degree programs for students at both levels who wish to major in applied mathematics.

Graduate Program

Graduate Program Coordinator
408L Guggenheim, Box 352420
206-543-5077

The Department of Applied Mathematics offers graduate programs of study leading to the degrees of Master of Science and Doctor of Philosophy. These programs involve (1) broad training in those mathematical methods and techniques that have been found useful in applications, (2) in-depth study in at least one field of application, and (3) opportunities to explore various specialized aspects of applied mathematics.

Master of Science, Doctor of Philosophy

Admission Requirements: Prospective students for the Master of Science program should hold an undergraduate degree either in mathematics with a strong background in applications such as the physical, engineering, biological, or social sciences with a strong background in applications-oriented mathematics. Students who wish to apply to the doctoral program need to show evidence of completion of course work equivalent to that described for the master's degree, with at least a 3.40 GPA, and indication of the ability or potential to perform independent research. It is required that the Graduate Record Examination be taken and the results sent to Graduate Admissions. Three letters of recommendation are required in support of each application and should be sent directly to the department. After receiving notification of admission to the Graduate School and a registration appointment, the student should contact the department. (On the Application for Graduate School Admission form, the student should be sure to indicate the desire to enter the Department of Applied Mathematics, rather than Mathematics.)

Master of Science

The M.S. degree program is designed to provide the student with a working knowledge of several basic areas of applied mathematics, together with exposure to at least one specific area of application. The applied mathematics areas include complex variables, ordinary and partial differential equations, applied linear algebra, numerical analysis, calculus of variations or optimization, and applied probability and statistics. The specific area of application is chosen by the student from a broad range of outside fields, such as engineering, the physical, biological, and certain areas of medical science. After fulfilling the basic course requirements, the student can obtain the M.S. degree by additional course work to complete the required minimum of 36 credits for the degree. Students may elect to do an M.S. thesis in lieu of a maximum of 6 course credits. Detailed requirements for the M.S. degree are listed in the Applied Mathematics graduate program guidelines.

Doctor of Philosophy

The Doctor of Philosophy degree in applied mathematics is primarily a research degree, not conferred as a result of course work alone. The granting of the degree is based on general proficiency and attainment in applied mathematics, together with a demonstrated ability to carry out an independent investigation which is described in a doctoral dissertation. Proficiency and attainment in applied mathematics is demonstrated by passing the General Examination that tests the student's ability to probe a new area of research and to exercise critical judgment on a technical issue of current importance in the chosen field of research. The doctoral dissertation must exhibit original mathematical contributions in a significant area of application. The Final Examination and

defense of the dissertation is a research seminar presentation open to the public. The detailed requirements for the doctoral degree are listed in the Applied Mathematics graduate program guidelines.

Financial Aid

Both research and teaching assistantships are available to full-time students who qualify. In addition, fellowship funds for the study of applied mathematics are available and awarded on a competitive basis.

Research Facilities

Students in applied mathematics have access to a departmental computing lab equipped with a DEC Alpha server, Alpha/AXP workstations, and X-terminals, with centralized file storage. Software for scientific visualization, numerical analysis, symbolic mathematics, programming, and document preparation is available. The lab is connected to the campus network and the Internet, providing access to supercomputing facilities and other resources.

Faculty

Chair

Ka Kit Tung

Professors

Baker, Marcia * 1980, (Adjunct); MS, 1960, Stanford University, PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Bretherton, Christopher S. * 1984; PhD, 1984, Massachusetts Institute of Technology; convective cloud systems, boundary layer meteorology, numerical modeling, tropical meteorology.

Bube, Kenneth P. * 1986, (Adjunct); PhD, 1978, Stanford University; numerical analysis, partial differential equations.

Burke, James V. * 1985, (Adjunct); PhD, 1983, University of Illinois; optimization, nonsmooth analysis.

Criminale, William O. * 1968; PhD, 1960, Johns Hopkins University; fluid dynamics, nonlinear mechanics, stability theory.

Durran, Dale R. * 1987, (Adjunct); MS, 1975, University of California (Berkeley), PhD, 1981, Massachusetts Institute of Technology; atmospheric dynamics and modeling, numerical methods, mountain meteorology, mesoscale meteorology.

Ford, E. David * 1985, (Adjunct); PhD, 1968, University College, London (UK); quantitative science, ecosystem analysis, forest productivity.

Greenbaum, Anne * 1997, (Adjunct); PhD, 1981, University of California (Berkeley); applied analysis and computational mathematics.

Kevorkian, Jirair * 1964; PhD, 1961, California Institute of Technology; partial differential equations, perturbation theory.

Kosaly, George * 1980, (Adjunct); PhD, 1974, Eotvos Lorand University (Hungary), DSc, 1979, Hungarian Academy of Sciences; turbulent combustion, nuclear reactor dynamics.

Leveque, Randall J. * 1985; PhD, 1982, Stanford University; numerical analysis, hyperbolic conservation laws, computational fluid dynamics.

Murray, James D. * 1988, (Emeritus); PhD, 1956, DSc, 1968, Oxford University (UK); mathematical biology, biological pattern formation, wound healing, spread of epidemics.

O'Malley, Robert E., Jr. * 1990; PhD, 1966, Stanford University; singular perturbations and asymptotic methods.

Pearson, Carl E. * 1967, (Emeritus); PhD, 1949, Brown University; wave propagation, fluid dynamics, numerical analysis, optimization.

Riley, James J. * 1983, (Adjunct); PhD, 1971, Johns Hopkins University; fluid mechanics, especially turbulent flows.

Rockafellar, R. T. * 1966; PhD, 1963, Harvard University; variational analysis and optimization.

Sarachik, Edward S. * 1984, (Adjunct); PhD, 1966, Brandeis University; atmospheric dynamics, air-sea interactions, greenhouse warming, equatorial dynamics, climate change.

Sylvester, John * 1987, (Adjunct); PhD, 1980, New York University; partial differential equations.

Tung, Ka Kit * 1988; PhD, 1977, Harvard University; atmospheric and geophysical fluid dynamics.

Vagners, Juris * 1967, (Adjunct); PhD, 1967, Stanford University; optimal control and estimation theory, applications to aircraft systems.

Yeh, Harry H. * 1983, (Adjunct); PhD, 1983, University of California (Berkeley); fluid mechanics, water wave motions, coastal and hydraulic engineering.

Associate Professors

Adams, Loyce M. * 1985; PhD, 1983, University of Virginia; numerical algorithms for parallel computers.

Kot, Mark * 1989; PhD, 1987, University of Arizona; mathematical ecology, nonlinear dynamics, and population biology.

Kutz, Jose Nathan 1997; PhD, 1994, Northwestern University; nonlinear waves, dynamical systems, asymptotic and perturbation methods, scientific computing.

Schmid, Peter J. * 1993; PhD, 1993, Massachusetts Institute of Technology; computational fluid dynamics, hydrodynamic stability theory, transition to turbulence.

Storti, Duane W. * 1983, (Adjunct); PhD, 1983, Cornell University; nonlinear dynamics and vibrations, dynamical systems, perturbations and bifurcations.

Assistant Professors

Qian, Hong 1997; PhD, 1989, Washington University; mathematical, physical chemistry and biology, statistical physics, stochastic mathematics.

Winters, Craig B. * 1984, (Affiliate); PhD, 1989, University of Washington; stratified fluid flows, scientific computation and inverse problems.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

AMATH 400 Mathematical Communication for Undergraduates (2) NW Techniques of effective writing and oral presentations in the mathematical sciences. Offered: jointly with MATH 400 and STAT 400. Prerequisite: at least 15 credits in MATH, STAT, AMATH, or CSE at the 300 or 400 level, including

MATH 307 or AMATH 351 and MATH 308 or AMATH 352.

AMATH 401 Introduction to Methods in Applied Mathematics I (4) NW Emphasis on acquisition of solution techniques; ideas illustrated with specific example problems arising in science and engineering. Applications of vector differential calculus, complex variables. Line-surface integrals; integral theorems; Taylor and Laurent series, contour integration. Offered: A.

AMATH 402 Introduction to Methods in Applied Mathematics II (4) NW See 401. Applications of ordinary differential equations; review of elementary concepts for first and second order equations; power series and Frobenius solutions. Laplace transforms; systems of differential equations, eigenvalues. Prerequisite: either AMATH 351 or MATH 307. Offered: W.

AMATH 403 Introduction to Methods in Applied Mathematics III (4) NW See 401. Applications of partial differential equations; linear and quasilinear first order equations, characteristics, shocks; classification of linear second order equations; basic solution techniques for parabolic, elliptic, and hyperbolic equations; Green's functions and integral transform methods. Prerequisite: AMATH 402.

AMATH 422 Introduction to Mathematical Biology (3) NW Mathematical modeling in biology and medicine. Introduction to chaos and nonlinear dynamics, population models (predator-prey and competition systems), epidemic models with applications to sexually transmitted diseases and dynamic diseases, enzyme kinetics, biological oscillators and switches. Prerequisite: either AMATH 351, MATH 136, or MATH 307. Offered: W.

AMATH 423 Mathematical Biology: Stochastic Models (3) NW Introduction to the basics of stochastic models. Applications are taken from the biomedical sciences such as random movement of cells and molecules, activation of neurons, cancer growth and spread, population dynamics, kinetics of unimolecular reactions. Prerequisite: either AMATH 351 or MATH 307, MATH/STAT 390. Offered: Sp.

AMATH 441 Introduction to Fluid Dynamics (3) NW Eulerian equations of mass and motion. Surface forces. Vorticity and vortex dynamics. Water waves and interfacial waves; concept of phase and group velocities. Linear instability theory. Simple viscous flows; boundary layer theory, potential theory. Low Reynolds-number flows, application to biological fluid flows. Prerequisite: AMATH 353.

AMATH 490 Special Topics (1-5, max. 15) Topics of current interest in applied mathematics not covered by other undergraduate courses.

AMATH 498 Senior Project or Thesis (1-6, max. 6) Intended for Honors students and other advanced undergraduates completing a special project or senior thesis in applied mathematics. Offered: A/WSpS.

AMATH 499 Undergraduate Reading and Research (1-6, max. 6) Credit/no credit only. Offered: A/WSpS.

Courses for Graduates Only

AMATH 500 Special Studies in Applied Mathematics (*, max. 12) Lectures and discussions of topics of current interest in applied mathematics. May not be offered every quarter; content may vary from one offering to another. Prerequisite: permission of instructor.

AMATH 501 Seminar in Applied Mathematics (1, max. 6) Special topics and selected problems of current interest in applied mathematics. Credit/no credit only. Offered: A/WSpS.

AMATH 502 Applied Mathematics Clinic (1) The clinic provides consulting service for problems from different academic units requiring assistance in formulation, analysis, and interpretation of mathematical models. Students learn to delineate sources of difficulties, identify or devise a method of solution, and effectively communicate it to clients. Credit/no credit only. Prerequisite: AMATH 568, AMATH 569, and AMATH 584. Offered: A/WSp.

AMATH 503 Mathematical Biology I (3) Mathematical modeling in biomedical sciences (mainly ecology, epidemiology, physiology, and zoology). Topics covered include modeling (continuous and discrete), population interactions, dynamic diseases, reaction kinetics, biological oscillators, oscillator generated wave phenomena, epidemics, and the dynamics of infectious diseases. Prerequisite: AMATH 402 or equivalent knowledge of ordinary differential equations. Offered: A.

AMATH 504 Mathematical Biology II (3) Mathematical modeling in the biomedical sciences (mainly ecology, epidemiology, and zoology). Topics include spatial spread of populations, traveling wave phenomena in biology, reaction diffusion theory, biological pattern formation mechanisms, mechanochemical theory of morphogenesis, spatial spread of epidemics. (May be taken independently of 503.) Prerequisite: AMATH 402, AMATH 403 or equivalents; ordinary, partial differential equations. Offered: W.

AMATH 505 Introduction to Fluid Dynamics (4) Eulerian equations for mass-motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress-strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high-low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with ATM S 505/OCEAN 511; A.

AMATH 506 Applied Probability Statistics (4) Discrete and continuous random variables, independence and conditional probability, central limit theorem, elementary statistical estimation and inference, linear regression. Emphasis on physical applications. Prerequisite: some advanced calculus and linear algebra. Offered: jointly with STAT 506.

AMATH 507 Calculus of Variations I (5) Necessary and sufficient conditions for a weak and strong extremum. Legendre transformation, Hamiltonian systems. Constraints and Lagrange multipliers. Space-time problems with examples from elasticity, electromagnetics, and fluid mechanics. Sturm-Liouville problems. Approximate methods. Prerequisite: AMATH 351 or MATH 307; MATH 324, 327; recommended: AMATH 402 and AMATH 403 or MATH 428 and 429.

AMATH 509 Theory of Optimal Control (3) Trajectories obtained from ordinary differential equations with control variables. Controllability, optimality, the maximum principle. Relaxation and the existence of solutions. Techniques of nonsmooth analysis. Prerequisite: real analysis on the level of MATH 426; background in optimization corresponding to AMATH 507 or AMATH 515. Offered: jointly with MATH 509; even years.

AMATH 510 Applications of Optimization in Engineering Design (3) Discussion of issues arising in applications of optimization to engineering design. Emphasis on formulating problems and selecting appropriate solution techniques. Random search methods for problems otherwise computationally intractable. Individual projects in engineering optimal design. Prerequisite: AMATH/MATH/IND E 515 and MATH 324 or permission of instructor. Offered: jointly with IND E 510.

AMATH 512 Methods of Engineering Analysis (3)

Applications of mathematics to problems in chemical engineering; vector calculus; properties and methods of solution of first and second order partial differential equations; similarity transforms, separation of variables, Laplace and Fourier transforms. Offered: jointly with CHEM E 512; A.

AMATH 514 Networks and Combinatorial Optimization (3)

Networks and directed graphs. Paths and trees. Feasible and optimal flows and potentials. Transportation problems, matching and assignment problems. Algorithms and applications. Prerequisite: MATH 308 or AMATH 352 and MATH 324. Offered: jointly with MATH 514.

AMATH 515 Fundamentals of Optimization (5)

Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with IND E 515/MATH 515.

AMATH 516 Numerical Optimization (3)

Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent, quasi-Newton methods. Quadratic programming and complementarity. Exact penalty methods, multiplier methods. Sequential quadratic programming. Cutting planes and nonsmooth optimization. Prerequisite: AMATH 515. Offered: jointly with MATH 516.

AMATH 517 Optimization Under Uncertainty (3)

Sequential optimization problems involving random variables. Dynamic programming, stochastic programming. Control of uncertain dynamic systems in finite, discrete time. Risk, feedback, adaptivity. Problems with imperfect state information. Applications to optimal stopping, inventory control, resource management. Prerequisite: AMATH 506 (or an introduction to basic concepts of probability such as STAT 390 or 394, 395), MATH 308 and 324. Offered: jointly with MATH 517.

AMATH 519 Introduction to Applied Stochastic Analysis (5)

Introduction to the theory of probability and stochastic processes based on differential equations. Poisson processes and Markov chains, branching processes and renewal processes, continuous-time Markov processes and Brownian motions, introductory stochastic differential equations, stochastic fractals, large deviation principle and randomly perturbed dynamical systems. Prerequisite: STAT 506 or AMATH 506.

AMATH 520 Special Topics in Mathematical Applications (5, max. 15)

In-depth study of an application topic in applied mathematics. Topics may include special studies in geophysical fluid dynamics, hydrodynamic stability, turbulence, analytic dynamics, solid mechanics, applied optimization, tensor analysis, stochastic analysis, and nonlinear optics and lasers. Offered: W.

AMATH 521 Special Topics in Mathematical Biology (5, max. 15)

DNA-folding, patter-forming systems, stochastic analysis. Prerequisite: AMATH 402 or equivalent. Offered: Sp.

AMATH 563 Methods of Partial Differential Equations II (3)

Nonlinear first-order partial differential equations: characteristics, applications to geometrical optics and Hamilton-Jacobi theory. Linear and quasilinear hyperbolic equations: conservation laws, characteristics, shocks, examples from fluid dynamics. Approximate solution methods: regular, singular, and multiple-scale perturbations. Prerequisite: AMATH 569. Offered: odd years.

AMATH 564 Methods of Partial Differential Equations III (3)

Nonlinear first-order partial differential equations: characteristics, applications to geometrical optics and Hamilton-Jacobi theory. Linear and quasilinear hyperbolic equations: conservation laws, characteristics, shocks, examples from fluid dynamics. Approximate solution methods: regular, singular, and multiple-scale perturbations. Prerequisite: AMATH 569. Offered: odd years.

AMATH 567 Methods of Applied Mathematics I (5)

Complex variable and associated topics. Branch cuts, series and product expansions. Contour integration, numerical implications. Harmonic functions. Complex potential (and singularities) in physical problems. Conformal mapping; applications and examples. Fourier and Laplace transforms and applications. Recommended: 401 or equivalent. Offered: A.

AMATH 568 Methods of Applied Mathematics II (5)

Survey of practical solution techniques for ordinary differential equations. Linear systems of equations including nondiagonal case. Nonlinear systems; stability phase plane analysis. Asymptotic expansions. Regular and singular perturbations. Recommended: 402 or equivalent. Offered: W.

AMATH 569 Methods of Applied Mathematics III (5)

Analytical solution techniques for linear partial differential equations. Discussion of how these arise in science and engineering. Transform and Green's function methods. Classification of second-order equations, characteristics. Conservation laws, shocks. Prerequisite: AMATH 403, AMATH 568 or MATH 428 or permission of instructor. Offered: Sp.

AMATH 570 Advanced Methods in Applied Mathematics I (5)

Analytical techniques of applied mathematics. Topics include systems of and nonlinear partial differential equations, asymptotics for integrals, perturbation and multiple-scale analysis, linear integral equations, calculus of variations. Prerequisite: AMATH 567, AMATH 568, AMATH 569. Offered: A.

AMATH 571 Advanced Methods in Applied Mathematics II (5)

Numerical techniques of applied mathematics. Topics include numerical solution of hyperbolic conservation laws, multigrid methods, Fourier and spectral methods. Prerequisite: AMATH 584, AMATH 585, AMATH 586. Offered: W.

AMATH 572 Advanced Methods in Applied Mathematics III (5)

Application of analytical and numerical techniques to problems in science and engineering. Topics include dynamical systems and bifurcation theory, wave propagation, wavelet analysis, stochastic processes, stochastic differential equations. Prerequisite: AMATH 571. Offered: Sp.

AMATH 574 Nonlinear Dynamics and Chaos (3)

Overview of ways in which complex dynamics arise in nonlinear dynamical systems. Topics include bifurcation theory, universality, Poincaré maps, routes to chaos, horseshoe maps, Hamiltonian chaos, fractal dimensions, Liapunov exponents, and the analysis of time series. Examples from biology, mechanics, and other fields. Prerequisite: AMATH 568 or equivalent.

AMATH 577 Perturbation Theory I (3)

Regular perturbations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

AMATH 578 Perturbation Theory II (3)

Regular perturbations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

otic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

AMATH 580 Mathematical Communication for Graduates (2)

Analysis and practice of mathematical writing. Oral and poster conference presentations. Academic job interview skills. Mathematics on the web. Offered: jointly with MATH 500 and STAT 500.

AMATH 581 Mathematical Problem Solving Using Computers (5)

Project-oriented computational approach to solving problems arising in the physical/engineering sciences, finance/economics, medical, social and biological sciences. Problems requiring use of advanced MATLAB routines and toolboxes. Covers graphical techniques for data presentation and communication of scientific results. Prerequisite: Proficiency in basic MATLAB or AMATH 301, or permission of instructor.

AMATH 584 Applied Linear Algebra and Introductory Numerical Analysis (5)

Numerical methods for solving linear systems of equations, linear least squares problems, matrix eigen value problems, nonlinear systems of equations, interpolation, quadrature, and initial value ordinary differential equations. Offered: jointly with MATH 584; A.

AMATH 585 Numerical Analysis of Boundary Value Problems (5)

Numerical methods for steady-state differential equations. Two-point boundary value problems and elliptic equations. Iterative methods for sparse symmetric and non-symmetric linear systems: conjugate-gradients, preconditioners. Prerequisite: AMATH 584/MATH 584 which may be taken concurrently. Offered: jointly with MATH 585; W.

AMATH 586 Numerical Analysis of Time Dependent Problems (5)

Numerical methods for time-dependent differential equations, including explicit and implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory. Spectral and pseudospectral methods. Prerequisite: AMATH 581 or AMATH 584. Offered: jointly with ATM S 581/MATH 586; Sp.

AMATH 587 Asymptotics and Special Functions (3)

Origin and properties of higher transcendental functions; theoretical basis and applications of Laplace, Fourier, Bessel, Mellin transforms; asymptotic analysis, including methods of steepest descent and stationary phase, WKB. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent.

AMATH 588 Green's Functions and Integral Equations (3)

Review of Sturm-Liouville theory. Green's functions and integral representation of solution to PDEs. Fredholm and Volterra integral equations. Hilbert-Schmidt theory. Singular integral equations of Cauchy type. Applications to science and engineering. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent.

AMATH 594 Special Topics in Numerical Analysis (2-3, max. 15)

Various advanced topics in numerical analysis and scientific computing, such as iterative methods, eigenvalue computations, approximation theory, finite element methods, inverse problems, nonlinear conservation laws, computational fluid dynamics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 594.

AMATH 595 Special Topics in Numerical Analysis (2-3, max. 15)

Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH

584, 585, 586, or equivalent. Offered: jointly with MATH 595.

AMATH 596 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 596.

AMATH 600 Independent Research or Study (*) Credit/no credit only.

AMATH 700 Master's Thesis (*) Credit/no credit only.

AMATH 800 Doctoral Dissertation (*) Credit/no credit only.

Art

104 Art



General Catalog Web page:
www.washington.edu/students/genocat/academic/art.html



Department Web page:
net.art.washington.edu

The School of Art serves a dual role within the educational structure of the University of Washington. It is both a professional school and an academic department. As a professional school it trains students for active careers in the visual arts; as a school of the College of Arts and Sciences it offers studio and lecture courses. All of its course offerings and its curriculum requirements are based on the underlying philosophy that an awareness and understanding of the visual arts are necessary to a liberal education, and that a liberal education is necessary to the training of a professional artist.

Graduate Program

Graduate Program Coordinator
104E Art, Box 353440
206-685-1714 or 206-543-0646

The School of Art offers eight art and design programs leading to the Master of Fine Arts degree: ceramics, fibers, metals, painting, photography, printmaking, sculpture, and visual communications design. Students are required to enroll for two years of full-time study (six quarters, excluding summer), earning a minimum of 63 credits of scheduled studio and class work and 9 credits of thesis for a total of 72 credits. Individual programs have specific requirements.

The thesis consists of a studio project representing a body of work, a written thesis statement, and documentation of the work in the form of slides. A selection of thesis work is exhibited at the School of Art's Master of Fine Arts Thesis Exhibition.

Admission Requirements

Applicants for admission to the Master of Fine Arts program are required to have a Bachelor of Fine Arts degree or equivalent (determined by the quality of the applicant's work and equivalent experience, based upon the UW B.F.A. requirements) with a minimum GPA of 3.00 in the undergraduate art major.

The Graduate Record Examination is not required. Admission is on a competitive basis. Annual deadline for applications is February 1, for consideration for admission the following autumn quarter.

Scholarships and Teaching Assistantships

School of Art scholarships are awarded annually to new and returning students, based on merit. Applicants admitted to the M.F.A. program may be offered School of Art scholarships for the coming year on an individual merit basis. Further application is not required.

The School of Art offers a limited number of teaching assistantships to incoming graduate students on an individual merit basis, as determined by each program. Enrolled graduate students may apply for a limited number of additional, competitive teaching assistantships.

Faculty

Chair

Christopher Ozubko

Professors

Berger, Paul E. * 1978; MFA, 1973, State University of New York (Buffalo); photography.

Bliquez, Lawrence J. * 1969; PhD, 1968, Stanford University; Greek Art, Greek historiography and historians, Greek and Roman medicine and private life.

Bravmann, Rene A. 1972; MA, 1963, University of Wisconsin, PhD, 1971, Indiana University; African art.

Carraher, Ronald G. * 1967, (Emeritus); MA, 1961, San Jose State College; photography.

Casteras, Susan P. * 1996; PhD, 1977, Yale University; nineteenth- to mid-twentieth-century British, American, European art; museology; women's studies.

Celentano, Francis * 1966, (Emeritus); MA, 1957, New York University; painting, drawing.

Christofides, Constantine * 1966, (Emeritus); PhD, 1956, University of Michigan; medieval, seventeenth century, Romanesque.

Clausen, Meredith L. 1979; MA, 1972, PhD, 1975, University of California (Berkeley); twentieth-century architecture.

Dahn, Richard F. * 1965, (Emeritus); MFA, 1959, Yale University; graphic design.

Dailey, Michael D. * 1963, (Emeritus); MFA, 1963, University of Iowa; painting, drawing.

Du Pen, Everett 1945, (Emeritus); MFA, 1937, Yale University; sculpture.

Failing, Patricia A. * 1982; MA, 1974, University of California (Berkeley); contemporary art and criticism.

Goldsmith, Layne * 1983; MA, 1975, San Jose State College, MFA, 1979, Cranbrook Academy of Art; fiber arts and related historic and contemporary textile structures and processes.

Hixson, William J. * 1950, (Emeritus); MFA, 1950, University of Oregon; painting.

Holm, Bill * 1968, (Emeritus); MFA, 1951, University of Washington; Northwest Coast Indians.

Hu, Mary L. * 1980; MFA, 1967, Southern Illinois University; metal design.

Hurley, Denzil * 1994; MFA, 1979, Yale University; abstraction involving painterly practice which establishes form.

Jones, Robert C. * 1960, (Emeritus); MS, 1959, Rhode Island School of Design; painting, drawing.

Kartsonis, Anna D. 1983; MA, 1968, PhD, 1982, New York University; Byzantine and medieval art.

Kehl, Richard L. * 1962; MA, 1961, MFA, 1961, Kansas City Art Institute; painting.

Kingsbury, Martha 1968; MA, 1963, PhD, 1969, Harvard University; nineteenth- and twentieth-century art.

Lundin, Norman K. * 1964, (Emeritus); MFA, 1963, University of Cincinnati; painting, drawing, art history, contemporary art, art theory.

Marshall, John C. * 1970, (Emeritus); MFA, 1968, Syracuse University; metal design.

Mason, Alden 1981, (Emeritus); MFA, 1947, University of Washington; painting.

Opperman, Hal N. * 1967, (Emeritus); PhD, 1972, University of Chicago; seventeenth- and eighteenth-century European art.

Ozubko, Christopher * 1981; MFA, 1981, Cranbrook Academy of Art; visual communication design.

Pizzuto, Eugene * 1957, (Emeritus); MFA, 1951, Cranbrook Academy of Art; painting, drawing.

Smith, Charles W. * 1948, (Emeritus); MFA, 1956, Cranbrook Academy of Art; sculpture.

Snow-Smith, Joanne * 1981; PhD, 1976, University of California (Los Angeles); Italian Renaissance.

Solberg, Ramona L. * 1967, (Emeritus); MFA, 1957, University of Washington; art education, metal design.

Spafford, Michael C. * 1969, (Emeritus); MA, 1960, Harvard University; painting, drawing.

Taylor, Norman J. * 1968; MA, 1967, MFA, 1967, University of Iowa; sculpture.

Wadden, Douglas J. * 1970; MFA, 1970, Yale University; graphic design, photography.

Walker, Jamie * 1989; MFA, 1983, Rhode Island School of Design; ceramic arts.

Warashina, M. Patricia * 1970, (Emeritus); MFA, 1964, University of Washington; ceramics.

Whitehill-Ward, John * 1975, (Emeritus); MS, 1974, Illinois Institute of Technology; graphic design.

Young, John T. * 1984; MFA, 1978, Rhode Island School of Design; sculpture, conceptual art.

Associate Professors

Brody, David * 1996; MFA, 1983, Yale University; painting and drawing.

Cabeen, Louise * 1993; MFA, 1989, The School of Art Institute of Chicago; socially critical art with research specialties in textile history and techniques.

Collins, Jeffrey L. * 1994; MA, 1989, Yale University, MA, 1992, Cambridge University (UK), PhD, 1994, Yale University; 17th-/18th-century European art and architecture; American material culture.

Garvens, Ellen J. * 1994; MA, 1983, MFA, 1987, University of New Mexico; mixed media photographic works combining flat images with sculptural materials.

Govedare, Philip B. * 1991; MFA, 1984, Tyler School of Art; painting and drawing.

Jeck, Douglas A. * 1996; MFA, 1989, The School of Art Institute of Chicago; figurative ceramics.

Koenig, Hazel L. * 1967, (Emeritus); MFA, 1950, University of Washington; fiber arts.

Labitzke, Curt W. * 1984; MFA, 1984, University of Notre Dame; printmaking; intaglio and lithography emphasizing hand-drawn techniques.

Oliver, Marvin E. 1974, (Adjunct); MFA, 1973, University of Washington; Northwest coast Indian art, Native American art, wood design, glass, metals.

Praczkowski, Edward * 1965, (Emeritus); MFA, 1965, Cranbrook Academy of Art; painting, drawing.

Proctor, Richard M. * 1962, (Emeritus); MA, 1962, Michigan State University; fiber arts.

Scheier, Shirley E. * 1986; MFA, 1985, University of Wisconsin; printmaking.

Takamori, Akio * 1988; MFA, 1978, New York State College of Ceramics; ceramic sculpture.

Welman, Valentine S. * 1954, (Emeritus); MFA, 1954, University of Colorado (Boulder); painting, drawing.

Wright, Robin K. 1990; MA, 1977, PhD, 1985, University of Washington; Native American art, Native art of the Pacific Northwest Coast, Haida art.

Assistant Professors

Bogel, Cynthea J. 1999; MA, 1985, PhD, 1995, Harvard University; Buddhist arts; Japanese art, architecture; ritual aesthetic meaning, changing values.

Brewster, Riley P. 2000; MFA, 1982, Yale University; painting, drawing.

Cheng, Karen * 1997; MDes, 1996, University of Cincinnati; professional practice of graphic design in both the print and Web mediums; typeface and font design.

Cummins, Rebecca 2001; MA, 1982, University of New Mexico; photography.

Gale, Ann E. 1995; MFA, 1991, Yale University; studio painting and drawing.

Goettler, Christine E. 1998; MA, 1985, PhD, 1991, University of Zurich (Switzerland); Northern European art (late medieval to Baroque); religious/devotional art; iconoclasm.

Lin, Zhi 2001; MFA, 1992, University of Delaware, MFA, University of London (UK); painting.

Loewenstein, Daniel F. * 1999; MFA, 1980, University of California (San Diego); sculpture and installation which explores symbol and metaphor using manipulated found objects.

Lyall, Marta * 1999; MFA, 1987, The School of Art Institute of Chicago; new media.

O'Toole, Helen J. *; MFA, 1989, The School of Art Institute of Chicago; studio drawing, painting, and art history.

Rousseau, John 2001; MFA, 1996, Cranbrook Academy of Art; visual communication design.

Scott, George W. * 1995; MFA, 1993, Cranbrook Academy of Art; industrial design; product design and development.

St. Pierre, Louise M. * 1995; BFA, 1983, University of Alberta (Canada); design of products/exhibits which educate and enable children.

Wieczorek, Marek K. 1997; MA, 1990, University of Amsterdam (Netherlands), PhD, 1997, Columbia University; modern European art; Mondrian and De Stijl; critical theory.

Lecturer

Nicholls, James Keith 1995; BArch, 1986, University of British Columbia (Canada); design, industrial design, construction technology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ART 421 Video Art (5, max. 15) VLPA Prerequisite: ART 380.

ART 428 Senior Thesis in Fiber Arts (5, max. 20) VLPA Specialized investigation involving surface design and/or fabric structures. Prerequisite: ART 324; ART 326; ART 327.

ART 436 Sculpture Composition (5, max. 15) VLPA Individual compositions in various media in large scale.

ART 440 Senior Thesis in Photography (5, max. 15) VLPA Development of a coherent photographic theme or topic evolved over two consecutive quarters resulting in a finished thesis portfolio. Prerequisite: ART 343. Offered: A/WSp.

ART 445 Advanced Industrial Design (5) VLPA Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 318.

ART 446 Advanced Industrial Design (5) VLPA Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 445.

ART 447 Advanced Industrial Design (5) VLPA Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 446.

ART 450 Individual Projects in Printmaking (5, max. 15) VLPA Individual media study within the context of group discussion and critique. Prerequisite: ART 345; ART 350.

ART 460 Advanced Metal Design (5, max. 25) VLPA Advanced individual projects in metal design.

ART 463 Advanced Painting (5, max. 15) VLPA Development of individuality in painting through creative exercises. Prerequisite: ART 360.

ART 464 Advanced Painting/Drawing (5, max. 15) VLPA Advanced problems in composition. Prerequisite: ART 463.

ART 466 Publications Design (5) VLPA Research, development, organization, design, and presentation of a complex communications document, such as a journal, annual report, or a large publication. All aspects of design, content, image creation and production are addressed in a quarter-long project. Prerequisite: ART 368; ART 378.

ART 467 Exhibition Design (5) VLPA Working with 3-dimensional space, students explore the integration and presentation of graphic images and typographic messages sequenced in a given space. Explores the possibilities and multi-disciplinary char-

acter of exhibition planning and design. Prerequisite: ART 466.

ART 468 Portfolio/Exhibition Presentation (5) VLPA Examines the relationship between problem solving in the educational and professional environments. Emphasis on effective evaluative skills in the development, presentation, discussion, revision, and resolution of individual work. Students present their work at the BFA Exhibition. Prerequisite: ART 467.

ART 478 Information Design (5) VLPA Explores the strategies for enhancing and visually presenting complex statistics and data. Identifies the principles underlying the successful presentation of information. Prerequisite: ART 368; ART 378.

ART 479 Media Information Design (5) VLPA Explores program authoring, communication, and complex information design. Assigned information-design problems are addressed using multimedia authoring tools. Design of effective user interface, navigation techniques, and enhanced content communication. Prerequisite: ART 478.

ART 480 Senior Project/Presentation (3) VLPA Increased opportunity for self-directed design research and study in the context of an advanced studio seminar. Investigation and integration of visual communication skills. Student present their work at the BFA Exhibition. Prerequisite: ART 479.

ART 485 Advanced Ceramic Art (5, max. 20) VLPA Pottery design and construction, stoneware, clay bodies, glazes. Prerequisite: ART 353.

ART 487 Senior Research Project, Ceramics (5) VLPA Independent research on a topic in ceramics.

ART 488 Senior Source Presentation, Ceramics (5) VLPA Designed to allow ceramics majors to explore and define the primary sources of inspiration for their interest in art and why they make it.

ART 496 Undergraduate Internship (2-5, max. 10) Faculty supervised fieldwork in art related activities. Credit/no credit only.

ART 497 Study Abroad-Studio Individual Projects (3-10, max. 20) VLPA

ART 498 Individual Projects-Painting/Sculpture (3/5, max. 15)

ART 499 Individual Projects-Design (3/5, max. 15)

Courses for Graduates Only

ART 512 Graduate Seminar (3, max. 9)

ART 513 Contemporary Studio Theories and Problems (3)

ART 515 Photography (3-15, max. 60)

ART 520 Seminar in Painting (3, max. 18) Designed as a forum for the presentation and criticism of student work as well as for discussion of contemporary directions in visual art. Credit/no credit only.

ART 522 Sculpture (3-15, max. 60)

ART 525 Graduate Studio: Drawing (3, max. 15) Supervised studio for advanced-level students from various media-based disciplines designed to develop an interest in and familiarity with aspects of drawing. Utilization of various media. Discussion of historical and contemporary issues concerning drawing.

ART 540 Fiber Arts (3-15, max. 60)

ART 547 Industrial Design (3-15, max. 60)

ART 550 Printmaking (3-15, max. 60)

ART 553 Ceramic Art (3-15, max. 60)

ART 558 Metal Design (3-15, max. 60)**ART 563 Painting (3-15, max. 60)****ART 581 Graduate Seminar in Design (5, max. 30)**
Critical issues in design. Topics vary. Offered: AWSp.

ART 590 Interdisciplinary Graduate Seminar in Contemporary Practices (5, max. 25) Constructive forum for developing dialogue and critique in practicum-based setting. Professional development highlights the student's experience.

ART 595 Master of Fine Arts Research Project (2-5, max. 9) An independent research project related to and informed by the MFA student's studio work. Final project form may be a lecture, slide presentation, or paper.

ART 600 Independent Study or Research (*)**ART 700 Master's Thesis (*)**

Art History

209 Art



General Catalog Web page:
www.washington.edu/students/gencat/academic/art_history.html



Department Web page:
net.art.washington.edu/SOASite/programs/AH/ahhome.html

Art history is the study of the creation, style, and meaning of works of art in relation to the artists and societies that created them. The history of art involves the interaction of styles, techniques, concepts, individual personalities, and social values from many places over long periods of time. This discipline is comparative in nature and requires many different skills, derived from the study of history and culture, foreign languages and literature, iconography, stylistic analysis, and connoisseurship.

Students studying in the field of Art History can expect to develop strong writing, research, analytical, critical thinking, and problem-solving skills. Course work is designed to allow students to comprehend the social, historical, ethical, and aesthetic significance of the visual realm that is our present environment and the heritage of many cultures.

Art History graduates pursue careers in fields such as gallery and museum management, visual technology, teaching, arts administration, arts education, research, curating and restoration, interior design, and art and antique connoisseurship.

Graduate Program

Graduate Program Coordinator
209 Art, Box 353440
206-543-4876
uwah@u.washington.edu

Master of Arts

Admission Requirements: (1) Bachelor of Arts degree with major in the history of art, or equivalent course work; (2) one copy of all academic transcripts (international applicants must submit two copies); (3) three letters of recommendation; (3) statement of professional objectives in the field; and (4) samples of the applicant's written work. Taking the Graduate Record Examination is required.

Graduation Requirements: (1) 55 credits in the thesis track or 65 credits in the non-thesis track. Of these credits, a minimum of 45 credits in the thesis track or

55 credits in the non-thesis track must be numerically graded art history courses numbered 400 and above, exclusive of thesis or practicum credits. A maximum of 10 credits in related fields, in numerically graded courses numbered 300 and above, may be approved for credit in place of art history courses. No more than 12 credits of ART H 600 may be counted toward the minimum credit requirement for the Master of Arts degree. (2) A minimum of 5 numerically graded credits must be taken in four of five major areas: African or Native American; East Asian; Ancient, Classical, and Medieval; Italian and Northern Renaissance, Baroque, and Rococo; or late eighteenth- to twentieth-first-century Western. (3) A minimum of 15 credits must be taken in 500-level seminars, in addition to ART H 500, Methods of Art History, and ART H 504, Methodology II, both of which must be taken within the first year of residence. At least one seminar each in a Western and a non-Western area is required. (4) A knowledge of either French, German, or Italian, or of Chinese or Japanese if appropriate. Degree candidates specializing in Native American art may substitute Spanish for French, German, or Italian. Candidates in the thesis track are required, in addition, to demonstrate knowledge in a second language appropriate to the student's area of study as determined by the faculty. Petitions to the Faculty Graduate Committee for exemption from the second language requirement will be considered as warranted by the needs of different fields or projects. Language requirements may be satisfied by passing graduate proficiency examinations (available in French, German, Italian, and Spanish), or by completing the third quarter of the second year of French, German, Italian, Chinese, Japanese, or other appropriate language as a graduate student at the University of Washington with a minimum grade of 3.0. Students are expected to satisfy at least one of the language requirements no later than the first quarter of residence in the program. (5) Students in the thesis track must take 10 thesis credits in ART H 700 in preparation for the written presentation and oral defense of a thesis that demonstrates the ability to conduct rigorous research, familiarity with relevant sources, and a capacity for synthesis and critical evaluation; students in the non-thesis track must take 10 practicum credits in ART H 598, a practical or theoretical program designed in conjunction with the faculty and defended by means of a final written report and oral examination.

Doctor of Philosophy

Admission Requirements: (1) Prior sound preparation in art history at a general level, which usually means having acquired the Master of Arts degree in the history of art; (2) one copy of all academic transcripts (international applicants must submit two copies); (3) three letters of recommendation; (4) statement of professional objectives in the discipline; and (5) samples of written research work in art history. Taking the Graduate Record Examination is required.

Graduation Requirements: Minimum of 90 credits, which include: (1) 60 credits in numerically graded art history courses numbered 400 and above, beyond the Master of Arts degree or equivalent, and exclusive of dissertation credits; a maximum of 20 credits in related fields in numerically graded courses numbered 300 and above may be approved for credit in place of art history courses; a minimum of 10 credits must be in areas other than those tested by the General Examination; at least 30 credits must be in 500-level seminars; (2) a knowledge of German, French, or Italian, or of Chinese or Japanese if appropriate; a research capability in a second language adjudged appropriate to the student's area of study; a knowledge of any other languages considered necessary by the faculty. Language requirements may be satisfied by passing graduate-proficiency examinations (available in French, German, Italian, and

Spanish), or by completing the third quarter of second-year French, German, Italian, Chinese, Japanese, or other appropriate language as a graduate student at the University with a minimum grade of 3.0; (3) a General Examination, written and oral, taken prior to enrollment for dissertation credits; this examination covers three specific fields of art history chosen from the following general areas: African, Native American, Chinese, Japanese, Ancient, Medieval, Renaissance, Baroque and eighteenth century, Modern, and Contemporary; no more than two fields may be selected from the same area; (4) 30 dissertation credits in ART H 800 taken after the General Examination in preparation and defense of the dissertation. These credits must be distributed over a minimum of three quarters; (5) a dissertation demonstrating original and independent investigation and achievement.

Financial Aid

The Art History division offers certain scholarship funds, as well as teaching assistantships, for art history graduate students. A small number of grants are awarded to outstanding entering students, but it is otherwise a policy to award financial aid and assistantships only to students who have completed at least one year of graduate study.

Faculty

Chair

Patricia Failing

Professors

Bliquez, Lawrence J. * 1969; PhD, 1968, Stanford University; Greek Art, Greek historiography and historians, Greek and Roman medicine and private life.

Bravmann, Rene A. 1972; MA, 1963, University of Wisconsin, PhD, 1971, Indiana University; African art.

Casteras, Susan P. * 1996; PhD, 1977, Yale University; nineteenth- to mid-twentieth century British, American, European art; museology; women's studies.

Clausen, Meredith L. 1979; MA, 1972, PhD, 1975, University of California (Berkeley); twentieth-century architecture.

Failing, Patricia A. * 1982; MA, 1974, University of California (Berkeley); contemporary art and criticism.

Hildebrand, Grant * 1964, (Emeritus); MArch, 1964, University of Michigan; history, preservation design.

Kartsonis, Anna D. 1983; MA, 1968, PhD, 1982, New York University; Byzantine and medieval art.

Kingsbury, Martha 1968; MA, 1963, PhD, 1969, Harvard University; nineteenth- and twentieth-century art.

Opperman, Hal N. * 1967, (Emeritus); PhD, 1972, University of Chicago; seventeenth- and eighteenth-century European art.

Snow-Smith, Joanne * 1981; PhD, 1976, University of California (Los Angeles); Italian Renaissance.

Associate Professors

Collins, Jeffrey L. * 1994; MA, 1989, Yale University, MA, 1992, Cambridge University (UK), PhD, 1994, Yale University; 17th-/18th-century European art and architecture; American material culture.

Langdon, Merle K. * 1976; PhD, 1972, University of Pennsylvania; Greek archaeology, epigraphy, topography, and history.

Oliver, Marvin E. 1974. (Adjunct); MFA, 1973, University of Washington; Northwest coast Indian art, Native American art, wood design, glass, metals.

Wright, Robin K. 1990; MA, 1977, PhD, 1985, University of Washington; Native American art, Native art of the Pacific Northwest Coast, Haida art.

Assistant Professors

Bogel, Cynthia J. 1999; MA, 1985, PhD, 1995, Harvard University; Buddhist arts; Japanese art, architecture; ritual aesthetic meaning, changing values.

Goettler, Christine E. 1998; MA, 1985, PhD, 1991, University of Zurich (Switzerland); Northern European art (late medieval to Baroque); religious/devotional art; iconoclasm.

Wieczorek, Marek K. 1997; MA, 1990, University of Amsterdam (Netherlands), PhD, 1997, Columbia University; modern European art; Mondrian and De Stijl; critical theory.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

ART H 400 ART History and Criticism (2-5, max. 15) VLPA Courses on special topics, frequently by visiting faculty, which cannot be offered on a continuing basis. Consult art history office for subjects offered.

ART H 411 Traditional Chinese Architecture and Gardens (3) I&S/VLPA Introduction to Chinese architecture (palaces, homes, temples, tombs), urban planning, and gardens; each area examined in terms of techniques of production, visual styles, historical development, and relationship to traditional Chinese cultural values. Recommended: some background in Chinese art, history, language, or literature. Offered: jointly with ARCH 451.

ART H 415 Chinese Painting: The Sung Period (5) I&S/VLPA Golden age of Chinese painting, emphasizing the monumental, romantic, and Zen Buddhist landscape painting traditions of the tenth through thirteenth centuries. Recommended: some background in Chinese art, history, language, or literature.

ART H 416 Chinese Painting: The Yuan Period (5) I&S/VLPA Chinese painting under Mongol rule, in the fourteenth century: a period of political and social crisis that gave rise to a revolution in painting styles. Recommended: some background in Chinese art, history, language, or literature.

ART H 417 Later Chinese Painting: Ming, Ch'ing, and Modern Periods (5) I&S/VLPA Major masters and traditions, esthetic attitudes, and social role of Chinese painting from the fifteenth century to the present day. Recommended: some background in Chinese art, history, language, or literature.

ART H 420 Art of the Japanese Print (3) VLPA Foundations of Ukiyo-e in Japanese genre from the twelfth through mid-seventeenth centuries; woodblock technique from the Heian period through the early Edo period. Emphasis on the changing styles and subject matter in Ukiyo-e Hanga from Moronobu through Kuniyoshi. Recommended: some background in Japanese art, history, language, or literature.

ART H 429 Japanese Cinema (3) VLPA Eleven masterpieces of Japanese cinema, studied in the context of what they reveal about Japanese culture and the art of the film. Recommended: some background in Japanese art, history, language, or literature.

ART H 430 Chinese Cinema (5) I&S/VLPA *Silbergeld* Chinese film, 1930s to the present, studied as a visual art form, set in relation to traditional and modern Chinese arts and literature, modern history, gender, and other social issues. Recommended: some background in Chinese art, history, language, or literature.

ART H 432 Oceanic Art (3) I&S/VLPA Arts of Oceania, studied through cultures of Polynesia, Micronesia, Melanesia, and Australia.

ART H 433 Northern Northwest Coast Native-American Art: Methodologies in Stylistic Analysis (3) VLPA Stylistic and historical analysis of northern Northwest Coast art (Haida, Tlingit, Tsimshian, Northern Wakashan). Intensive analysis of formline rules; stylistic variation through time and between tribal and individual artists' styles. Recommended: some background in Native American art, history, languages, or literature.

ART H 434 Native-American Art and Ceremony of the Southern and Central Northwest Coast (3) I&S/VLPA Examination of the role of the visual arts in the ceremonial life of the Native-American people of the central and southern Northwest Coast. Emphasis on the traditional social and religious aspects of ceremonialism, contrasts between tribal traditions, and continuing twentieth-century traditions. Recommended: some background in Native American art, history, languages, or literature.

ART H 435 Thematic Studies in Native-American Art (3, max. 9) I&S/VLPA *Wright* Approach to Native-American art through themes and issues. Focus varies from year to year (e.g. Shamanism in Native-American art, gender identity in Native-American art, social and political aspects of Native-American art, issues in contemporary Native-American art). Recommended: some background in Native American art, history, languages, or literature.

ART H 436 Arts of Sub-Saharan Africa I (3) I&S/VLPA Traditional arts of the Western Sudan and the Western Guinea coast with their archaeological antecedents. Recommended: some background in African art, history, languages, or literature.

ART H 437 Arts of Sub-Saharan Africa II (3) I&S/VLPA Traditional arts of the Central Guinea coast, Nigeria, Cameroon, and Gabon, from precontact times to the present. Recommended: some background in African art, history, languages, or literature.

ART H 438 Arts of Sub-Saharan Africa III (3) I&S/VLPA Arts of Zaire, Angola, the Swahili coast, and southern Africa. Recommended: some background in African art, history, languages, or literature.

ART H 442 Greek Painting (3) VLPA *Langdon* Study of painted decoration on Greek vases, with emphasis on stylistic developments and cultural and historical influences. Painting on other media also examined as evidence allows. Offered: jointly with CL AR 442.

ART H 443 Roman Painting (3) VLPA Study of surviving painting from the Roman World, with emphasis on wall paintings from Pompeii and Herculaneum. Principal topics for discussion: the four styles of Pompeian painting the dependence of Roman painters on Greek prototypes, and the significance of various kinds of painting as domestic decoration. Offered: jointly with CL AR 443.

ART H 446 Greek Architecture (3) VLPA Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with CL AR 446/ARCH 454.

ART H 447 The Archaeology of Early Italy (3) VLPA *Harmon* Study of the principal archaeological sites of early Italy, including Etruria, Sicily, southern Italy, and archaic Rome up to the Republican period. Attention given to the material remains and their relationship to the Etruscan, ancient Sicilian, and early Roman civilizations. Offered: jointly with CL AR 447.

ART H 448 The Archaeology of Italy (3) VLPA *Harmon* Study of the principal archaeological sites in Italy with special emphasis on ancient Rome. Sites include the Alban hills, Ostia, Pompeii, Herculaneum, Tarquinia, Paestum, Tivoli, and Praeneste. Attention given to the relationship between material remains and their purpose in ancient life. Illustrated by slides. Offered: jointly with CL AR 448.

ART H 451 Topics in Early Christian and Byzantine Art and Architecture (3, max. 9) VLPA Specific theme or area of early Christian and Byzantine art and architecture, such as early Christian and Byzantine mosaics or the art of Constantinople.

ART H 452 Art, Religion, and Politics in the Early Christian Period, 300-700 AD (3) I&S/VLPA *Kartsonis* Evolution of the art of the early Christian period (300-700 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with RELIG 442.

ART H 455 Special Studies in Gothic Art and Architecture (3) VLPA Detailed study of Gothic architecture and its accompanying sculpture and stained glass, with special emphasis on the twelfth and thirteenth centuries in France and England. Offered: jointly with ARCH 455.

ART H 463 Italian Renaissance Sculpture (3) VLPA From Nicola Pisano to Giambologna. Recommended: some background in Italian Renaissance art or history.

ART H 466 High Renaissance Painting in Venice (3) VLPA Painting in Venice, circa 1480 to circa 1580: Bellini, Carpaccio, Giorgione, Titian, Lotto, del Piombo, Tintoretto, and Veronese. Recommended: some background in Italian Renaissance art or history.

ART H 470 English Art: 1500-1800 (3) VLPA English art, principally painting, and, to a lesser extent, architecture. Emphasis on patronage, on the conditions that produced the decided peculiarities of English art, and on the final triumph of the native tradition. Recommended: some background in English history.

ART H 476 French Art: Eighteenth Century (3) VLPA Painting, sculpture, and prints; emphasis on the successive phases of Rococo style and iconography and the emergence of Neoclassicism.

ART H 481 Romanticism (3) VLPA Romantic tendencies of the late eighteenth and early nineteenth centuries, with emphasis on stylistic and iconographic study of painting in Spain, England, Germany, France, and the United States to about 1830. Recommended: some background in the art or history of the period.

ART H 482 Realism and Impressionism (3) VLPA Art and the world, 1830-80: high Romanticism through Realism and Impressionism, with emphasis on painting in France. Recommended: some background in the art or history of the period.

ART H 484 Topics in Modern Art (3, max. 9) VLPA Approach to art of the nineteenth and twentieth cen-

turies through particular themes, genres, contexts, or other issues. Focus varies from year to year. Recommended: some background in the art or history of the period.

ART H 485 Italian Futurism, Dada, Surrealism (5) VLPA *Falling* Survey of three European early modern art movements whose ultimate objective was the collapse of bourgeois culture. Central issues: the role of art and artists in catalyzing social change, strategies for destroying public faith in logic, integration of verbal and visual signs and nonaesthetic conceptions of art. Recommended: some background in the art or history of the period.

ART H 486 Abstract Expressionism: History and Myth (5) VLPA Thematic and chronological survey of abstract expressionism, including major genres of critical interpretation, revisionist scholarship, and the relationship of artistic production to a larger context of visual production. Recommended: some background in the art or history of the period.

ART H 488 American Architecture (3) VLPA American architecture from indigenous native American traditions to the present. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 488.

ART H 490 Nineteenth-Century Architecture (3) VLPA From late eighteenth-century French rationalists, Neoclassicists, to *fin de siècle* Vienna and Paris. Includes theorists such as Ruskin, Viollet-le-Duc, and Semper; major movements, such as the Arts and Crafts, and the French Ecole des Beaux-Arts method of design. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 456.

ART H 491 Twentieth-Century Architecture (3) VLPA Architecture in the twentieth century, mainly in Europe and the United States. Traces roots of Modernism in Europe in the 1920s, its demise (largely in the United States) in the 1960s and recent trends such as Post-Modernism and Deconstructivism. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 457.

ART H 492 Alternative Art Forms Since 1960 (5) VLPA Survey of "post-studio" art forms developed in the 1960s by artists who did not equate artmaking with painting, sculpture, or other traditional forms. Topics include: happenings, Fluxus, land projects, artists' video, artists, books, performance, site works, and art made for distribution on CD-ROM and on the World Wide Web.

ART H 493 Architecture Since 1945 (3) VLPA Theories and forms in architecture from the end of World War II to present. Includes new wave Japanese architects, recent Native-American developments, and non-Western as well as Western trends. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 459.

ART H 498 Individual Projects, Undergraduate Practicum (2-5, max. 10) Fieldwork or internships in art-related areas in the community. Practical experience in areas such as arts administration, gallery and museum operations, collection cataloguing, curatorial responsibilities, and art education. Credit/no credit only.

ART H 499 Individual Projects (2-5, max. 10)

Courses for Graduates Only

ART H 500 Methods of ART History (5) 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.

ART H 501 Seminar in the General Field of Art (5, max. 15)

ART H 504 Methods of Art History: Faculty Research (2) Discussion and analysis of methodological issues posed in faculty research. Credit/no credit only. Offered: W.

ART H 509 Seminar in Special Topics in ART History (5, max. 15) Specific focus changes from quarter to quarter.

ART H 511 Seminar in Chinese Art (5, max. 15) Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of China.

ART H 515 Seminar in Japanese Art (5, max. 15) Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of Japan.

ART H 531 Seminar in Tribal Art (5, max. 15) Methodological and cross-disciplinary problems in the visual arts of precolonial Africa, Oceania, and America. Specific content varies.

ART H 533 Seminar in North American Indian Art (5, max. 15) Problems in North American Indian visual arts. Content varies.

ART H 541 Seminar in Greek and Roman Art (5) Langdon In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered: jointly with CL AR 541.

ART H 551 Seminar in Early Christian, Byzantine, and/or Medieval Art and Architecture (5, max. 15) Problems in early Christian, Byzantine, and medieval art and architecture. Content varies. Prerequisite: permission of instructor.

ART H 561 Seminar in Italian Renaissance Art (5, max. 15) Problems and in-depth study of selected topics of the art of the Italian Renaissance.

ART H 566 Seminar in North European Art (5, max. 15) Deals with problems of style and iconography of the northern European masters of the fourteenth through seventeenth centuries.

ART H 577 Seminar in Baroque Art (5, max. 15) 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.

ART H 581 Seminar in Modern Art (5, max. 15) Art historical problems of the nineteenth and twentieth centuries.

ART H 591 Seminar in Twentieth-Century Architecture (3/5) Specific focus changes from quarter to quarter. Prerequisite: graduate standing with background in art history, architecture, architectural history, or permission of instructor. Offered: jointly with ARCH 558.

ART H 598 Master's Practicum (*, max. 15) Credit/no credit only.

ART H 599 Reading and Writing Projects (2) Art historical issues, methods, and materials. Required of all graduate majors registered in 400-level art history courses. Open also to graduate nonmajors.

ART H 600 Independent Study or Research (*)

ART H 700 Master's Thesis (*) Credit/no credit only.

ART H 800 Doctoral Dissertation (*) Credit/no credit only.

Asian American Studies

See American Ethnic Studies.

Asian Languages and Literature

223 Gowen



General Catalog Web page:
www.washington.edu/students/genocat/academic/asian_lang_lit.html



Department Web page:
depts.washington.edu/asianll/

The Department of Asian Languages and Literature offers instruction in the principal languages and literatures of Asia, including East, Southeast, and South Asia. Emphasis is placed on the roles of these languages within the cultures they serve as well as on linguistic, textual, and literary analysis. Courses on Asian literature in English are offered for majors and nonmajors alike.

Graduate Program

Graduate Program Coordinator
225 Gowen, Box 353521
206-543-4996

The Department of Asian Languages and Literature offers programs of study leading to the Master of Arts and Doctor of Philosophy degrees with specializations in (1) the languages and literatures of China; (2) the language and literature of Japan; (3) the languages and literatures of South Asia, subsuming Sanskrit and Hindi. All graduate students in the department must affiliate themselves with one of these three programs. The department does not offer degrees or specializations in language pedagogy.

Financial aid for graduate students newly entering the department is very limited and is awarded on a competitive basis. National Resource Fellowships are awarded for the study of Chinese, Japanese, and Korean. The department offers incoming graduate students limited opportunities for teaching assistant positions in Chinese, Japanese, and Korean. Since some financial aid is wholly or partially determined by need, all prospective students are urged to submit the Free Application for Federal Student Aid (FAFSA) with the College Scholarship Service in New Jersey, and to apply for other forms of aid mentioned in the department's cover letter to prospective students.

A full range of courses in other disciplines and aspects of Asian cultures and civilizations is available from other departments and schools of the University, such as the departments of Anthropology, Art History, History, Linguistics, Comparative Literature, and Political Science, and the Henry M. Jackson School of International Studies. Students in the Department of Asian Languages and Literature are encouraged to avail themselves of these offerings to complement and supplement their language and literature studies.

Admission Requirements

Applicants for admission should present an undergraduate major in the language and literature of specialization (four years of language training for admission to the Chinese and Japanese programs; fewer years of language acquisition may be acceptable in

South Asian languages), or the background and training equivalent to such a major. Students without such a background may be qualified for admission, but will need to acquire the program prerequisites during the earliest stages of their graduate study. Besides an application and one original set of transcripts of prior postsecondary education (international students are required to send a second original set directly to the Office of Graduate Admissions), the department requires a statement of academic goals, and three letters of recommendation addressed to the Graduate Program Coordinator.

Degree Requirements

The research component of the Master of Arts degree may be satisfied by the writing of either a thesis or two research papers. The Doctor of Philosophy degree requires a dissertation. In addition to the language of specialization, reading knowledge of a second (usually Western) language is required for the Master of Arts degree, and of a third (usually Asian) language for the Doctor of Philosophy degree. Neither English nor, usually, the student's native language may be used to fulfill these additional requirements.

Faculty

Chair

William Boltz

Professors

Boltz, William * 1981; PhD, 1974, University of California (Berkeley); classical Chinese.

Cox, Collett D. * 1985; PhD, 1983, Columbia University; Buddhist studies (East and South Asian), Indian philosophy and religion, comparative religion.

Knechtges, David R. * 1972; MA, 1965, Harvard University, PhD, 1968, University of Washington; Han and Six Dynasties literature.

Norman, Jerry * 1971, (Emeritus); PhD, 1969, University of California (Berkeley); Chinese language and linguistics, Altaic linguistics.

Salomon, Richard G. * 1981; PhD, 1975, University of Pennsylvania; Sanskrit language and literature, Buddhist studies.

Shapiro, Michael C. * 1970; PhD, 1974, University of Chicago; South Asian language, literature, and linguistics.

Yue-Hashimoto, Anne O. * 1980; PhD, 1966, Ohio State University; Chinese linguistics, grammar (historical and modern), dialectology, historical reconstruction.

Associate Professors

Boltz, Judith M. 1988; MA, 1976, PhD, 1985, University of California (Berkeley); Chinese narrative literature.

Brandauer, Frederick P. * 1973, (Emeritus); PhD, 1973, Stanford University; traditional Chinese vernacular fiction and modern Chinese literature.

Cooke, Joseph R. * 1967, (Emeritus); PhD, 1965, University of California (Berkeley); Thai language and literature.

Kano, Tamako-niwa * 1982, (Emeritus); PhD, 1956, Radcliffe; Japanese language.

Ohta, Amy * 1990; PhD, 1993, University of California (Los Angeles); applied linguistics, especially second

language acquisition, discourse analysis, and Japanese.

Tsutsui, Michio * 1990, (Adjunct); PhD, 1984, University of Illinois; computer-aided instruction, international communication, Japanese linguistics, technical Japanese.

Assistant Professors

Braester, Yomi 2000, (Adjunct); PhD, 1998, Yale University; modern Chinese literature, film, literary criticism, theory of art.

Handel, Zev * 1999; MA, 1992, PhD, 1998, University of California (Berkeley); Chinese historical phonology; Sino-Tibetan linguistics.

Lee, Ann Sung-Hi * 1996; PhD, 1991, Columbia University; Korean and East Asian language and literature.

Pauwels, Heidi R. * 1997; PhD, 1994, University of Washington; Hindi language and literature: medieval and modern; Sanskrit language and literature; Hinduism.

Senior Lecturers

Nguyen, Kim O. 1984; PhD, 1973, University of California (Los Angeles); Vietnamese language and literature.

Ohta, Kaoru * 1989; PhD, 1994, University of California (Los Angeles); syntax, morphology, Japanese linguistics, language acquisition, and Japanese pedagogy.

Lecturers

Bi, Nyan-Ping 2000; MA, 1988, Indiana University; second language acquisition, Chinese linguistics, Chinese language pedagogy.

Dreyfuss, Jeffrey 1998; MA, 1970, PhD, 1981, University of Michigan; Indonesian language, general linguistics, dysfunction and language, functions of redundancy.

Kesavatana-Dohrs, Wiworn 1989; PhD, 1989, University of Michigan; Thai language and literature.

Kim, Soohee 1999; PhD, 1999, University of Washington; Korean language, morphology, phonology-phonetics interface, and historical linguistics.

Matsuda-Kiami, Izumi 1996; MA, 1992, University of Wisconsin; Japanese language and pedagogy.

Singh, Kunwar P. 2000; PhD, 2000, University of Wisconsin; Hindi language.

Takeda, Fumiko 1996; MA, 1996, University of Oregon; Japanese language.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

Asian Languages and Literature

ASIAN 401 Introduction to Asian Linguistics (5) VLPA *Handel, K. Ohta, Shapiro* Linguistic analysis, with emphasis on languages of east, southeast, south, and central Asia. Includes phonetics, phonemics, morphology, syntax, historical reconstruction, linguistic typology, comparative grammar. Survey of

major languages and language families of Asia. Diverse Asian languages as subjects of linguistic analysis. Prior knowledge of linguistics not required. Recommended: two years of any Asian language.

ASIAN 404 Writing Systems (3) VLPA *Boltz, Salomon* Origin, nature, and development of writing systems. Alphabets, syllabaries, and logographic systems; relation of writing systems to spoken languages; decipherment of previously undeciphered scripts. Prerequisite: ASIAN 401. Offered: alternate years.

ASIAN 411 Buddhist Literature (5) I&S/VLPA Overview of major Buddhist literary traditions of India, China, and Tibet from antiquity to the end of the first millennium CE. Special focus on Indian Mahayana literature and the historical factors that accompanied its introduction and preservation in China and Tibet. Prerequisite: either RELIG 202, or RELIG 354. Offered: W.

ASIAN 405 Advanced Problems in Asian Linguistics (3) VLPA *Handel, K. Ohta, Shapiro* Advanced problems in the analysis of the languages of east, southeast, south, and central Asia. Includes phonology, morphology, syntax, lexicography, historical reconstruction, linguistic typology, and comparative grammar. Prerequisite: ASIAN 401. Offered: alternate years.

ASIAN 498 Special Topics (1-5, max. 15) VLPA Offered occasionally by permanent or visiting faculty members. Topics vary. Offered: AWSp.

Courses for Graduates Only

ASIAN 503 Seminar in Asian Linguistics (1-5, max. 15) *Handel, A. Ohta, K. Ohta* Topics vary. Prerequisite: permission of instructor. Offered: AWSp.

ASIAN 510 Teaching Assistant Training Workshop (3) A. *Ohta* Introduction to issues and methods of teaching Asian languages in American college classrooms. Recommended for all new teaching assistants. Prerequisite: concurrent registration in ASIAN 518 and permission of instructor. Offered: A.

ASIAN 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with GERMAN 518/NEAR E 518/SCAND 518/SLAV 518.

ASIAN 585 Seminar in Buddhism (3, max. 27) *Cox* Systems and history of Buddhist thought. Original and secondary sources are used. Combines the methods of specialists in south, central, and east Asian Buddhism with those of historians of religion and philosophy. Prerequisite: permission of instructor. Offered: AWSp.

ASIAN 600 Independent Study or Research (*) Offered: AWSpS.

ASIAN 700 Master's Thesis (*) Offered: AWSpS.

ASIAN 800 Doctoral Dissertation (*) Offered: AWSpS.

Altai

ALTAI 401 Written Mongolian (3) Introduction to Mongolian written in the vertical script. Texts of different periods and genres. Offered: alternate years; A.

ALTAI 402 Written Mongolian (3) Introduction to Mongolian written in the vertical script. Texts of different periods and genres. Offered: alternate years; W.

ALTAI 403 Written Mongolian (3) Introduction to Mongolian written in the vertical script. Texts of different periods and genres. Offered: alternate years; Sp.

ALTAI 405 Manchu (3) Introduction to Manchu, with principal focus on the structure of the language. Reading of texts of different genres. Offered: alternate years; A.

ALTAI 406 Manchu (3) Introduction to Manchu, with principal focus on the structure of the language. Reading of texts of different genres. Offered: alternate years; W.

ALTAI 407 Manchu (3) Introduction to Manchu, with principal focus on the structure of the language. Reading of texts of different genres. Offered: alternate years; Sp.

ALTAI 415 Spoken Mongolian (5) Introduction to the modern spoken language of Mongolia. Emphasis on correct pronunciation and oral skills. Offered: A.

ALTAI 416 Spoken Mongolian (5) Introduction to the modern spoken language of Mongolia. Emphasis on correct pronunciation and oral skills. Offered: W.

ALTAI 417 Spoken Mongolian (5) Introduction to the modern spoken language of Mongolia. Emphasis on correct pronunciation and oral skills. Offered: Sp.

Courses for Graduates Only

ALTAI 579 Comparative Altaic Linguistics (3) Comparative phonology and morphology of Mongolian, Turkic, and other Altaic languages. Prerequisite: permission of instructor. Offered: jointly with LING 579.

Chinese

CHIN 411 Fourth-Year Chinese (5) VLPA *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: CHIN 303. Offered: A.

CHIN 412 Fourth-Year Chinese (5) VLPA *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: CHIN 411. Offered: W.

CHIN 413 Fourth-Year Chinese (5) VLPA *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: CHIN 412. Offered: Sp.

CHIN 421 Business Chinese I (5) VLPA *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 313. Offered: A.

CHIN 422 Business Chinese II (5) VLPA *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 421. Offered: W.

CHIN 423 Business Chinese III (5) VLPA *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 422. Offered: Sp.

CHIN 443 Structure of Chinese (5) VLPA *Yue-Hashimoto* Outline of the major grammatical struc-

tures of Chinese. Focus on learning and teaching problems. Prerequisite: either CHIN 313 or CHIN 334. Offered: W.

CHIN 445 Foreign Study: Fourth-Year Chinese (1-15, max. 20) VLPA Modern 400-level Chinese language studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 451 First-Year Classical Chinese (5) VLPA *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 213. Offered: A.

CHIN 452 First-Year Classical Chinese (5) VLPA *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 451. Offered: W.

CHIN 453 First-Year Classical Chinese (5) VLPA *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 452. Offered: Sp.

CHIN 461 History of Chinese Literature (5) VLPA *Knechtges* Chinese literature from earliest times to the end of the Six Dynasties. Offered: A.

CHIN 462 History of Chinese Literature (5) VLPA *Knechtges* Chinese literature from the T'ang to the end of the Song. Offered: W.

CHIN 463 History of Chinese Literature (5) VLPA *Knechtges* Chinese literature from the Yuan to recent times. Offered: Sp.

CHIN 470 Advanced Readings in Modern Chinese (5) VLPA Reading and translation of scholarly articles and selections in the humanities and social sciences. Prerequisite: CHIN 413. Offered: A.

CHIN 482 Advanced Readings in Modern Chinese (5) VLPA Modern texts in the original, mainly works published since the beginning of the twentieth century. Focus on literature, primarily short story and essay. Offered: W.

CHIN 495 Foreign Study: Advanced Chinese Literature or Linguistics (1-5, max. 15) VLPA Advanced Chinese literature or linguistics studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 496 Special Studies in Chinese (5, max. 15) VLPA Topics vary.

CHIN 499 Undergraduate Research (3-5, max. 15) For Chinese language and literature majors. Offered: AWSpS.

Courses for Graduates Only

CHIN 531 Studies in Chinese Phonology (3) *Handel* Sources and methods in the study of Chinese phonology; modern standard Chinese. Prerequisite: ASIAN 401. Offered: A.

CHIN 532 Studies in Chinese Phonology (3) *Handel* Sources and methods in the study of Chinese phonology; medieval period. Offered: W.

CHIN 533 Studies in Chinese Phonology (3) *Handel* Sources and methods in the study of Chinese phonology; advanced topics in Chinese historical phonology. Offered: Sp.

CHIN 540 Seminar on Chinese Linguistics (3, max. 9) *Handel, Yue-Hashimoto* Advanced topics in Chinese linguistics. Subject emphasis varies from year to year. Offered: Sp.

CHIN 541 Seminar in Chinese Grammar (3, max. 9) *Boltz, Yue-Hashimoto* Problems of theory and analysis of Chinese grammar, both synchronic and diachronic, modern and classical. Prerequisite: CHIN 443.

CHIN 542 Chinese Historical Phonology (3) *Handel* Introduction to Chinese historical phonology; emphasis on the Middle Chinese period. Prerequisite: ASIAN 401 and permission of instructor.

CHIN 544 Chinese Dialectology (3, max. 9) *Yue-Hashimoto* Methodology and theory of studying Chinese dialects. Among areas covered are field-work methods, dialect classification, and dialectal grammar. Prerequisite: CHIN 542, ASIAN 401, and permission of instructor.

CHIN 551 Second-Year Classical Chinese (5) *Knechtges* Problems of grammar, rhetoric, and textual criticism. Early literary texts. Offered: A.

CHIN 552 Second-Year Classical Chinese (5) *Knechtges* Problems of grammar, rhetoric, and textual criticism. Later literary texts. Offered: W.

CHIN 553 Second-Year Classical Chinese (5) *Boltz* Continuation of 551, 552. Intermediate level readings in Han and pre-Han historical and philosophical texts. Prerequisite: CHIN 551 and CHIN 552. Offered: Sp.

CHIN 557 Introduction to Chinese Philology and Textual Criticism (5) *Boltz* Principles and methods of textual criticism and philological analysis of ancient Chinese texts. Study of both manuscripts and transmitted texts. Emphasis on Han and pre-Han documents; specific texts vary. Prerequisite: two years of classical Chinese and ASIAN 401. Offered: alternate years; W.

CHIN 558 Seminar in Chinese Lexicology and Grammatonymy (3) *Boltz* Study of the Chinese script, lexicographical history, and lexicological and etymological analysis. Prerequisite: two years of classical Chinese, ASIAN 401. Offered: alternate years.

CHIN 559 Methods and Materials (5) *Knechtges* Introduction to the basic reference works and methods of research in Chinese language and literature. Includes a history of Sinology, survey of basic bibliographies, dictionaries, atlases, catalogs, journals, literary collections, concordances, and other sources. Prerequisite: CHIN 551, CHIN 552. Offered: alternate years; A.

CHIN 560 Proseminar in Chinese (3-5) *Boltz, Knechtges* Methods and materials in the study of Chinese texts. Problems in textual analysis and Chinese literary history. Prerequisite: CHIN 553 and one of CHIN 554, CHIN 555, and CHIN 556.

CHIN 561 Studies in Chinese Literature (5) *Knechtges* Literature before Ch'in. Prerequisite: permission of instructor. Offered: W.

CHIN 562 Studies in Chinese Literature (5) *Knechtges* Poetry of the T'ang and Sung periods. Prerequisite: permission of instructor. Offered: Sp.

CHIN 563 Studies in Chinese Literature (5) *Knechtges* Literary theory and criticism. Prerequisite: permission of instructor.

CHIN 573 Seminar in Chinese Poetry (5, max. 15) Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite: permission of instructor. Offered: alternate years; W.

CHIN 575 Studies in Chinese Drama (5, max. 15) Readings and discussion of Chinese drama. Subject emphasis varies. Prerequisite: permission of instructor. Offered: alternate years.

CHIN 580 Readings in Vernacular Chinese Fiction (5, max. 15) Directed study of selected works of pre-modern vernacular Chinese narrative, with an emphasis on Ming and Ch'ing fiction. Introduction to various critical approaches to the study of Chinese narrative. Offered: A.

CHIN 582 Topics in Chinese Literature and Cultural Studies (5, max. 15) Directed study of aspects of twentieth-century Chinese literary and popular cultures. Provides both historical coverage and a grounding in various theoretical and methodological problems. Topics include print culture, cinema, popular music, as well as aspects of material culture; emphasis varies. Prerequisite: permission of instructor. Offered: W.

CHIN 583 Seminar in Modern Chinese Literature (5) Directed study of selected works of modern Chinese literature. Primary focus on the novel, short story, and essay. Offered: Sp.

CHIN 590 Readings in the Thirteen Classics (5) *Boltz* Selected readings from the Thirteen Classics, and from their associated exegetic and hermeneutic traditions. Readings and emphases vary from year to year. Prerequisite: two years of Classical Chinese and CHIN 557. Offered: alternate years.

CHIN 592 Studies in the History of Chinese Thought (5) *Knechtges* Directed readings in selected traditional philosophical texts. Sung and Yuan. Prerequisite: permission of instructor.

Hindi

HINDI 401 Advanced Hindi (5) VLPA Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: A.

HINDI 402 Advanced Hindi (5) VLPA Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: W.

HINDI 403 Advanced Hindi (5) VLPA Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: Sp.

HINDI 404 Derivational Morphology of Hindi/Urdu (3) VLPA *Shapiro* A systematic introduction to the derivational morphology of Hindi/Urdu. Sanskrit, Persian, Arabic, and English elements in Hindi/Urdu. Treatment of derivational prefixes and suffixes, stem alternations, and methods of compound formation. Prerequisite: HINDI 323. Offered: alternate years; W.

HINDI 421 Survey of Modern Hindi Literature (3) VLPA *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative short stories. Prerequisite: HINDI 403.

HINDI 422 Survey of Modern Hindi Literature (3) VLPA *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative poems. Prerequisite: HINDI 403.

HINDI 423 Survey of Modern Hindi Literature (3) VLPA *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative novels. Prerequisite: HINDI 403.

HINDI 431 Advanced Conversational Hindi (2, max. 8) VLPA Conversational practice in contemporary Hindi. Prerequisite: HINDI 323. Offered: Sp.

HINDI 451 Advanced Hindi Readings (3, max. 9) VLPA Readings in Modern Standard Hindi prose texts drawn from diverse disciplines. Prerequisite: HINDI 403. Offered: W.

HINDI 499 Undergraduate Research (3-5, max. 15) Primarily for Hindi language and literature majors. Offered: AWSpS.

Courses for Graduates Only

HINDI 501 Studies in Medieval Braj Literature (3, max. 9) *Pauwels* Introduction to the Braj dialect of Hindi and its literature. Prose readings and selected poetry by Surdas, Raskhan, Bihari, and others. Prerequisite: HINDI 403 or equivalent. Offered: A.

HINDI 502 Studies in Medieval Avadhi Literature (3, max. 9) *Pauwels* Introduction to the Avadhi dialect of Hindi and its literature. Readings from Ramcaritmanas of Tulsidas and Padmavat of Muhammad Malik Jayasi. Prerequisite: HINDI 403 or equivalent. Offered: W.

HINDI 503 Studies in Medieval Sant Literature (3, max. 9) *Shapiro* Introduction to the language and literature of Sant poets. Readings include Guru Nanak's Japuji and excerpts from Kabir's Granthavali. Prerequisite: HINDI 403 or equivalent.

HINDI 504 Studies in Medieval Rajasthan Literature (3) *Pauwels* Introduction to the literary language of Rajasthan. Reading of extracts from representative selections from Rajasthan literature. Prerequisite: HINDI 403 or equivalent.

Indian

INDN 401 Pali (3) VLPA *Cox, Salomon* Introduction to Pali language and literature. Prerequisite: SNKRT 303.

INDN 402 Pali (3) VLPA *Cox, Salomon* Introduction to Pali language and literature.

INDN 403 Introduction to Written Urdu (3) VLPA Modern written Urdu for students with at least elementary knowledge of Hindi. Prerequisite: HINDI 313.

INDN 404 Readings in Urdu Literature (3, max. 18) VLPA Readings in Urdu prose and poetry. Urdu prose composition. Prerequisite: INDN 403.

INDN 410 Prakrit (3, max. 6) VLPA *Salomon* Introduction to the various Prakrit or Middle Indo-Aryan dialects (Gandhari, Magadhi, Maharashtri, Sauraseni) from literary, canonical, and inscriptional sources. Prerequisite: SNKRT 303.

INDN 411 First-Year Intensive Bengali (15) *Salomon* Study of modern Standard Bengali, including reading, writing, and conversation. Introduction to Bengali script. Offered: S.

INDN 499 Undergraduate Research (3-5, max. 15) Primarily for South Asian language and literature majors. Offered: AWSpS.

Courses for Graduates Only

INDN 530 Readings in Pali Literature (3, max. 18) *Cox, Salomon* Reading and interpretation of intermediate and advanced texts in Pali. Prerequisite: INDN 402 or equivalent.

INDN 590 Special Topics in Indology (1-5, max. 27) Studies in selected research topics in South Asian languages and literatures. Prerequisite: graduate standing and permission of instructor. Offered: Sp.

Japanese

JAPAN 421 Fourth-Year Japanese I (5) I&S/VLPA Reading, class discussion, oral presentations, and composition on topics related to the Japanese language and present-day Japan. Conducted in Japanese. Prerequisite: JAPAN 313.

JAPAN 422 Fourth-Year Japanese II (5) I&S/VLPA Reading, class discussion, oral presentations, and

composition on topics related to the Japanese language and present-day Japan. Conducted in Japanese. Prerequisite: JAPAN 421.

JAPAN 423 Fourth-Year Japanese II (5) I&S/VLPA Reading, class discussion, oral presentations, and composition on topics related to the Japanese language and present-day Japan. Conducted in Japanese. Prerequisite: JAPAN 422.

JAPAN 431 Readings in Modern Japanese Literature (5) VLPA Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax. Prerequisite: JAPAN 313.

JAPAN 432 Readings in Modern Japanese Literature (5) VLPA Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax.

JAPAN 433 Readings in Modern Japanese Literature (5) VLPA Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax.

JAPAN 440 Introduction to Japanese Linguistics (5) VLPA *A. Ohta, K. Ohta* Overview of major topics in the linguistic description of Japanese: phonology, morphology, syntax, history, dialects, sociolinguistics, and the writing system. Elementary training in phonological, morphological, and syntactic analysis of Japanese. Prerequisite: JAPAN 313; recommended: introductory linguistics course.

JAPAN 443 Topics in Japanese Sociolinguistics (5) I&S/VLPA *A. Ohta* Methodology and theory of sociolinguistic analysis. Reading of research literature and training in analysis of Japanese language data. Prerequisite: JAPAN 313 which may be taken concurrently; recommended: JAPAN 343.

JAPAN 445 Foreign Study: Fourth-Year Japanese (1-15, max. 20) VLPA For participants in study abroad programs in Japan who complete 400-level language courses in approved programs in Japan. Evaluation by department/faculty required.

JAPAN 451 Readings in Japanese for China and Korea Specialists (5) VLPA

JAPAN 460 Topics in Japanese Popular Culture and Literature (5) VLPA Critical reading and analysis of multi-media texts related to various genres and aspects of popular culture and literature in Japan. Covers film and manga in particular. Primary texts in Japanese original. Prerequisite: JAPAN 313.

JAPAN 471 Classical Japanese Grammar (5) VLPA Introduction to classical grammatical forms and translation of classical literary texts. Prerequisite: JAPAN 313. Offered: A.

JAPAN 472 Classical Japanese Grammar (5) VLPA Introduction to classical grammatical forms and translation of classical literary texts. Prerequisite: JAPAN 471. Offered: W.

JAPAN 473 Readings in Classical Japanese Literature (5) VLPA Readings in prose, poetry, and drama, antiquity to nineteenth century. Prerequisite: JAPAN 472. Offered: Sp.

JAPAN 499 Undergraduate Research (3-5, max. 15) For Japanese language and literature majors. Offered: AWSpS.

Courses for Graduates Only

JAPAN 532 Advanced Readings in Modern Japanese Literature (5) Rapid reading of modern

literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

JAPAN 533 Advanced Readings in Modern Japanese Literature (5) Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

JAPAN 540 Seminar on Japanese Linguistics (3, max. 15) A. *Ohta* Problems in the history and structure of the Japanese language. Topics vary each quarter, according to the needs and interests of the students. Prerequisite: JAPAN 440 or permission of instructor.

JAPAN 571 Advanced Readings in Classical Japanese Literature (5) Continued readings in classical literary texts. Prerequisite: JAPAN 473 or permission of instructor.

JAPAN 572 Advanced Readings in Classical Japanese Literature (5) Continued readings in classical literary texts. Prerequisite: JAPAN 473 or permission of instructor.

JAPAN 580 Development of Modern Japanese Fiction (5, max. 15) Reading and translation of major works of modern fiction in the original, with emphasis on the chronological development of modern prose style. Offered: A.

JAPAN 590 Seminar in Japanese Literature (5, max. 15) Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese literature. Prerequisite: permission of instructor. Offered: Sp.

Korean

KOREAN 411 Readings in Contemporary Korean (5) VLPA Completes the introduction to Korean writing in mixed script of 311, 312, 313. Prerequisite: either minimum score of 42 on KR200A placement test or KOREAN 313. Offered: A.

KOREAN 412 Readings in Contemporary Korean (5) VLPA Provide experience in reading a variety of contemporary styles. Materials from published works include informal essays, short stories, one-act plays, academic essays, and newspaper editorials. Offered: W.

KOREAN 413 Readings in Contemporary Korean (5) VLPA Provide experience in reading a variety of contemporary styles. Materials from published works include informal essays, short stories, one-act plays, academic essays, and newspaper editorials. Offered: Sp.

KOREAN 415 Social Science Literature in Korean (3) VLPA Readings in selections from contemporary Korean publications in social science topics. Prerequisite: KOREAN 413. Offered: A.

KOREAN 416 Readings in Korean Literature (3) VLPA Reading of various literary texts which may include pre-modern Korean narrative and poetry as well as modern literature and drama. Prerequisite: KOREAN 413. Offered: W.

KOREAN 417 Readings in Korean Journals (3) VLPA Selections from Korean newspapers, news magazines, and other journals. Prerequisite: KOREAN 413. Offered: Sp.

KOREAN 445 Foreign Study: Korean Literature (1-15, max. 20) VLPA For participants in study abroad programs who complete course work Korean literature.

KOREAN 499 Undergraduate Independent Study (3-5, max. 15) For students who have completed 417 or equivalent. Offered: AWSpS.

Courses for Graduates Only

KOREAN 503 Seminar in Korean Linguistics (3-5) Topics in Korean linguistics. Prerequisite: background in linguistics and permission of instructor.

KOREAN 531 Advanced Readings in Modern Korean Literature (5) *Lee* Literature and literary criticism in Korean. Prerequisite: fourth-year Korean or equivalent. Offered: alternate years.

KOREAN 532 Advanced Readings in Traditional Vernacular Korean Literature (5) *Lee* Readings in traditional Korean vernacular literature, including poetry, sung narrative, and fiction. Prerequisite: fourth-year Korean or equivalent. Offered: alternate years.

Sanskrit

SNKRT 401 Intermediate Sanskrit (5) VLPA *Cox, Salomon* Further study of classical grammar; introduction to classical literature and Vedic language and texts. Prerequisite: SNKRT 303. Offered: A.

SNKRT 402 Intermediate Sanskrit (5) VLPA *Cox, Salomon* Further study of classical grammar; introduction to classical literature and Vedic language and texts. Offered: W.

SNKRT 403 Intermediate Sanskrit (5) VLPA *Cox, Salomon* Further study of classical grammar; introduction to classical literature and Vedic language and texts. Offered: Sp.

SNKRT 411 Advanced Sanskrit (3, max. 9) VLPA *Cox, Salomon* Reading and analysis of classical texts, chosen according to students' interests. Prerequisite: SNKRT 403. Offered: A.

SNKRT 412 Advanced Sanskrit (3, max. 9) VLPA *Cox, Salomon* Reading and analysis of classical texts, chosen according to students' interests. Offered: W.

SNKRT 413 Advanced Sanskrit (3, max. 9) VLPA *Cox, Salomon* Reading and analysis of classical texts, chosen according to students' interests. Offered: Sp.

SNKRT 491 Vedic Studies (3) VLPA *Salomon* Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes background material on Vedic religion, literature, and culture. Prerequisite: SNKRT 303.

SNKRT 494 Readings in Religious Classics of India (5) VLPA Reading and analysis of the older religious brahmanical texts. Prerequisite: SNKRT 402.

SNKRT 495 Studies in Indian Thought (3, max. 9) VLPA *Cox* Religious and philosophical traditions in South Asia. The original documents studied vary from year to year. Prerequisite: SNKRT 402.

SNKRT 499 Undergraduate Research (3-5, max. 15) Primarily for Sanskrit language and literature majors. Offered: AWSp.

Courses for Graduates Only

SNKRT 550 Seminar on Sanskrit Literature (3, max. 9) *Salomon* Detailed study of selected authors, periods, or traditions, within the context of Indian literary history. Prerequisite: SNKRT 403 or permission of instructor.

SNKRT 555 Seminar on Sanskrit Grammar (3, max. 6) *Salomon* Reading and critical study of traditional literature on grammar and language, including texts of Paninian and other schools. Offered: A.

SNKRT 560 Readings in Philosophical Sanskrit (3, max. 9) *Cox, Potter, Salomon* Intensive reading and analysis of Hindu or Buddhist philosophical

texts. Prerequisite: SNKRT 494 or permission of instructor. Offered: AWSp.

SNKRT 570 Seminar in Indian Epigraphy and Paleography (3, max. 6) *Salomon* Introduction to the study of inscriptions and other original documents in Sanskrit and Prakrit languages and in Kharosthi, Brahmi, and derived scripts. History of writing in India and development of Indic scripts. Methods of critical evaluation of inscriptions as sources of political and cultural history. Prerequisite: SNKRT 403.

SNKRT 581 Readings in Buddhist Texts (3, max. 9) *Cox* Interpretation of original sources. Texts vary from year to year. Prerequisite: ability to study sources in the original languages, an introduction to Buddhist thought, and permission of instructor.

SNKRT 582 Readings in Buddhist Texts (3, max. 9) *Cox* Interpretation of original sources. Texts vary from year to year. Prerequisite: ability to study sources in the original languages, an introduction to Buddhist thought, and permission of instructor.

Thai

THAI 401 Intermediate Thai (5) VLPA *Kesavatana-Dohrs* Continuation of 303. Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 303. Offered: A.

THAI 402 Intermediate Thai (5) VLPA *Kesavatana-Dohrs* Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 401. Offered: W.

THAI 403 Intermediate Thai (5) VLPA *Kesavatana-Dohrs* Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 402. Offered: Sp.

THAI 411 Readings in Thai (3-5, max. 15) VLPA *Kesavatana-Dohrs* Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: THAI 403. Offered: A.

THAI 412 Readings in Thai (3-5, max. 15) VLPA *Kesavatana-Dohrs* Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: THAI 411. Offered: W.

THAI 413 Readings in Thai (3-5, max. 15) VLPA *Kesavatana-Dohrs* Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: THAI 412. Offered: Sp.

THAI 499 Undergraduate Research (3-5, max. 25) For Thai language and literature majors. Offered: AWSp.

Vietnamese

VIET 496 Special Studies in Vietnamese (3-5, max. 15) VLPA *Nguyen* Topics vary. Emphasizes improving language skills for research. Primarily for Southeast Asian Studies majors. Offered: AWSp.

Asian Studies

See International Studies.

Astronomy

C319 Physics-Astronomy Building



General Catalog Web page:
www.washington.edu/students/genocat/academic/astrometry.html



Department Web page:
www.astro.washington.edu

Modern research in astronomy and astrophysics encompasses a large number of disciplines and specialties, and the faculty members of the Department of Astronomy are active in many of these areas. Research areas of the department include planetary astronomy, stellar structure and evolution, interstellar matter, x-ray sources, galactic structure, extragalactic astronomy, galactic dynamics, quasars and galactic nuclei, and theoretical and observational cosmology. The department operates a well-instrumented 30-inch telescope with modern instrumentation at the Manastash Ridge Observatory near Ellensburg primarily for students. The department is also part of a consortium of universities which operates a 3.5-meter optical/infrared telescope located on Sacramento Peak, New Mexico, and is a partner in the innovative Sloan Digital Sky Survey. Students also have access to a variety of national facilities, such as the Kitt Peak and Cerro Tololo observatories and the Very Large Array. A variety of research is conducted with satellite instruments such as the Hubble Space Telescope. Data analysis and theoretical research are conducted on the department's cluster of SUN, PC, and SGI computers, and on a variety of UW and national supercomputer facilities. Undergraduate majors often assist faculty members in acquisition, reduction, and interpretation of data.

Graduate Program

Graduate Program Coordinator
C304 Physics-Astronomy, Box 351580
206-685-2392
office@astro.washington.edu

Master of Science, Doctor of Philosophy

A series of graduate courses in solar system, stellar, galactic, and extragalactic astrophysics is offered. The heart of the graduate program is the collaboration of students and faculty members in research at the frontiers of astronomy. Students work collaboratively with members of the faculty to develop the techniques and insight necessary for successful research, and, subsequently, to define a thesis topic. The student's thesis research may be purely theoretical or use observational material (obtained through the facilities of either the University of Washington or one of the national observatories) or a combination. Active research programs are being carried out in the areas of stellar interiors, stellar atmospheres, planetary atmospheres and surfaces, x-ray sources, interplanetary dust, interacting binary stars, extragalactic astronomy, gravitation, interstellar matter, dark matter, cosmology, relativistic astrophysics, and computational astrophysics.

Admission Qualifications

Most, though not all, entering students have a bachelor's degree in physics. Entering students are not required to have a background in astronomy, although some knowledge of general astronomy is expected of those to whom a teaching assistantship is to be offered. Undergraduates interested in a graduate program in astronomy are urged to concentrate on preparation in physics and mathematics before entering.

Assistantships

Normally all students making satisfactory academic progress receive financial support. More than three-quarters of the department's graduate students hold fellowships or research assistantships. A number of teaching assistantships are available, primarily in the elementary astronomy courses.

Faculty

Chair

Bruce Balick

Professors

Adelberger, Eric G. * 1972, (Adjunct); PhD, 1967, California Institute of Technology; experimental gravitational physics; experimental nuclear physics.

Anderson, Scott F. * 1988; PhD, 1985, University of Washington; quasars and active galaxies, x-ray astronomy.

Balick, Bruce * 1975; PhD, 1971, Cornell University; evolved stars, nebular structure, hydrodynamics.

Bardeen, James M. * 1976, (Adjunct); PhD, 1965, California Institute of Technology; general relativity, theoretical astrophysics, cosmology.

Bohm, Karl-Heinz * 1967, (Emeritus); PhD, 1954, University of Kiel (Germany); stellar structure, star formation.

Bohm-Vitense, Erika H. * 1968, (Emeritus); PhD, 1951, University of Kiel (Germany); pulsating star, stellar activity.

Boynnton, Paul E. * 1970; PhD, 1967, Princeton University; high-energy astrophysics, astronomy.

Brownlee, Donald E. * 1965; PhD, 1971, University of Washington; origin of the solar system, comets, interplanetary dust.

Haxton, Wick C. * 1984, (Adjunct); PhD, 1976, Stanford University; theoretical physics, nuclear physics.

Hodge, Paul W. * 1965, (Emeritus); PhD, 1960, Harvard University; extragalactic astronomy, stellar evolution.

Hogan, Craig J. * 1990; PhD, 1980, Cambridge University (UK); astrophysical cosmology, especially the origin of astronomical structures in the expanding universe.

Jacobsen, Theodor S. 1979, (Emeritus); PhD, 1926, University of California (Berkeley); astronomy.

Lake, George Russell * 1985; PhD, 1980, Princeton University; stellar dynamics, galaxy structure and formation, cosmology, computational astrophysics.

Margon, Bruce H. * 1980; PhD, 1973, University of California (Berkeley); galactic and extragalactic x-ray astronomy, optical counterparts of x-ray sources.

Stubbs, Christopher * 1981; PhD, 1988, MSc, 1988, University of Washington; observational cosmology and gravitation.

Sullivan, Woodruff T, II * 1973; PhD, 1971, University of Maryland; radio astronomy, galactic and extragalactic structure, history of astronomy.

Szkody, Paula * 1982; PhD, 1975, University of Washington; cataclysmic variables, multiwavelength observations x-r-g-ir.

Wallerstein, George * 1965, (Emeritus); PhD, 1958, California Institute of Technology; chemical composition of stars, peculiar stars, interstellar matter.

Ward, Peter D. * 1984, (Adjunct); PhD, 1976, McMaster University (Canada); paleontology, paleobiology, regional coastal stratigraphy.

Associate Professors

Hawley, Suzanne * 1999; PhD, 1989, University of Texas (Austin); variable stars, magnetic activity, flares, galactic structure, dwarf galaxies.

Quinn, Thomas R. * 1993; PhD, 1986, Princeton University; Solar System dynamics and galaxy formation.

Assistant Professor

Dalcanton, Julianne * 1998; PhD, 1995, Princeton University; the evolution and formation of galaxies.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ASTR 421 Stellar Observations and Theory (3) NW

Observations and theory of the atmospheres, chemical composition, internal structure, energy sources, and evolutionary history of stars.

ASTR 422 Interstellar Material (3) NW

Description and physics of the matter between the stars. Physical conditions, distribution, evolution, and motions of interstellar atoms, molecules, and dust grains. Exchange of energy and matter between stars and interstellar material.

ASTR 423 High-Energy Astrophysics (3) NW

High-energy phenomena in the universe. Includes supernova, pulsars, neutron stars, x-ray and gamma-ray sources, black holes, cosmic rays, quasi stellar objects, active galactic nuclei, diffuse background radiations. Radiative emission, absorption processes, and models derived from observational data. Prerequisite: PHYS 224; PHYS 225.

ASTR 480 Introduction to Astronomical Data Analysis (5) NW

Hands-on experience with electronic imaging devices (CCDs) and software for image reduction and analysis. Introduction to operating systems, reduction software, and statistical analysis with applications to CCD photometry. Prerequisite: ASTR 323, which may be taken concurrently.

ASTR 481 Introduction to Astronomical Observation (5) NW

Theory and practice of obtaining optical data at a telescope. Preparation, obtaining data with a CCD on a telescope, and subsequent data analysis for completion of a research project. Prerequisite: ASTR 480.

ASTR 497 Topics in Current Astronomy (1-3, max. 9) NW

Recent developments in one field of astronomy or astrophysics. Prerequisite: either ASTR 101 or ASTR 150, either of which may be taken concurrently.

ASTR 499 Undergraduate Research (*, max. 15)

Special astronomical problems and observational projects, by arrangement with instructor.

Courses for Graduates Only

ASTR 500 Seminar in Elementary Astronomy Instruction (3) Seminar in the preparation of lecture and workshop materials with emphasis on demonstration, visual aids, and the evaluation of students' progress. Credit/no credit only.

ASTR 507 Physical Foundations of Astrophysics I (3) Thermodynamics from an astronomer's point of view: black body radiation, basic radiative transfer, equation of state, degenerate gases, crystallization at high density.

ASTR 508 Physical Foundations of Astrophysics II (3) Introduction to astronomical hydrodynamics and magnetohydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics, waves in a plasma.

ASTR 509 Physical Foundations of Astrophysics III (3) Potential theory as applied to astrophysical systems. Orbits. Integrals of motion. Equilibrium and stability of stellar systems. Encounters of stellar systems. Kinetic theory of collisional systems. Applications of stellar dynamics to star clusters, galaxies, and large-scale structure.

ASTR 510 Nuclear Astrophysics (3) Big bang nucleosynthesis; nuclear reactions in stars; solar neutrinos and neutrino oscillations; core-collapse supernovae; nucleosynthesis in stars, novae, and supernovae; neutron stars; composition and sources of cosmic rays; gamma ray bursts; atmospheric neutrinos. Offered: jointly with PHYS 554; A.

ASTR 511 Galactic Structure (3) Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure and evolution of galaxies.

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

ASTR 513 Cosmology and Particle Astrophysics (3) Big bang cosmology; relativistic world models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter. Offered: jointly with PHYS 555.

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

ASTR 531 Stellar Interiors (4) Physical laws governing the temperature, pressure, and mass distribution in stars. Equation of state, opacity, nuclear energy generation, computational methods. Models of main sequence stars and star formation. Prerequisite: PHYS 421 or equivalent.

ASTR 532 Stellar Evolution (3) Theoretical and observational approaches to stellar evolution. Structure of red giants, supernovae, and white dwarfs. Observations of star clusters and the chemical composition of stars as they relate to the theory of stellar structure. Prerequisite: ASTR 531.

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

ASTR 555 Planetary Atmospheres (3) Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all; roles of radiation, chemistry, and dynamical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context

of comparative planetology. Offered: jointly with ATM S 555/ESS 581.

ASTR 556 Planetary Surfaces (3) Comparison of surface processes and conditions on Mercury, Venus, Earth, moon, Mars, asteroids, and satellites of the great planets. Emphasis on understanding how and why planetary surfaces differ from one another and the implied course of solar-system evolution. Analysis of data from Earth-based telescopes and manned and unmanned space missions.

ASTR 557 Origin of the Solar System (3) Nebular and nonnebular theories of the solar system origin; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; physical and chemical evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with ESS 583.

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. Credit/no credit only. Prerequisite: permission of department.

ASTR 576 Astronomy Colloquium (1, max. 20) Current research topics in astronomy and astrophysics. Credit/no credit only. Prerequisite: permission of department.

ASTR 597 Topics in Observational Astrophysics (1-5, max. 20)

ASTR 598 Topics in Theoretical Astrophysics (1-5, max. 20)

ASTR 599 Advanced Astronomy Seminar (1-3, max. 6) Practical exercises in astrophysics. Emphasis on methods and techniques of simulation, acquisition, evaluation, and analysis of observational data and its interpretation using models of astrophysical systems. Prerequisite: permission of instructor.

ASTR 600 Independent Study or Research (*)

ASTR 700 Master's Thesis (*)

ASTR 800 Doctoral Dissertation (*)

Atmospheric Sciences

408 Atmospheric Sciences-Geophysics Building



General Catalog Web page:
www.washington.edu/students/genecat/academic/atmos_sci.html



Department Web page:
www.atmos.washington.edu

Graduate Program

Graduate Program Coordinator
408B Atmospheric Sciences-Geophysics, Box 351640
206-543-6471
advise@atmos.washington.edu

Master of Science, Doctor of Philosophy

Admission to the graduate program requires a baccalaureate degree in physical science, engineering,

or mathematics, or its equivalent, as well as the Graduate Record Examination. The program of graduate study varies with each individual.

During the first year of graduate study, most students concentrate on developing a strong background in the fundamentals that underlie the atmospheric sciences and on getting a broad understanding of the wide range of problems encountered in the atmosphere. A qualifying examination is given toward the end of the first year of graduate study, as soon as possible after the student has completed 24 credits, including 12 credits in courses numbered 500 and above. All students desiring to proceed toward the Ph.D. degree must take this examination, and students desiring the Master of Science degree may elect to take it. This examination tests understanding of the fundamental aspects of the atmospheric sciences and of the relevant mathematics and physics. Physical reasoning, rather than factual information, is stressed. Those who pass the examination with distinction are encouraged to work toward the Ph.D. degree; those who pass continue toward the Master of Science degree. Students whose objective is the Master of Science degree may elect to submit a written-thesis proposal in lieu of the qualifying examination.

Research assistantships and a few teaching assistantships are available to full-time students. Applications are made through the department office.

Faculty

Chair

James R. Holton

Professors

Badgley, Franklin * 1953, (Emeritus); MS, 1948, PhD, 1951, New York University; turbulence.

Baker, Marcia * 1980; MS, 1960, Stanford University, PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Battisti, David S. * 1983; MS, 1981, PhD, 1988, University of Washington; large-scale atmosphere-ocean dynamics, climate dynamics, tropical circulation, polar climates.

Breidenthal, Robert E. * 1980, (Adjunct); PhD, 1979, California Institute of Technology; turbulence, entrainment, mixing, vorticity.

Bretherton, Christopher S. * 1984; PhD, 1984, Massachusetts Institute of Technology; convective cloud systems, boundary layer meteorology, numerical modeling, tropical meteorology.

Brown, Robert A. * 1971, (Research); MS, 1962, University of California (Berkeley), PhD, 1969, University of Washington; planetary boundary layers, air-sea interaction, turbulence, remote sensing.

Businger, Joost A. * 1983, (Emeritus); PhD, 1954, University of Utrecht (Netherlands); energy transfer.

Covert, David S. * 1975, (Research); MS, 1971, PhD, 1974, University of Washington; atmospheric chemistry; aerosol physics, chemistry, optics, and instrumentation.

Durrant, Dale R. * 1987; MS, 1975, University of California (Berkeley), PhD, 1981, Massachusetts Institute of Technology; atmospheric dynamics and modeling, numerical methods, mountain meteorology, mesoscale meteorology.

Fleagle, Robert G. * 1948, (Emeritus); MS, 1944, PhD, 1949, New York University; physical and dynamic meteorology, weather modification and public policy,

air-sea interaction.

Gammon, Richard H. * 1985, (Adjunct); PhD, 1970, Harvard University; atmospheric chemistry, chemical oceanography, environmental chemistry; biogeochemical cycles, global.

Grenfell, Thomas C. * 1968, (Research); MS, 1968, University of Chicago, PhD, 1972, University of Washington; atmospheric radiation, radiative transfer, microwave remote sensing, ice and snow optics.

Harrison, Don Edmunds * 1985, (Affiliate); MS, 1973, PhD, 1977, Harvard University; ocean circulation modeling, air-sea interaction, ocean and climate dynamics.

Hartmann, Dennis L. * 1977; PhD, 1975, Princeton University; climate change, dynamic meteorology, radiation and remote sensing.

Hegg, Dean A. * 1975, (Research); MS, 1976, PhD, 1979, University of Washington; atmospheric chemistry, cloud physics.

Hobbs, Peter V. * 1963; PhD, 1963, University of London: Imperial College; aerosol/cloud/precipitation physics, atmospheric chemistry, air pollution, mesoscale meteorology.

Holton, James R. * 1965; PhD, 1964, Massachusetts Institute of Technology; dynamic meteorology, middle atmosphere meteorology.

Houze, Robert A. * 1972; MS, 1969, PhD, 1972, Massachusetts Institute of Technology; mesoscale meteorology, cloud physics and dynamics, tropical and mountain meteorology.

Jaffe, Daniel A. * 1997, (Adjunct); MS, 1983, PhD, 1987, University of Washington; atmospheric chemistry, urban and global air pollution, environmental education.

Katsaros, Kristina B. * 1959, (Affiliate); PhD, 1969, University of Washington; air-sea interaction, radiative surface fluxes, remote sensing.

LaChapelle, Edward R. * 1982, (Emeritus); ScD, 1967, University of Puget Sound; snow-ice physics.

Leovy, Conway B. * 1967, (Emeritus); PhD, 1964, Massachusetts Institute of Technology; climatic role of clouds, planetary atmospheres, astrobiology, atmospheric circulation and dynamics.

Mass, Clifford F. * 1981; PhD, 1978, University of Washington; synoptic and mesoscale meteorology.

Maykut, Gary * 1969, (Research); PhD, 1969, University of Washington; polar air-sea-ice interaction, radiative transfer in ice and snow.

Overland, James E. * 1983, (Affiliate); MS, 1971, University of Washington, PhD, 1973, New York University; Arctic and North Pacific climate variability, sea ice.

Plant, William J. 1992, (Affiliate); MS, 1968, PhD, 1972, Purdue University; microwave remote sensing of the sea surface, atmosphere-ocean interaction.

Radke, Lawrence F. * 1964, (Affiliate); MS, 1966, PhD, 1968, University of Washington; cloud and aerosol physics, wildfire science, remote sensing, airborne instrumentation.

Reed, Richard J. * 1954, (Emeritus); DSc, 1949, Massachusetts Institute of Technology; weather analysis and prediction, numerical modeling.

Rhines, Peter B. * 1984; PhD, 1967, Cambridge University (UK); the circulation of the oceans and evolution of climate.

Sarachik, Edward S. * 1984; PhD, 1966, Brandeis University; atmospheric dynamics, air-sea interac-

tions, greenhouse warming, equatorial dynamics, climate change.

Tillman, James E. 1971, (Research); MS, 1961, Massachusetts Institute of Technology; Mars meteorology; humidity, temperature, and wind instrumentation, K-12 and public outreach programs.

Untersteiner, Norbert * 1957, (Emeritus); PhD, 1950, University of Innsbruck (Austria); air-sea-ice interaction, polar climatology, sea ice physics.

Wallace, John M. * 1966; PhD, 1966, Massachusetts Institute of Technology; atmospheric general circulation, climate variability, global warming.

Warren, Stephen G. * 1981; MA, 1969, PhD, 1973, Harvard University; atmospheric radiation, radiative properties of clouds, snow and sea ice, Antarctic climate.

Associate Professors

Bates, Timothy S. * 1990, (Affiliate); MS, 1978, PhD, 1988, University of Washington; oceanic and atmospheric chemistry, atmosphere-ocean interaction, aerosols and climate.

Bond, Nicholas A. 1997, (Affiliate); PhD, 1986, University of Washington; air-sea interaction, boundary layers, coastal and marine meteorology.

Chen, Shuyi S. * 1991, (Affiliate); MS, 1985, University of Oklahoma, PhD, 1990, Pennsylvania State University; tropical meteorology, air-sea interactions, mesoscale dynamics, numerical modeling.

Colman, Bradley R. 1999, (Affiliate); PhD, 1984, Massachusetts Institute of Technology; weather analysis and forecasting, coastal meteorology and oceanography, numerical modeling.

Ghan, Steven J. 1993, (Affiliate); MS, 1981, PhD, 1988, Massachusetts Institute of Technology; clouds, aerosols and tropospheric chemistry, global and regional climate modeling.

Harrison, Halstead * 1971, (Emeritus); PhD, 1960, Stanford University; atmospheric chemistry, dispersion modeling, radiative transfer.

Smull, Bradley F. 1996, (Research); PhD, 1986, University of Washington; mesoscale and radar meteorology, severe storms, large-scale atmosphere-ocean interactions.

Assistant Professors

Alexander, M. Joan * 1992, (Affiliate); MS, 1989, PhD, 1992, University of Colorado (Boulder); stratospheric data analysis, mesoscale convection modeling, spectral analysis, gravity wave dynamics.

Catling, David C.* 2001; DPhil, 1994, Oxford University (UK); astrobiology, planetary atmospheres, geochemical-atmosphere interaction on early Earth and Mars.

Fu, Qiang * 2000; PhD, 1991, University of Utah; atmospheric radiation; cloud/aerosol/radiation/climate interactions; remote sensing.

Hakim, Gregory J. * 1999; MS, 1993, PhD, 1997, State University of New York (Albany); synoptic and mesoscale meteorology; atmospheric dynamics; stratified turbulence.

Jaegle, Lyatt * 2000; MS, 1992, PhD, 1996, California Institute of Technology; atmospheric chemistry and photochemistry; chemical modeling of atmospheric observations.

Kamenkovich, Igor V. 1998, (Research); PhD, 1996, Massachusetts Institute of Technology; atmosphere-ocean coupled modeling, thermohaline circulation.

Mantua, Nathan J. * 1998, (Affiliate); PhD, 1994, University of Washington; climate change, El Niño, Southern Oscillation, climate impacts on human activities and ecosystems.

Stoelinga, Mark T. 2002, (Research); PhD, 1993, University of Washington; synoptic and mesoscale meteorology, cloud and precipitation physics.

Walden, Von P. 2001, (Affiliate); MS, 1990, PhD, 1995, University of Washington; polar meteorology, infrared remote sensing of the atmosphere and surface.

Yuter, Sandra Ellyn * 1990, (Research); PhD, 1996, University of Washington; physical meteorology, mesoscale meteorology, radar and remote sensing.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ATM S 431 Atmospheric Physics (5) NW Energy transfer processes: solar and atmospheric radiation, turbulence, and boundary layer structure. Applications. Prerequisite: either ATM S 340 or PHYS 224. Offered: A.

ATM S 441 Atmospheric Motions I (3) NW Basic equations governing atmospheric motions and their elementary applications; circulation and vorticity; dynamics of midlatitude disturbances. Prerequisite: either AMATH 353 or MATH 309; MATH 324. Offered: A.

ATM S 442 Atmospheric Motions II (5) NW Wave dynamics, numerical prediction, development of midlatitude synoptic systems, and general circulation. Includes laboratory exercises. Prerequisite: ATM S 441. Offered: W.

ATM S 451 Instruments and Observations (5) NW Principles of operating instruments for measuring important atmospheric parameters (e.g., temperature, humidity, aerosol concentration). Concepts of sensitivity, accuracy, representativeness, time response. Manipulation of output data including signal processing and statistical analysis. Experimental design and implementation of the design in actual field experiments is included. Prerequisite: ATM S 370; ATM S 442; STAT 311. Offered: Sp.

ATM S 452 Weather Forecasting and Advanced Synoptic Meteorology (5) NW Basic forecasting techniques. Application of numerical modeling and statistical approaches. Structure, evolution, and forecasting of convective systems. Radar applications. Diurnal and topographically-forced circulations. Aviation meteorology. Laboratories include extensive practice in forecasting and surface map analysis. Prerequisite: ATM S 370; ATM S 442; STAT 311. Offered: Sp.

ATM S 458 Global Atmospheric Chemistry (4) NW Global atmosphere as chemical system. Physical factors and chemical processes. Natural variabilities and anthropogenic change. Cycling of trace substances. Global issues such as climate change, acidic deposition, influences on biosphere. Prerequisite: either ATM S 358 or CHEM 456. Offered: jointly with CHEM 458; A.

ATM S 460 Water in the Environment (3) NW Baker, Raymond, Waddington, Warren Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions,

and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with ESS 424/PHYS 460. Offered: A.

ATM S 480 Air-Quality Modeling (3) NW Evaluation of air-quality models relating air pollution emissions to environmental concentrations. Topics include meteorological dispersion models and various "receptor" models based on chemical "fingerprinting" of sources. Emphasizes current problems. Prerequisite: either CEE 381, ATM S 458, or CHEM 458. Offered: jointly with CEE 480; W.

ATM S 492 Readings in Meteorology or Climatology (*) Credit/no credit only. Offered: A/W/Sp.

Courses for Graduates Only

ATM S 501 Fundamentals of Physics and Chemistry of the Atmosphere (5) Fundamentals of hydrostatics, thermodynamics, radiation, cloud physics, and atmospheric chemistry. Offered: A.

ATM S 502 Introduction to Synoptic Meteorology (3) Overview of weather systems; atmospheric observations and data assimilation. Elementary manual and computer-aided synoptic analysis techniques. Interpretation of satellite and ground-based observations. Kinematics. Fronts and frontogenesis; life cycles of extratropical cyclones; related mesoscale phenomena. Numerical weather prediction; interpretation of forecast products. Offered: Sp.

ATM S 503 Atmospheric Motions I (3) Basic equations governing atmospheric motions and their elementary applications; circulation and vorticity; dynamics of midlatitude disturbances. Offered: A.

ATM S 504 Atmospheric Motions II (5) Wave dynamics, numerical prediction, development of midlatitude synoptic systems, and general circulation. Prerequisite: either ATM S 441 or ATM S 503. Offered: W.

ATM S 505 Introduction to Fluid Dynamics (4) Eulerian equations for mass, motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress, strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high, low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with AMATH 505/OCEAN 511; A.

ATM S 508 Geochemical Cycles (4) Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with OCEAN 523/CHEM 523; Sp.

ATM S 509 Geophysical Fluid Dynamics I (4) Dynamics of rotating stratified fluid flow in the atmosphere/ocean and laboratory analogues. Equations of state, compressibility, Boussinesq approximation. Geostrophic balance, Rossby number. Poincare, Kelvin, Rossby waves, geostrophic adjustment. Ekman layers. Continuously stratified dynamics: Inertia-gravity waves, potential vorticity, quasi-geostrophy. Prerequisite: ATM S/AMATH 505/OCEAN 511. Offered: jointly with OCEAN 512; W.

ATM S 510 Physics of Ice (3) Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from vapor and liquid phases. Offered: jointly with ESS 531; alternate years; W.

ATM S 511 Formation of Snow and Ice Masses (3) Snow and ice climatology. Formation of the ice crystals in clouds. Snow metamorphism. Transfer of radiative, sensible, and latent heat at snow and ice surfaces. Remote sensing of snow and ice. Growth and melt of sea ice. Climatic records from ice. Prerequisite: permission of instructor. Offered: jointly with ESS 532; alternate years; A.

ATM S 512 Dynamics of Snow and Ice Masses (3) Rheology of snow and ice. Sliding and processes at glacier beds. Thermal regime and motion of seasonal snow, glaciers, and ice sheets. Avalanches and glacier surges. Deformation and drift of sea ice. Response of natural ice masses to change in climate. Prerequisite: permission of instructor. Offered: jointly with ESS 533; alternate years; Sp.

ATM S 513 Structural Glaciology (3) Physical and chemical processes in snow, stratigraphy, and metamorphism. Interpretation of ice sheet stratigraphy in terms of paleoenvironment. Dynamic metamorphism of ice from flow. Structures formed at freezing interfaces. Structure of river, lake, and sea ice. Relationship between structures and bulk physical properties. Prerequisite: permission of instructor. Offered: jointly with ESS 534; alternate years; W.

ATM S 514 Ice and Climate Modeling (3) Principles of global climate modeling. Modeling seasonal cycles of snow cover and sea ice. Ice-sheet mass balance and flow. Solar radiation anomalies due to changes in earth's orbit. Climate/ice-sheet models of Pleistocene ice ages. Prerequisite: permission of instructor. Offered: jointly with ESS 535; alternate years.

ATM S 520 Atmospheric Sciences Colloquium (1, max. 15) Seminars on current research in advanced topics related to atmospheric sciences, conducted by faculty and visiting professors/scientists. Includes presentation of doctoral dissertations by department graduate students. For Atmospheric Sciences graduate students only. Credit/no credit only. Prerequisite: permission of department. Offered: A/W/Sp.

ATM S 521 Seminar in Atmospheric Dynamics (*) Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/W/Sp.

ATM S 523 Seminar in Clouds and Precipitation (*) Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: AW.

ATM S 524 Seminar in Climate Dynamics and Energy Transfer (*) Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

ATM S 525 Seminar Topics in Atmospheric Chemistry (1-3, max. 6) Seminar for atmospheric scientists, chemists, and engineers in problems associated with the chemical composition of the atmosphere. Topics range from the natural system to urban pollution and global atmospheric change. Faculty lectures and student participation. Prerequisite: CEE 301 or permission of instructor. Offered: jointly with CEE 553; W.

ATM S 532 Atmospheric Radiation: Introductory (3) Fundamentals of radiative transfer; absorption and scattering by atmospheric gases; elementary applications to constraints on the thermal structure, photochemistry, and remote sensing. Prerequisite: PHYS 225 or permission of instructor. Offered: jointly with ESS 571; Sp.

ATM S 533 Atmospheric Radiation: Advanced (3) Optical properties and particle absorption and scattering; solutions of radiative transfer equation in multiple scattering atmospheres; applications to atmos-

pheric and surface energy balance and remote sensing. Prerequisite: ATM S 532/ESS 571 or permission of instructor. Offered: jointly with ESS 572; A.

ATM S 534 Remote Sensing of the Atmosphere and Climate System (3) Satellite systems for sensing the atmosphere and climate system. Recovery of atmospheric and surface information from satellite radiance measurements. Applications to research. Prerequisite: ATM S 532 or ATM S 533. Offered: jointly with ESS 521; alternate years.

ATM S 535 Cloud Microphysics and Dynamics (3) Basic concepts of cloud microphysics, water continuity in clouds, cloud dynamics, and cloud models. Prerequisite: ATM S 501 or permission of instructor. Offered: jointly with ESS 573; W.

ATM S 536 Mesoscale Storm Structure and Dynamics (3) Techniques of observing storm structure and dynamics by radar and aircraft, observed structures of precipitating cloud systems, comparison of observed structures with cloud models. Prerequisite: either ATM S 535 or ESS 573. Offered: alternate years; Sp.

ATM S 542 Synoptic and Mesoscale Dynamics (3) Quasi-geostrophic theory, baroclinic instability, symmetric instability, tropical disturbances, frontogenesis, orographic disturbances, convective storms. Prerequisite: ATM S 509/OCEAN 512 and AMATH 402 or equivalents. Offered: Sp.

ATM S 545 General Circulation of Atmosphere (3) Requirements of the global angular momentum, heat, mass, and energy budgets upon atmospheric motions as deduced from observations. Study of the physical processes through which these budgets are satisfied. Prerequisite: ATM S 509/OCEAN 512 or permission of instructor. Offered: A.

ATM S 547 Boundary Layer Meteorology (3) Turbulence, turbulent fluxes, averaging. Convection and shear instability. Monin-Obukhov similarity theory, surface roughness. Wind profiles. Organized large eddies. Energy fluxes at ocean and land surfaces, diurnal cycle. Convective and stably stratified boundary layers. Cloud-topped boundary layers. Remote sensing. Boundary layer modeling and parameterization. Prerequisite: ATM S 505, AMATH 505, or OCEAN 511. Offered: alternate years; Sp.

ATM S 551 Atmospheric Structure and Analysis I: Synoptic Scale Systems (4) Extratropical cyclones and cyclogenesis. Jet streams. Upper waves in the westerlies. Diagnosis of vertical motions. Fronts and frontogenesis. Prerequisite: ATM S 502 and ATM S 509/OCEAN 512. Offered: alternate years; A.

ATM S 552 Objective Analysis (3) Review of objective analysis techniques commonly applied to atmospheric problems; examples from the meteorological literature and class projects. Superposed epoch analysis, cross-spectrum analysis, filtering, eigenvector analysis, optimum interpolation techniques. Offered: W.

ATM S 555 Planetary Atmospheres (3) Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all; roles of radiation, chemistry, and dynamical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. Offered: jointly with ASTR 555/ESS 581; alternate years.

ATM S 556 Planetary-Scale Dynamics (3) Zonally symmetric circulations, planetary waves, equatorial waves, dynamics of the middle atmosphere, trace constituent transport, nonlinear aspects of atmospheric flows. Prerequisite: ATM S 542 or permission of instructor. Offered: alternate years; Sp.

ATM S 558 Atmospheric Chemistry (3) Photochemistry of urban, rural, and marine tropospheric air, and of the natural and perturbed ozone in the middle atmosphere. Unity of the chemistries in these apparently different regimes. Prerequisite: ATM S 458 or ATM S 501 or CHEM 457 or permission of instructor. Offered: alternate years; Sp.

ATM S 560 Atmosphere/Ocean Interactions (3) Observations and theory of phenomena of the coupled atmosphere-ocean system. El Niño/Southern Oscillation; decadal tropical variability; atmospheric teleconnections; midlatitude atmosphere-ocean variability. Overview of essential ocean and atmospheric dynamics, where appropriate. Credit/no credit only. Prerequisite: ATM S 509/OCEAN 512. Offered: jointly with OCEAN 560; alternate years; Sp.

ATM S 564 Atmospheric Aerosol and Multiphase Atmospheric Chemistry (3) Physics and chemistry of particles and droplets in the atmosphere. Statistics of size distributions, mechanics, optics, and physical chemistry of atmospheric aerosols. Brownian motion, sedimentation, impaction, condensation, and hydroscopic growth. Prerequisite: permission of instructor. Offered: alternate years; W.

ATM S 571 Advanced Physical Climatology (3) Physical processes that determine the climate of Earth and its past and future changes. Greenhouse effect. Climate modeling. Radiative and dynamical feedback processes. Orbital parameter theory. Critical analysis of climate change predictions. Prerequisite: permission of instructor. Offered: A.

ATM S 575 Large Scale Dynamics of the Tropical Atmosphere (3) Observations and underlying dynamics of large-scale tropical circulations. Factors that determine regions of large-scale persistent precipitation in the tropics, thermal forcing of atmospheric circulations by these regions, and temporal variability of the forcing and response. Credit/no credit only. Prerequisite: ATM S 509/OCEAN 512, ATM S 542. Offered: alternate years; W.

ATM S 581 Numerical Analysis of Time Dependent Problems (5) Numerical methods for time-dependent differential equations, including explicit and implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory. Spectral and pseudospectral methods. Prerequisite: AMATH 581 or AMATH 584. Offered: jointly with AMATH 586/MATH 581; Sp.

ATM S 582 Numerical Modeling of Atmospheric Flows II (3) Topics of current interest including: efficient time differencing, semi-implicit and multiple time-step techniques. Semi-lagrangian schemes. Treatment of poorly resolved gradients. Flux-corrected transport. Positive definite advection schemes. Aliasing error and nonlinear instability. Wave permeable boundary conditions. Credit/no credit only. Prerequisite: ATM S 581. Offered: alternate years.

ATM S 586 Current Research in Climate Change (2, max. 20) Weekly lectures focusing on a particular aspect of climate (topic to change each year) from invited speakers (both UW and outside), plus one or two keynote speakers, followed by class discussion. Offered: jointly with ESS 586/OCEAN 586.

ATM S 587 Climate Dynamics (3) *Hartman, Thompson* Examines Earth's climate system; distribution of temperature, precipitation, wind ice, salinity, and ocean currents; fundamental processes determining Earth's climate; energy and constituent transport mechanisms; climate sensitivity; natural climate variability on interannual to decadal time scales; global climate models; predicting future climate. Offered: jointly with ESS 587/OCEAN 587; A.

ATM S 588 The Global Carbon Cycle and Climate (3) *Quay* Oceanic and terrestrial biogeochemical

processes controlling atmospheric CO₂ and other greenhouse gases. Records of past changes in the earth's carbon cycle from geological, oceanographic and terrestrial archives. Anthropogenic perturbations to cycles. Develop simple box models, discuss results of complex models. Offered: jointly with OCEAN 588/ESS 588; W.

ATM S 589 Paleoclimatology: Data, Modeling and Theory (3) *Battisti, Emerson, Steig* Evidence for past changes in land and sea surface temperature, in precipitation and atmospheric dynamics, and in ocean circulation: both long and interannual timescales. Paleoclimate modeling and theory. Time series analysis and climate noise. Rapid climate change. Statistical reconstruction of interannual variability. Offered: jointly with ESS 589/OCEAN 589; Sp.

ATM S 591 Special Topics (1-4, max. 9) Lecture series on topics of major importance in the atmospheric sciences. Prerequisite: permission of instructor.

ATM S 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

ATM S 700 Master's Thesis (*) Offered: AWSpS.

ATM S 800 Doctoral Dissertation (*) Offered: AWSpS.

Biology

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

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, Microbiology, and Zoology.

BIOL 401 Cell Biology (5) NW *Bakken, Crowe, Hille, Wakimoto, Wright* Selected topics in molecular cell biology. Strong emphasis on understanding original experiments that describe the functions of the cell. Prerequisite: either BIOL 200 or BIOL 202; either CHEM 221, CHEM 224, CHEM 238, or CHEM 336; either BIOL 355, GENET 372, ZOOL 301, ZOOL 455, ZOOL 485, BIOC 405, or BIOC 440.

BIOL 402 Cell Biology Laboratory (3) NW Practice in modern methods (restriction enzyme digestion, blotting, hybridization, immunochemistry, density gradient centrifugation, electrophoresis) and other methods currently used to study plant and animal cells, nucleic acids, and proteins. Includes practice in scientific style writing. Prerequisite: BIOL 401, which may be taken concurrently.

BIOL 405 Cellular and Molecular Biology of Human Disease (3) NW *Wakimoto* Concepts of cellular and molecular biology as applied to human disease. Emphasis on current experimental approaches to investigate disease mechanisms and the contributions of model systems. Selected topics in cancer biology, viral induced disease, gene therapy. Prerequisite: either BIOL 202 or BIOL 220; either BIOC 405, BIOC 440, BIOL 355, BIOL 401, GENET 371, GENET 372, ZOOL 301, ZOOL 455, or ZOOL 485.

BIOL 438 Biological Monitoring and Assessment (5) NW *Karr* Explores the technical questions (con-

ceptual, sampling, and analytical), the rationale, policy relevance, and legal basis for tools—existing and needed—to assess ecological health. Prepares students to see the biological components of ecological systems in diverse ways. Offered: jointly with FISH 438.

BIOL 454 Evolutionary Mechanisms (4) NW Evolutionary change as determined by mutation, selection, drift and other mechanisms. Effects of the genetic system, isolating mechanisms, and population structure on speciation. Examples of microevolutionary and macroevolutionary changes from the diversity of life. For advanced undergraduate and graduate students in biological sciences. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203.

BIOL 470 Biogeography (4) NW Analysis of historical and ecological determinants of current and past distributions of organisms. Integrates techniques developed by taxonomists, paleontologists, geologists, evolutionists, ecologists, and biogeographers to elucidate relationships between geographical distributions and continental drift, ecological interactions, climate, and dispersal abilities of organisms. Not available for credit if credit has previously been given for ZOOL 475. Recommended: one year college biology; background in ecology and evolution.

BIOL 472 Principles of Ecology (5) NW Population biology, interactions between species in biological communities, relationship of community to environment, biodiversity, energy flow, and nutrient cycling in ecosystems. Principles and applications. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203.

BIOL 473 Limnology (3) NW *Schindler* Ecology, conservation and management of inland aquatic ecosystems. Explores interactions among biological, chemical and physical features of lakes and other aquatic habitats. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203. A.

BIOL 475 Limnology Laboratory (2) NW *Schindler* Examination of biota of fresh waters, survey of limnological methods, analysis of data, and writing of scientific papers. Prerequisite: BIOL 473, which may be taken concurrently.

BIOL 476 Conservation Biology (5) NW *Boersma* Explores biological, managerial, economic, and ethical concepts affecting survival of species. Applications of ecology, biogeography, population genetics, and social sciences for the preservation of species in the face of widespread global habitat modification, destruction, and other human activities. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203.

BIOL 477 Marine Conservation (3) NW Terrestrially based concepts of conservation biology applied to marine systems. Human activities affecting the marine environment including fishing and pollution; influence of legal and cultural frameworks; and ecosystem management. Prerequisite: BIOL 476.

BIOL 478 Topics in Sustainable Fisheries (3, max. 9) I&S/NW *Parrish* Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Pre-seminar discussion section focusing on select readings. Final paper. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with ENVIR/FISH 478; odd years; W.

BIOL 490 Undergraduate Seminar (1-3, max. 6) NW Supervised readings and group discussion of selected topics of broad biological significance. Prerequisite: BIOL 102, BIOL 203, or BIOL 220.

BIOL 491 Special Topics in Biological Science for Teachers (3-9, max. 9) NW Study of selected areas

of biology. Designed to enhance the skills and background of K-12 teachers. Credit/no credit only. Recommended: teaching experience.

BIOL 492 The Teaching of Biology (2) Basic course in the teaching of biology in the secondary school. Designed to help preservice teachers identify useful laboratory techniques, materials, and content for the teaching of pre-college biology. Special attention to current issues in biology education. Required for biology students in Teacher Certification Program.

BIOL 493 Study Abroad—Advanced Biology (1-15, max. 15) NW For participants in UW study abroad program. Specific content varies and must be individually evaluated. Credit does not apply to major requirements without approval.

BIOL 496 Peer Teaching Assistants in Biology (1-5, max. 10) Direct experience in the classroom, typically teaching a lab section of BIOL 100. Peer Teaching Assistants attend lectures and weekly preparation meetings and gain in-depth background on the subject material as well as training in teaching techniques and approaches. Credit/no credit only. Prerequisite: either BIOL 102, BIOL 220, or both BIOL 202 and BIOL 203. Offered: AWSp.

BIOL 497 Special Topics in Biology (1-5, max. 10) NW

BIOL 498 Library Research (1-5, max. 10)

BIOL 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

BIOL 501 Advanced Cytology (1-5, max. 5) Detailed study of the structure and function of the cell.

BIOL 508 Cell Biology (3, max. 6) Four to five topics of current interest in cell biology selected by the enrollees.

BIOL 581 Biology of Drosophila Seminar (1, max. 12) Weekly presentation by participants of classical literature, current literature, and research in the molecular biology, developmental biology, neurobiology, and genetics of *Drosophila*. Prerequisite: permission of instructor. Offered: AWSp.

BIOL 585 Methods and Problems in Development (3) *Schubiger, Comai, Kimelman* Special topics in development. Integrates classical and current approaches. Developmental genetics, experimental embryology, molecular mechanisms of developmental regulation, and gene function in cell determination and differentiation in developing systems. Prerequisite: BIOL 455 or equivalent.

BIOL 586 Analysis of Development (3, max. 6) Analysis of structural, physiological, and molecular levels of developmental processes, including gametogenesis, fertilization, cell and tissue movements, induction, and cytodifferentiation. Prerequisite: ZOO 456 and BIOC 442.

BIOL 591 Problems in Biological Instruction (1-3, max. 3)

BIOL 600 Independent Study or Research (1-9, max. 9)

Botany

426 Hitchcock



General Catalog Web page:
www.washington.edu/students/genecat/academic/botany.html



Department Web page:
depts.washington.edu/botweb/

Botany is concerned with the function and structure of plants, algae and fungi, their ecology and evolution, classification, physiology, development and genetics. Emphasis is placed both on organismal and on cellular and molecular biology. Special courses and programs in botany of the Pacific Northwest are shared with related departments.

Graduate Program

Graduate Program Coordinator
430 Hitchcock, Box 355325
206-543-1942
botweb@u.washington.edu

The Department of Botany offers programs of graduate study leading to the Master of Science and Doctor of Philosophy degrees. Each program takes into consideration the background and interests of the student.

Research Facilities

Special departmental facilities include a herbarium containing vascular plants, bryophytes, algae and fungi, a modern greenhouse, algae and fungal culture collections, growth chambers and rooms, modern instrumentation, and a scanning electron microscope center. The Friday Harbor Laboratories on San Juan Island offer opportunities for the study of marine botany. The great variety of habitats in the Pacific Northwest provide excellent opportunities for field investigations.

Special Requirements

A prospective graduate student is expected to have had the equivalent of an undergraduate major in biological science, with training in chemistry (at least through organic chemistry), and background in general botany and genetics. Calculus and/or statistics are recommended.

Financial Aid

Teaching assistantships and fellowships are awarded to selected applicants by March of each year. Students should inquire about research assistantships, training grants and other sources of support.

Faculty

Chair

Joseph F. Ammirati

Professors

Ammirati, Joseph F. * 1979; MA, 1967, San Francisco State, PhD, 1972, University of Michigan; mycology, taxonomy and ecology of fungi.

Bendich, Arnold J. * 1970; PhD, 1969, University of Washington; structure and replication of chromosomal DNA molecules in mitochondria, chloroplasts, and bacteria.

Bliss, Lawrence C. * 1978, (Emeritus); PhD, 1956, Duke University; physiological plant ecology and

ecosystem development and function, arctic, alpine environments.

Cattolico, Rose A. * 1975; PhD, 1973, State University of New York (Stony Brook); signal transduction and calcium cycle processes in toxic marine algae.

Cleland, Robert E. * 1964, (Emeritus); PhD, 1957, California Institute of Technology; physiology of plant growth.

Comai, Luca * 1989; PhD, 1980, University of California (Davis); chromatin and gene regulation, genetics of polyploidy, functional genomics, plant transformation.

Del Moral, Roger * 1968; PhD, 1968, University of California (Santa Barbara); ecology, primary succession, gradient analysis, community structure.

Ebrey, Thomas 1997; PhD, 1968, University of Chicago; light energy transduction by retinal proteins, especially visual pigments and bacteriorhodopsin.

Hall, Benjamin D. * 1963; PhD, 1959, Harvard University; the evolution of nuclear genes in plants and fungi.

Halperin, Walter * 1968, (Emeritus); PhD, 1965, University of Connecticut; plant physiology, plant morphology.

Haskins, Edward F. * 1966, (Emeritus); PhD, 1965, University of Minnesota; cell biology and ultrastructure of microorganisms, especially slime molds.

Hinckley, Thomas M. * 1980, (Adjunct); PhD, 1971, University of Washington; forest tree physiology and autecology, subalpine ecosystems, water stress problems.

Kruckeberg, Arthur R. * 1950, (Emeritus); PhD, 1950, University of California (Berkeley); evolution, biosystematics, edaphic ecology.

Leopold, Estella B. * 1976, (Emeritus); PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environments and climate history.

Nester, Eugene W. * 1962, (Adjunct); PhD, 1959, Case Western Reserve University; genetics and biochemistry, of bacterial-plant cell interactions.

Tsukada, Matsuo * 1969, (Emeritus); PhD, 1961, Osaka City University (Japan); interpretation of Quaternary events from palynological and kindred data.

Van Volkenburgh, Elizabeth * 1982; PhD, 1980, University of Washington; leaf growth and development, photobiology and electrophysiology.

Waaland, J. Robert * 1969; PhD, 1969, University of California (Berkeley); biology of marine algae.

Walker, Richard B. * 1948, (Emeritus); PhD, 1948, University of California (Berkeley); plant physiology, mineral nutrition, water relations.

Whisler, Howard C. * 1963, (Emeritus); PhD, 1960, University of California (Berkeley); mycology, aquatic fungi, slime-molds and phycomycetes, development.

Associate Professors

Bradshaw, Harvey D. * 1984, (Adjunct Research); PhD, 1984, Louisiana State University; plant molecular genetics, evolutionary biology, genetic engineering of forest trees.

Halpern, Charles * 1991, (Adjunct Research); PhD, 1987, Oregon State University; plant community ecology, plant succession, effects of forest management on plant diversity.

Mandoli, Dina F. * 1988; PhD, 1982, Stanford University; plant development and morphogenesis using genetics, molecular biology, physiology.

Olmstead, Richard G. * 1996; PhD, 1988, University of Washington; plant molecular systematics and evolution.

Assistant Professor

Torii, Keiko * 1999; PhD, 1993, University of Tsukuba (Japan); Arabidopsis developmental genetics; receptor-mediated signal transduction in higher plants.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

BOTANY 428 Molecular and Cellular Biology of Plants (3) NW *Bendich, Cattolico, Comai* Structure and function of the nucleus, the organelles, and their genomes. Review of the techniques used in cellular and molecular biology such as tissue culture, cell fractionation, nucleic acid characterization, genetic engineering, and genome mapping. Prerequisite: either BIOL 101 or BIOL 203. Offered: W.

BOTANY 429 Plant Nuclear and Cytoplasmic Genetics (3) NW *Bendich, Comai* Covers genetic aspects specific to plants and algae, including chromosome structure, genome mapping, transposon biology, genes for floral and vegetative development, genetic engineering, ploidy levels, and cytoplasmic genetics. Prerequisite: either BIOL 101 or BIOL 203; either GENET 371 or GENET 372. Offered: A/WSpS.

BOTANY 441 Morphology and Anatomy of Land Plants (5) NW Comparative morphology and anatomy of land plants. Derivation of morphological structures and basis for current classification schemes examined using living and fossil organisms. Laboratories emphasize live plants native to the Pacific Northwest. Prerequisite: either BIOL 102 or BIOL 203. Offered: A.

BOTANY 443 Origins of Our Modern Floras (5) NW *Leopold* Evolution and biogeographic development of modern forest taxa and associations. Late Cenozoic forests (last 60 million years) of western North American environments, emphasizing geologic and climatic shifts that have shaped temperate and tropical vegetation. Three required weekend field trips. Prerequisite: BOTANY 113; either BIOL 102 or BIOL 203. Offered: A.

BOTANY 445 Marine Botany (8) NW Survey of plants represented in marine environments; natural history; ecology, distribution, habitat, adaptation, and trophic interrelationships. Prerequisite: either BIOL 102 or BIOL 203; ZOO 430, which may be taken concurrently. Offered: at Friday Harbor Laboratories; Sp.

BOTANY 446 Phycology (5) NW *Cattolico, Waaland* Study of major algal groups emphasizing form, function, reproduction, and distribution. Topics include evolution, phylogeny, and classification. Economically useful and ecologically important algae emphasized. Prerequisite: either BIOL 102 or BIOL 203. Offered: Sp.

BOTANY 455 Vegetation of Western Washington (5) NW *del Moral* Vegetation of western Washington, including mature, seral, and weedy vegetation. Recognition of landscape patterns, sight identification of common and indicator species, classification

of major community types, and uses of native species in landscape design. Four weekend field trips required. Recommended: either BOTANY 113 or BOTANY 354. Offered: even years; Sp.

BOTANY 456 Plant Community Ecology (5) NW *del Moral* Development of plant community theory; theory of vegetation structure and typical identification; numerical methods for vegetation description and pattern analysis; gradient analysis; competition in complex systems; vegetation dynamics; niche theory. Laboratory emphasizes field and computer methods. Three weekend field trips required. Prerequisite: either BOTANY 354 or BOTANY 455. Offered: odd years; Sp.

BOTANY 458 Alpine Plant Ecology (5) NW Structure of plant communities in alpine regions of the Pacific Northwest. Characteristics of physical environment which influence species adaptation and distribution. Influence, impact of humans and criteria for preservation and/or management of alpine areas. Three weekend field trips required. Prerequisite: either BIOL 102 or BIOL 203. Offered: S.

BOTANY 461 General Mycology (5) NW *Ammirati, Whisler* General survey of the fungi with emphasis on life cycles, structure, physiology, economic importance. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203. Offered: A.

BOTANY 462 Mushrooms and Related Fungi (5) NW *Ammirati* General biology, ecology, and classification of mushrooms, polypores, puffballs, and other related basidiomycetes. Emphasis on Pacific Northwest species. Prerequisite: either BIOL 102 or BIOL 203.

BOTANY 490 Undergraduate Seminar (1-3, max. 6) NW Presentation and discussion of undergraduate research, including honors projects, and selected topics in botany and related biological sciences. Offered: A/WSp.

BOTANY 496 Peer Teaching Assistantships in Botany (1-5, max. 15) Direct experience in the classroom, typically teaching a lab section of an undergraduate course. Peer TAs attend lectures and weekly preparation meetings and gain in-depth background in the subject material as well as training in teaching techniques and approaches. Credit/no credit only. Offered: A/WSpS.

BOTANY 498 Special Problems in Botany (1-15, max. 15) Students with suitable background in botany may enroll for special study in phycology, anatomy, ecology, mycology, morphology, paleobotany, physiology, or taxonomy. Offered: A/WSpS.

Courses for Graduates Only

BOTANY 502 Teaching Assistant Orientation (2) Theory and practice of effective teaching in the laboratory. Students study the theory of being an effective teaching assistant in biological laboratories and receive direct experience in the laboratory setting. Credit/no credit only. Offered: A.

BOTANY 505 Modern Botany (2, max. 4) For incoming graduate students in botany and certain interdisciplinary programs. Reviews recent advances in modern botany, covering molecular, cellular, organismal, and community areas.

BOTANY 511 Scanning Electron Microscopy and Energy Dispersive Spectroscopy (2/3) *Clason* Principles and practice of scanning electron microscopy and energy dispersive spectroscopy applied to biological and non-biological materials. Includes sample preparation, critical point drying, sputter coating, SEM operation, photomicrography, backscattered electron imaging, SEM alignment and performance maximization, x-ray microanalysis, x-ray dot maps, and quantitative x-ray microanalysis.

Prerequisite: permission of instructor. Offered: A/WSpS.

BOTANY 520 Seminar (1, max. 18) Credit/no credit only. Offered: A/WSp.

BOTANY 521 Topics in Plant Physiology (1-3, max. 10) *Cleland, Torii, Van Volkenburgh* Modern trends and methods in plant physiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 523 Selected Topics in Mycology (1-3, max. 10) *Ammirati* Selected topics from all phases of mycology. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 524 Topics in Phycology (1-3, max. 10) *Cattolico, Waaland* Topics from all phases of phycology. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 525 Topics in Plant Ecology (1-3, max. 10) *del Moral* Selected topics from various phases of plant ecology. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 527 Advanced Topics in Plant Molecular Systematics and Evolution (1-3, max. 10) *Hall, Olmstead* In-depth discussion of topics which emphasize molecular level systematics and evolution. Credit/no credit only. Prerequisite: permission of instructor. Offered: on demand.

BOTANY 529 Topics in Plant Molecular Biology (1-3, max. 10) *Bendich, Comai, Torii* Discussions of recent trends in plant molecular biology, genetics, and development. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 530 Topics in Plant Population Ecology (1-3, max. 10) Discussions of recent developments in plant population biology and ecology. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 545 Marine Phycology (9) *Waaland* Morphology, life histories, systematics, and ecology of marine algae, with emphasis on the local flora. Prerequisite: 10 credits of biological sciences or permission of the Director of Friday Harbor Laboratories. Offered: at Friday Harbor; S.

BOTANY 560 Population Biology I: Evolution and Systematics (3) Rigorous overview of historical foundations and current perspectives in the fields of evolutionary biology and systematics. Offered: jointly with ZOO 560/GENET 572.

BOTANY 561 Population Biology II: Ecology and Conservation Biology (3) Rigorous overview of historical foundations and current perspectives in the fields of ecology, population biology, and conservation biology. Offered: jointly with ZOO 561/GENET 573.

BOTANY 577 Molecular Genetics of Plant Development (2) *Torii* Concepts of plant growth and development approached in modern molecular-genetic terms. Topics include structure and function of meristems, cell fate specification, cell-lineage and positional information, dorso-ventral polarity determination, organogenesis, and floral patterning. Emphasis on the developmental genetics of model plants, *Arabidopsis*, *Antirrhinum*, maize, and tobacco.

BOTANY 597 Advanced Reading in Botany (1-3, max. 12) Reading and evaluation of subject matter in plant, algal, and fungal biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

BOTANY 598 Field Studies in Botany (1-6, max. 12) Field studies of plants, algae or fungi. Emphasis on

methods and techniques for gathering and evaluating field data. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

BOTANY 599 Laboratory Studies in Botany (1-6, max. 12) Laboratory studies of plants, algae, and/or fungi. Emphasis on methods, procedures, and evaluating research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

BOTANY 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

BOTANY 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

BOTANY 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Canadian Studies

See International Studies.

Chemistry

109 Bagley



General Catalog Web page:
www.washington.edu/students/genecat/academic/chemistry.html



Department Web page:
www.chem.washington.edu

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. Chemistry is a central science, connecting on one side with physics and mathematics, on another with earth and environmental science, and on yet another with biology and medicine.

Graduate Program

Graduate Program Coordinator
109D Bagley, Box 351700
206-543-4787
graduate@chem.washington.edu

The Master of Science and Doctor of Philosophy programs are designed to lead to positions of leadership and independent investigation in research institutes, industrial laboratories, and government agencies, and as teachers, researchers, or administrators in colleges and universities in chemistry or allied fields.

Students can pursue research in the following areas of chemistry: analytical, bioanalytical, bioinorganic, bioorganic, biophysical, environmental, inorganic, medicinal, nuclear, organic, organometallic, physical, polymer, process analytical, and theoretical.

Thesis research for the Master of Science degree and dissertation research for the Doctor of Philosophy degree will constitute an original contribution of knowledge worthy of report in the scientific literature.

Master of Science

Admission Requirements: Baccalaureate degree with major in chemistry or allied sciences; Graduate Record Examination.

Graduation Requirements: With Thesis—36 approved credits with 18 in courses at the 500 level or above; 21 credits in courses at the 400 or 500 level taken for numerical grade; 9 credits in thesis

research. Without Thesis—Same as with thesis, except that additional course work may be substituted for the required research. Minimum GPA of 3.00 required for both degrees.

Doctor of Philosophy

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

Graduation Requirements: 18-27 credits of approved courses at the 400 or 500 level, with a total minimum GPA of 3.00; candidacy examinations covering area of specialization; dissertation.

Faculty

Chair

Paul B. Hopkins

Professors

Andersen, Niels H. * 1968; PhD, 1967, Northwestern University; bioorganic, biophysical, and medicinal chemistry, NMR spectroscopy.

Borden, Weston T. * 1972; PhD, 1968, Harvard University; molecular orbital theory of organic molecules, reactions, and synthesis of unnatural products.

Callis, James B. * 1973; PhD, 1970, University of Washington; instrumentation development, process analytical chemistry, non-invasive clinical chemistry.

Campbell, Charles T. * 1989; PhD, 1979, University of Texas (Austin); physical chemistry of solid surfaces, chemisorption, catalysis, and surface analysis.

Charlson, Robert J. * 1962, (Emeritus); MS, 1959, Stanford University, PhD, 1964, University of Washington; atmospheric chemistry.

Christian, Gary D. * 1972; PhD, 1964, University of Maryland; atomic spectroscopy, clinical analysis, electroanalysis, flow injection analysis, optodes.

Dalton, Larry R. * 1998; PhD, 1971, Harvard University; materials chemistry focused on producing next generation opto-electronic materials.

Dovich, Norman J. * 2000; PhD, 1980, University of Utah; laser-based microchemical analysis, capillary separation techniques, bioanalytical chemistry.

Drobny, Gary P. * 1981; PhD, 1981, University of California (Berkeley); two-dimensional and multiple quantum studies in nuclear magnetic resonance.

Engel, Thomas * 1980; PhD, 1969, University of Chicago; surface chemistry and catalysis.

Epiotis, Nicholas * 1972; PhD, 1972, Princeton University; applied quantum chemistry.

Floss, Heinz G. * 1987, (Emeritus); PhD, 1961, Technical University of Munich (Germany); bioorganic and natural products chemistry.

Gammon, Richard H. * 1985; PhD, 1970, Harvard University; atmospheric chemistry, chemical oceanography, environmental chemistry; biogeochemical cycles.

Gelb, Michael H. * 1985; PhD, 1982, Yale University; mechanistic enzymology, bioorganic and medicinal chemistry.

Gregory, Norman W. * 1946, (Emeritus); PhD, 1943, Ohio State University; structure and thermodynamic properties of inorganic substances, vaporization reactions.

Hakomori, Sen-Itiroh * 1967, (Adjunct); MD, 1951, DrMedS, 1956, Tohoku Imperial University (Japan); membrane biochemistry and glycoproteins.

Halsey, George D. * 1951, (Emeritus); PhD, 1948, Princeton University; absorption and interaction of rare gases with surfaces, solid solutions of rate gases, catalysis.

Heinekey, Dennis M. * 1991; PhD, 1982, University of Alberta (Canada); organometallic chemistry of the transition metals.

Hopkins, Paul B. * 1982; PhD, 1982, Harvard University; organic synthesis, bioorganic and nucleic acid chemistry.

Jenekhe, Samson A. * 2000; MS, 1980, PhD, 1985, University of Minnesota; polymer science and engineering, optoelectronic/photonic materials.

Jonsson, Hannes * 1988; PhD, 1985, University of California (San Diego); computer simulations and scattering calculation in materials and surface science.

Kahr, Bart E. * 1997; PhD, 1988, Princeton University; design, growth, structure, physical properties of new crystalline materials.

Klevit, Rachel E. * 1983, (Adjunct); DPhil, 1981, Oxford University (UK); protein structure and function; molecular recognition; protein NMR.

Kovacs, Julia A. * 1988; PhD, 1986, Harvard University; synthesis, structure, and reactivity of biologically relevant transition-metal complexes.

Krohn, Kenneth A. * 1981, (Adjunct); PhD, 1971, University of California (Davis); chemistry, radiation oncology.

Kwiram, Alvin L. * 1970; PhD, 1963, California Institute of Technology; molecular structure and dynamics in the solid state with emphasis on excited states.

Lingafelter, Edward C. * 1939, (Emeritus); PhD, 1939, University of California (Berkeley); crystal and molecular structure of coordination compounds.

Mayer, James M. * 1984; PhD, 1982, California Institute of Technology; inorganic, organometallic, and bioinorganic transition metal chemistry.

Murray, James W. * 1973, (Adjunct); PhD, 1973, Massachusetts Institute of Technology; marine geochemistry, aquatic chemistry.

Norman, Joe G., Jr. * 1972; PhD, 1972, Massachusetts Institute of Technology; synthesis and structures of transition metal complexes, theoretical calculations on large molecules.

Olmstead, Marjorie A. * 1991, (Adjunct); PhD, 1985, University of California (Berkeley); experimental condensed-matter physics, surface and interface physics.

Palczewski, Krzysztof * 1992; MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Parson, William W. * 1967, (Adjunct); PhD, 1965, Case Western Reserve University; bioenergetics, with particular emphasis on photosynthesis, picosecond spectroscopy.

Pocker, Yeshayau * 1961, (Emeritus); PhD, 1953, University College, London (UK), DSc, 1960, University of London (UK); organic reaction mechanisms, chemical and enzymatic catalysis, metalloenzymes, Alzheimer proteins.

Rabinovitch, B. Seymour * 1985, (Emeritus); PhD, 1942, McGill University (Canada); chemical dynamics, energy relaxation, properties of silver surfaces.

Rathod, Pradipsinh K. * 2001; PhD, 1981, Oregon Health Sciences University; biochemistry, immunology.

Raucher, Stanley * 1975; PhD, 1973, University of Minnesota; new methods in synthetic organic chemistry, total synthesis of natural products.

Reid, Brian R. * 1980; PhD, 1965, University of California (Berkeley); biophysical chemistry, NMR of DNA and tRNA.

Reinhardt, William P. * 1991; PhD, 1968, Harvard University; theoretical and computational chemistry with applications in thermodynamics and atomic physics.

Robinson, Bruce H. * 1980; PhD, 1975, Vanderbilt University; magnetic resonance, molecular dynamics, polymer dynamics, nonlinear response theory.

Rose, Norman J. * 1966, (Emeritus); PhD, 1960, University of Illinois; design, synthesis, and study of coordination compounds of transition metals, including the lanthanid.

Ruzicka, Jaromir * 1984; PhD, 1963, Technical University of Prague (Czechoslovakia); analysis via flow injection for clinical research and industrial applications.

Schubert, Wolfgang M. * 1947, (Emeritus); PhD, 1947, University of Minnesota; mechanism and steric course of organic reactions, substituent and solvent effects.

Schurr, J. Michael * 1966; PhD, 1965, University of California (Berkeley); physical chemistry of DNA and other biopolymers, photon correlation techniques.

Stuve, Eric M. * 1985, (Adjunct); MS, 1979, PhD, 1983, Stanford University; electrochemical surface science, fuel cell engineering.

Synovec, Robert E. * 1986; PhD, 1986, Iowa State University; multidimensional chemical separation techniques, chemometric data analysis.

Trager, William F. * 1972, (Adjunct); PhD, 1965, University of Washington; medicinal chemistry, bioanalytical chemistry drug metabolism.

Turecek, Frantisek * 1990; PhD, 1977, Charles University (Czechoslovakia); mass spectrometry and organic structural analysis.

Vandenbosch, Robert * 1963, (Emeritus); PhD, 1957, University of California (Berkeley); nuclear studies, particularly fission and nuclear reaction mechanisms, molecular clusters.

Varani, Gabriele * 2001; PhD, 1987, University of Milan (Italy); physical biophysical.

Woodman, Darrell J. * 1965; PhD, 1965, Harvard University; peptide synthesis, heterocyclic compounds, computers in chemical education.

Yager, Paul * 1987, (Adjunct); PhD, 1980, University of Oregon; physical chemistry, applications of biomembranes, biosensors, microfluidics.

Zoller, William H. * 1984; PhD, 1969, Massachusetts Institute of Technology; analytical, environmental, and nuclear chemistry.

Associate Professors

Crittenden, Alden L. * 1947, (Emeritus); PhD, 1947, University of Illinois; mass spectra, solid electrode polarography.

Goldberg, Karen 1995; PhD, 1988, University of California (Berkeley); energetics and mechanisms of fundamental organometallic reactions.

Macklin, John W. * 1968; PhD, 1969, Cornell University; spectroscopic studies of materials in condensed phase and in solutions.

Reid, Philip J. 1995; PhD, 1992, University of California (Berkeley); ultrafast condensed phase chemical reaction dynamics.

Sasaki, Tomikazu * 1989; PhD, 1985, Kyoto University (Japan); design and synthesis of functional proteins and protein mimetics.

Stenkamp, Ronald E. * 1978, (Adjunct); PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, blood clotting proteins.

Assistant Professors

Beeson, Craig C. * 1996; PhD, 1993, University of California (Irvine); the chemistry and biochemistry of the immune system, regulation of energy metabolism.

Chiu, Daniel T. 2000; PhD, 1998, Stanford University; development of physical and analytical tools for applications in biology.

Frank, Natia 2000; PhD, 1996, University of California (San Diego); magnetic exchange and charge transport processes in biology and materials.

Gamelin, Daniel R. 2000; PhD, 1997, Stanford University; physical inorganic chemistry; spectroscopy, bio- and materials-related inorganic chemistry.

Keller, Sarah L. 2000; PhD, 1995, Princeton University; biophysics; physical chemistry; soft condensed matter; surfactants; lipids; self-assembly.

Prezhdo, Oleg * 1998; PhD, 1997, University of Texas (Austin); excitation dynamics of condensed phase chemical systems.

Sigurdsson, Snorri * 1996, (Research); PhD, 1993, University of Washington; nucleic acids chemistry; RNA catalysts (ribozymes); RNA structure and function.

Simon, Julian A. * 1996, (Affiliate); PhD, 1991, Columbia University; identification and characterization of new anticancer agents.

Xia, Younan * 1997; PhD, 1996, Harvard University; materials chemistry and nanotechnology.

Senior Lecturer

Nyasulu, Frazier W. 1991; PhD, 1985, University of Salford (UK); chemical education, electroanalytical chemistry, electro depositions.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CHEM 410 Radiochemistry Laboratory (2) NW Introductory general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radiation, radiochemical and tracer techniques. Prerequisite: either 1.7 in CHEM 155 or 1.7 in CHEM 162; recommended: CHEM 418. Offered: alternate years.

CHEM 414 Chemistry of the Main Group Elements (3) NW The elements and their compounds in relation to the periodic system. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 452 or CHEM 457; either CHEM 453, CHEM 455, or CHEM 475. Offered: alternate years.

CHEM 415 The Chemical Bond (3) NW Nature of the chemical bond. Simple bonding theories, molecular orbital methods, symmetry, and group theory. Includes weekly computer exercises in which students perform ab initio calculations. Prerequisite: either CHEM 453, CHEM 455, or CHEM 475. Offered: alternate years.

CHEM 416 Transition Metals (3) NW Survey of selected key topics in the chemistry of the transition metals, including emphasis on the structure, bonding, and reactivity of major classes of compounds. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 453, CHEM 455, or CHEM 475, which may be taken concurrently. Offered: A.

CHEM 417 Organometallic Chemistry (3) NW Chemistry of the metal-carbon bond for both main group and transition metals. Structure and reactivity with applications to organic synthesis and catalysis. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 416. Offered: W.

CHEM 418 Nuclear Chemistry (3) NW Natural radioactivity, nuclear systematics and reactions, radioactive decay processes, stellar nucleosynthesis, applications of radioactivity. Prerequisite: either CHEM 452, CHEM 455, or CHEM 475. Offered: alternate years.

CHEM 419 Bioinorganic Chemistry (3) NW Description of transition metal-containing systems found in biology. Structural and electronic properties and reactivity of metalloproteins, metalloenzymes, and metallocofactors. Methods used to probe and model metal sites by spectroscopic and synthetic techniques. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 416. Offered: Sp.

CHEM 426 Instrumental Analysis (3) NW Introduction to modern instrumental methods of chemical analysis, including chromatography, optical and mass spectroscopy, electrochemistry and flow injection analysis. Basic concepts of transducers, spectrometers, mass analysis, separation sciences, and computerized data acquisition and reduction. Includes laboratory. Prerequisite: CHEM 321. Offered: Sp.

CHEM 429 Chemical Separation Techniques (3) NW Introduction to modern separation techniques such as gas chromatography, high-performance liquid chromatography, electrophoresis, and field flow fractionation. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; either CHEM 241, CHEM 321, or CHEM 346. Offered: W.

CHEM 433 Theoretical Organic Chemistry—Predictions and Experimental Tests (3) NW Molecular orbital theory in organic chemistry. Woodward-Hoffmann rules, aromaticity, concerted reactions, photochemical transformations, and reactions of electron-deficient species. Prerequisite: either CHEM 239 or CHEM 337. Offered: alternate years.

CHEM 435 Introductory Biophysical Chemistry (3) NW Survey of the statics and dynamics of biophysical and biochemical processes. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; either CHEM 452, CHEM 455, or CHEM 475, any of which may be taken concurrently; recommended: either BIOC 405 or BIOC 440. Offered: alternate years; W.

CHEM 436 Molecular Enzymology (3) NW Enzyme structure, function, chemistry and inhibition, including modes of biological catalysis, stereochemistry,

enzyme characterization and kinetics, and design and principles of enzyme inhibitors. Also major classes of natural products, their chemistry, biological activity, biosynthesis, physiological role, and ecological significance. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; recommended: either BIOC 405 or BIOC 440. Offered: alternate years; Sp.

CHEM 452 Physical Chemistry for Biochemists I (3) NW General equilibrium thermodynamics emphasizing biochemical applications: ligand binding, biological oxidation-reduction reactions, membranes, active transport, colligative properties, and surface tension. No more than the number of credits indicated can be counted toward graduation from the following course groups: 355, 452 (4 credits); 452, 456 (3 credits). Prerequisite: either CHEM 155 or CHEM 162; either MATH 125 or MATH 134; either PHYS 115 or PHYS 122. Offered: AW.

CHEM 453 Physical Chemistry for Biochemists II (3) NW Continuation of 452. Includes transport properties, enzyme kinetics, introduction to quantum mechanics, spectroscopy, and classical statistical mechanics. Prerequisite: either CHEM 452 or CHEM 456; either MATH 126 or MATH 135; either PHYS 116 or PHYS 123. Recommended: MATH 307; MATH 308. Offered: WSp.

CHEM 455 Physical Chemistry (3) NW Introduction to quantum chemistry and spectroscopy. Theory of quantum mechanics presented at an elementary level and applied to the electronic structure of atoms and molecules and to molecular spectra. Prerequisite: either CHEM 155 or CHEM 162; either MATH 126 or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307; MATH 308. Offered: ASpS.

CHEM 456 Physical Chemistry (3) NW Chemical thermodynamics. Laws of thermodynamics presented with applications to phase equilibria, chemical equilibria, and solutions. No more than the number of credits indicated can be counted toward graduation from the following course groups: 452, 456 (3 credits). Prerequisite: either CHEM 155 or CHEM 162; either MATH 126 or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307. Offered: WS.

CHEM 457 Physical Chemistry (3) NW Introduction to statistical mechanics, kinetic theory, and chemical kinetics. Prerequisite: either CHEM 455 or CHEM 475; either CHEM E 326 which may be taken concurrently, CHEM 456 or CHEM 476. Offered: WSp.

CHEM 458 Global Atmospheric Chemistry (4) NW Global atmosphere as chemical system. Physical factors and chemical processes. Natural variabilities and anthropogenic change. Cycling of trace substances. Global issues such as climate change, acidic deposition, influences on biosphere. Prerequisite: either ATM S 358 or CHEM 456. Offered: jointly with ATM S 458.

CHEM 460 Spectroscopic Molecular Identification (3) NW Basic theory of spectral techniques-infrared and ultraviolet/visible spectroscopy, NMR, and mass spectrometry-with emphasis on spectral interpretation skills needed for the elucidation of structure, conformation, and dynamics in organic and biological chemistry. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; recommended: either CHEM 455 or CHEM 475. Offered: A.

CHEM 461 Physical Chemistry Laboratory (3-4) NW Physical measurements in chemistry. Vacuum techniques, calorimetry, spectroscopic methods, electrical measurements. Prerequisite: either CHEM 155, CHEM 162, or CHEM E 436; either CHEM 453, CHEM 457, CHEM 477, or both CHEM 452 and CHEM 455; either PHYS 117 or PHYS 131; recommended: PHYS 132; PHYS 133. Offered: ASpS.

CHEM 462 Techniques of Synthetic Organic Chemistry (2-3) NW Laboratory techniques of synthetic organic chemistry. Vacuum distillation, multi-step synthesis, air sensitive reagents, photochemistry, chromatography, and separation techniques. Prerequisite: either CHEM 242 or CHEM 347; CHEM 460 which may be taken concurrently. Offered: A.

CHEM 463 Spectroscopic Techniques for Structural Identification (2) NW Laboratory techniques of spectroscopic analysis for structural determination using UV, IR, NMR, mass spectroscopy. Prerequisite: CHEM 460. Offered: W.

CHEM 464 Computers in Data Acquisition and Analysis (3) NW Introduction to use of the computer in the chemistry laboratory. Principles of microcomputers and their use for such problems as data acquisition, noise reduction, and instrument control. Prerequisite: either CHEM 453, CHEM 455, or CHEM 475; MATH 136, or both MATH 307 and MATH 308. Offered: Sp.

CHEM 465 Computations in Chemistry (3) NW Computer calculations on color graphics workstations applied to problems in chemistry. Numerical methods and algorithms for calculating classical dynamics, quantum wavefunctions, wavepacket propagation, chemical kinetics. Use of computer programs for calculating electronic wavefunctions, molecular conformations, simulations of liquids and solids. Prerequisite: either CHEM 453, CHEM 456, or CHEM 476, any of which may be taken concurrently. Offered: W.

CHEM 471 Physical Chemistry of Macromolecules (3) NW Classical hydrodynamic methods, and modern optical correlation and pulse techniques for studying dynamical motions and conformations of macromolecules, especially biopolymers, in solution. Cooperative thermal transitions, optical properties, and polyelectrolyte effects. Prerequisite: either CHEM 452, CHEM 456, or CHEM 476; either CHEM 453, CHEM 457, or CHEM 477. Offered: alternate years; W.

CHEM 475 Honors Physical Chemistry (3) NW Introduction to quantum chemistry, spectroscopy. Theory of quantum mechanics applied more rigorously than in CHEM 455. Application of quantum mechanics to electronic structure of atoms and molecules. Computer software used to solve problems. Prerequisite: either CHEM 155 or CHEM 162; either MATH 126 or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307; MATH 308. Offered: A.

CHEM 476 Honors Physical Chemistry (3) NW For chemistry and biochemistry majors and otherwise qualified students. Chemical Thermodynamics. Similar in scope to CHEM 456 with the study of more complicated systems. Emphasis on using computer software to solve problems. Prerequisite: CHEM 475. Offered: W.

CHEM 477 Honors Physical Chemistry (3) NW For chemistry and biochemistry majors or otherwise qualified students. Statistical mechanics, kinetic theory, and chemical kinetics including statistical interpretations of kinetics and transport phenomena. Prerequisite: CHEM 475; either CHEM E 326, which may be taken concurrently, or CHEM 476. Offered: Sp.

CHEM 496 Research Seminar for Undergraduates (1, max. 2) NW Formal presentations of student research. One credit applies to research component of a relevant major. Credit/no credit only. Prerequisite: either BIOC 396 or CHEM 396. Offered: jointly with BIOC 496; Sp.

CHEM 498 Teaching Chemistry (3) NW Training in teaching chemistry laboratory and quiz sections. For chemistry and biochemistry majors, especially those

planning graduate work or secondary education. Covers teaching strategies, student diversity, learning styles, grading, and interaction with students and faculty. Credit/no credit only. Offered: A.

CHEM 499 Undergraduate Research and Report Writing (*, max. 12) Research in chemistry and/or study in the chemical literature. Credit/no credit only. Offered: AWSpS.

Courses for Graduates Only

CHEM 501 Readings in Chemistry (1, max. 9) Individual meetings with faculty to discuss readings (journal articles, book chapters, proceedings) in the chemical sciences. Credit/no credit only. Offered: AWSpS.

CHEM 502 Practical NMR Methods for Biological and Organic Structure Elucidation (4) Theory of NMR (rotating frame formalism, multi-pulse experiments, relaxation phenomena, 2D experiments) as applied to structural and dynamic problems in organic and biological chemistry. Provides basis for experiment selection and spectrum interpretation. A more advanced treatment of NMR than 460. Prerequisite: CHEM 224, CHEM 239, or CHEM 337; recommended: CHEM 460 or equivalent, CHEM 435 or CHEM 455. Offered: W.

CHEM 508 Advanced Inorganic Chemistry (3, max. 9) Discussion of selected applications of physical techniques to the study of inorganic molecules. Topics include group theory, magnetic resonance spectroscopy (NMR and ESR), vibrational spectroscopy (IR and Raman), electronic spectroscopy, magnetism, and electrochemistry. Offered: A.

CHEM 510 Current Problems in Inorganic Chemistry (1-3, max. 12) Primarily for doctoral candidates in inorganic chemistry. Current topics (e.g., bioinorganic, advanced organometallic, materials and solid state, advanced inorganic spectroscopy). See department for instructor and topics during any particular quarter. Offered: Sp.

CHEM 520 Current Problems in Analytical Chemistry (1-3, max. 12) Primarily for doctoral candidates in analytical chemistry. Current topics (e.g., flow injection analysis, mass spectrometry, and advanced radiochemistry). See department for instructor and topics during any particular quarter. Offered: AW.

CHEM 521 Analytical Electrochemistry (3) Theory and practice of modern electrochemistry with emphasis on instrumentation and applications in chemical analysis. Offered: alternate years.

CHEM 522 Atomic and Molecular Analytical Spectroscopy (3) Quantitative analysis of atomic and molecular species, using all forms of electromagnetic radiation, electrons, and gaseous ions. Offered: alternate years.

CHEM 523 Geochemical Cycles (4) Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with OCEAN 523/ATM S 508.

CHEM 525 Process Analytical Chemistry (3) Chemical sensors and systems approach to chemical analysis as an integral part of monitoring and controlling chemical, biological, and medical processes. Offered: alternate years.

CHEM 526 Chemometrics (3, max. 9) Mathematical and statistical methods for experimental design, calibration, signal resolution, and instrument control and optimization. Offered: alternate years.

CHEM 530 Advanced Organic Chemistry (3) Fundamental aspects of organic structures and transformations. Structure and basicity of carbanions, substitution reactions, elimination reactions, nucleophilic addition and addition/elimination reactions, condensation reactions, structure and rearrangements of carbocations, electrophilic addition, electrophilic substitutions, neighboring group effects. Prerequisite: CHEM 337. Offered: A.

CHEM 531 Advanced Organic Chemistry (3) Synthetic organic chemistry. Discussion of practical methods for the synthesis of complex organic molecules with an emphasis on strategy and the control of stereochemistry. Prerequisite: CHEM 530. Offered: W.

CHEM 532 Advanced Organic Chemistry (3) Chemical Biology. Application of chemical methods to the study of biological processes that occur in cells. Prerequisite: CHEM 530 and CHEM 531. Offered: Sp.

CHEM 540 Current Problems in Organic Chemistry (1-3, max. 12) Primarily for doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See department for instructor and topic during any particular quarter.

CHEM 550 Introduction to Quantum Chemistry (3) 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: CHEM 455. Offered: A.

CHEM 551 Introduction to Quantum Chemistry (3) Electronic structure of many-electron atoms and molecules, vibration and rotation levels of molecules, effects of particle exchange, angular momentum and group theory, spectroscopic selection rules. Prerequisite: CHEM 550. Offered: W.

CHEM 552 Statistical Mechanics (3) 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. Prerequisite: CHEM 455 and CHEM 456 (concurrent registration permitted) or equivalent. Offered: Sp.

CHEM 553 Statistical Mechanics (3) 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. Prerequisite: CHEM 552. Offered: A.

CHEM 560 Current Problems in Physical Chemistry (1-3, max. 12) Primarily for doctoral candidates in physical chemistry. A discussion of topics selected from active research fields. See department for instructor and the topic during any particular quarter.

CHEM 561 Macromolecules (3, max. 9) Physical chemistry of macromolecules and biopolymers. Topics include solution thermodynamics, hydrodynamic properties, molecular weight distributions, optical and electro-optic techniques, chain configuration statistics, cooperative phenomena, theory of rubber elasticity, and polyelectrolytes. Offered: alternate years.

CHEM 575 Molecular Modeling Methods (4) Introduction to theory and practice of computer simulation studies of molecules with emphasis on applications to biological molecules and complexes. Discussion of background theory, implementation

details, capabilities and practical limitations of these methods. Prerequisite: previous coursework in biochemistry and physical chemistry and/or permission of instructor. Offered: jointly with BIOEN 575; A.

CHEM 580 Topics in Chemistry (1, max. 3) General topics of interest relating to chemistry. Credit/no credit only.

CHEM 581 Topics in Inorganic Chemistry (3, max. 18) Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

CHEM 582 Topics in Analytical Chemistry (3, max. 18) Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

CHEM 583 Topics in Organic Chemistry (3, max. 18) Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

CHEM 585 Topics in Physical Chemistry (3, max. 18) Open only to students accepted for doctoral work in chemistry. Credit/no credit only. Offered: AWSp.

CHEM 590 Seminar in General Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

CHEM 591 Seminar in Inorganic Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

CHEM 592 Seminar in Analytical Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

CHEM 593 Seminar in Organic Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

CHEM 595 Seminar in Physical Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSpS.

CHEM 600 Independent Study or Research (*) Prerequisite: permission of coordinator. Offered: AWSpS.

CHEM 700 Master's Thesis (*) Prerequisite: permission of coordinator. Offered: AWSpS.

CHEM 800 Doctoral Dissertation (*) Prerequisite: permission of coordinator. Offered: AWSpS.

Chicano Studies

See American Ethnic Studies.

China Studies

See International Studies.

Classics

218 Denny



General Catalog Web page:
www.washington.edu/students/genocat/academic/Classics.html



Department Web page:
depts.washington.edu/clasdept/

Classics embraces the ancient Greek and Roman civilizations from prehistoric times to the Middle Ages. The department is concerned with the Greek and Latin languages and their literatures, including poetry, drama, history, philosophy, rhetoric, and polit-

ical theory, as well as with classical art and archaeology.

Classical Seminar in Rome: During spring quarter, the department offers instruction in classics for advanced undergraduate majors and graduate students at the University of Washington Rome Center, located in the Palazzo Pio on the Campo de Fiori.

Graduate Program

Graduate Program Coordinator
218 Denny, Box 353110
206-543-2266
clasdept@u.washington.edu

The Department of Classics offers programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The M.A. degree may be in Greek, Latin, or Classics (a combination of Greek and Latin). The Ph.D. degree requires both Greek and Latin.

The program of formal instruction has been designed to ensure comprehensive and thorough training in the basic disciplines needed for teaching and research. The department offers courses in the major writers and periods of literature, philosophy, and history, in classical art and archaeology, and in Greek and Latin linguistics. The courses in Greek and Latin literature include many works on the Ph.D.-degree reading list. Seminars introduce research techniques through the study of more specialized topics, which vary from quarter to quarter. Students may include in their programs courses and seminars given by other departments in such subjects as ancient philosophy, ancient and medieval history, comparative literature, and linguistics. A brochure, *The Graduate Program in Classics*, available from the department, gives additional information.

The Suzzallo Library has an extensive classics collection. The department's seminar room in Denny Hall, which is available to graduate students for their study and research, contains an excellent noncirculating library with such reference works as Pauly-Wissowa, *L'Année Philologique*, the *Thesaurus Linguae Latinae*, the *Müller Handbuch* series, the Teubner and Oxford texts, commentaries on the classical authors, standard collections of inscriptions and fragments, and a number of important serials. The department also possesses an Ibycus scholarly computer and a license for the *Thesaurus Linguae Graecae*, *Thesaurus Linguae Latinae*, *Perseus*, and other databases.

Applicants for admission to the M.A. program should present an undergraduate major or its equivalent in Greek, Latin, or Classics. Prospective aspirants for the Ph.D. degree should have had two years of upper-division study in both languages, but may be admitted with less preparation in one language if their preparation in the other language is exceptionally strong. Admission to the Ph.D. program may be granted after completion of the requirements for the M.A. degree.

The M.A. degree requires a minimum of 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, German, or Italian; either an acceptable thesis or 9 additional credits in approved graduate courses and seminars and a research paper.

The Doctor of Philosophy degree requires a minimum of 72 credits in courses or seminars in Greek, Latin, and related subjects approved by the department; a reading knowledge of German and either French or Italian; Greek and Latin prose composition; translation examinations on Greek and Latin; examinations in two special authors and one field of classical stud-

ies; an oral General Examination; dissertation; and Final Examination. Graduate students must have teaching experience before completing requirements for their terminal degree.

A number of teaching assistantships as well as the Jim Greenfield Graduate Fellowship are available. Assistants teach sections of elementary Latin and Greek, a course in Latin and Greek derivatives, hold discussion sections in classical literature in translation, or assist faculty members with other courses. The teaching load is four to six hours a week throughout the academic year.

Faculty

Chair

Stephen E. Hinds

Professors

Bliquez, Lawrence J. * 1969; PhD, 1968, Stanford University; Greek Art, Greek historiography and historians, Greek and Roman medicine and private life.

Blondell, Ruby * 1985; PhD, 1984, University of California (Berkeley); Greek and Roman philosophy and literature.

Clauss, James J. * 1984; PhD, 1983, University of California (Berkeley); Latin poetry and prose, Hellenistic literature, Latin literature of the Empire.

Halleran, Michael R. * 1983; PhD, 1981, Harvard University; Greek literature, especially tragedy; Greek intellectual history.

Harmon, Daniel P. *; PhD, 1968, Northwestern University; Greek and Roman religion, Latin poetry, Greek tragedy, classical linguistics.

Hinds, Stephen E. * 1992; PhD, 1985, St. Johns College (UK); Latin poetry, especially elegy and epic; literary criticism and theory.

Mackay, Pierre A. * 1966, (Emeritus); PhD, 1964, University of California (Berkeley); Greek literature, post classical and Byzantine Greek literature, numismatics.

McDiarmid, John B. * 1949, (Emeritus); PhD, 1940, Johns Hopkins University; Greek literature and philosophy.

Pascal, Paul * 1953, (Emeritus); PhD, 1953, University of North Carolina; Latin literature, Roman archaeology, medieval Latin.

Associate Professors

Connors, Catherine M. * 1990; PhD, 1989, University of Michigan; Roman epic, ancient novel, women in Greek and Roman antiquity, representations of nature.

Gowing, Alain M. * 1988; PhD, 1988, Bryn Mawr College; Latin and Greek historiography, Latin literature of the Empire.

Langdon, Merle K. * 1976; PhD, 1972, University of Pennsylvania; Greek archaeology, epigraphy, topography, and history.

Assistant Professor

Stroup, Sarah C. 2000; PhD, 2000, University of California (Berkeley); Latin prose literature, Greek and Roman drama, cultural studies.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Classics

Upper-division classics courses in English (300 and 400 level) in the Department of Classics do not generally have prerequisites. Most 400-level courses deal with a single genre of literature or with a limited area of classical studies. The 300-level courses deal with broader subjects at a relatively advanced level. Both are primarily for juniors and seniors, but they are open to freshmen and sophomores with an interest or background in the subject of the course.

CLAS 401 Undergraduate Seminar in Classics (3-5) VLPA Seminar on a broadly defined topic in classics. Includes reading in Latin or Greek as appropriate for individual students. Additional readings of works in English translation and works of scholarship chosen to give undergraduate majors familiarity with research methods and perspective on the discipline.

CLAS 424 The Epic Tradition (5) VLPA *Clauss, Levaniouk* Ancient and medieval epic and heroic poetry of Europe in English: the *Iliad*, *Odyssey*, and *Aeneid*; the *Roland* or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material varies according to instructor's preference. Offered: jointly with C LIT 424.

CLAS 427 Greek and Roman Tragedy in English (5) VLPA *Stroup* 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) VLPA *Power, Stroup* Readings from the comedies of Aristophanes, Plautus, and Terence.

CLAS 430 Greek and Roman Mythology (3/5) VLPA Principal myths found in classical and later literature. Offered: AWP.

CLAS 432 Classical Mythology in Film (3/5) VLPA *Clauss* Comparison and discussion of classical myths and modern films inspired by them. Promotes access to the reading of classical mythology. Analyzes significant differences between ancient literary and modern cinematographic representations of the myth.

CLAS 435 The Ancient Novel (3) VLPA *Connors, Power* Reading and discussion of the principal Greek and Roman novels, the earliest European prose fiction, with attention to earlier literature and to imperial culture.

CLAS 445 Greek and Roman Religion (3) I&S/VLPA *Harmon, Langdon, Levaniouk* Religion in the social life of the Greeks and Romans, with emphasis placed on their public rituals and festivals. Attention is given to the priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Many lectures illustrated by slides. Recommended: RELIG 201. Offered: jointly with RELIG 445.

CLAS 495 Senior Essay (1-3, max. 4) VLPA Usually written in conjunction with another course in the final year of study in the major.

CLAS 496 Special Topics (2-5, max. 15) VLPA Offered occasionally by visitors or resident faculty.

Courses for Graduates Only

CLAS 520 Seminar (5, max. 45) Advanced comparative work on Greek and Latin materials studied in both original languages.

CLAS 700 Master's Thesis (*)

CLAS 800 Doctoral Dissertation (*)

Classical Archaeology

CL AR 442 Greek Painting (3) VLPA *Langdon* Study of painted decoration on Greek vases, with emphasis on stylistic developments and cultural and historical influences. Painting on other media also examined as evidence allows. Offered: jointly with ART H 442.

CL AR 443 Roman Painting (3) VLPA Study of surviving painting from the Roman World, with emphasis on wall paintings from Pompeii and Herculaneum. Principal topics for discussion: the four styles of Pompeian painting the dependence of Roman painters on Greek prototypes, and the significance of various kinds of painting as domestic decoration. Offered: jointly with ART H 443.

CL AR 444 Greek and Roman Sculpture (3) VLPA *Langdon* History and development of Greek sculpture and sculptors, their Roman copyists, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century BC. Offered: jointly with ART H 444.

CL AR 446 Greek Architecture (3) VLPA *Langdon* Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with ARCH 454/ART H 446.

CL AR 447 The Archaeology of Early Italy (3) VLPA *Harmon* Study of the principal archaeological sites of early Italy, including Etruria, Sicily, southern Italy, and archaic Rome up to the Republican period. Attention given to the material remains and their relationship to the Etruscan, ancient Sicilian, and early Roman civilizations. Offered: jointly with ART H 447.

CL AR 448 The Archaeology of Italy (3) VLPA *Harmon* Study of the principal archaeological sites in Italy with special emphasis on ancient Rome. Sites include the Alban hills, Ostia, Pompeii, Herculaneum, Tarquinia, Paestum, Tivoli, and Praeneste. Attention given to the relationship between material remains and their purpose in ancient life. Illustrated by slides. Offered: jointly with ART H 448.

Courses for Graduates Only

CL AR 513 Athenian Topography (5) Langdon Detailed consideration of the topography and monuments of ancient Athens from the beginning through the Roman period.

CL AR 541 Seminar in Greek and Roman Art (3) Langdon In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered: jointly with ART H 541.

Classical Linguistics

Courses for Graduates Only

CL LI 501 Comparative Phonology of Greek and Latin (5) Harmon Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

CL LI 503 History of the Greek Language (5) 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 (5) *Harmon* Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

CL LI 506 Italic Dialects (5) *Harmon* Principal remains of the non-Latin languages and dialects of ancient Italy.

CL LI 508 Greek Dialects (5) The non-Attic dialects of ancient Greek, based on a study of inscriptions and the literary remains.

Greek

Prerequisite for the following 400-level Greek courses; four years of high school Greek or 307 or permission.

GREEK 413 The Pre-Socratic Philosophers (3) **VLPA** *Blondell*

GREEK 414 Plato (3) **VLPA** *Blondell*

GREEK 415 Aristotle (3) **VLPA** *Blondell*

GREEK 422 Herodotus and the Persian Wars (3) **VLPA** *Bliquez, Langdon, Levaniouk, Power*

GREEK 424 Thucydides and the Peloponnesian War (3) **VLPA** *Bliquez, Langdon*

GREEK 426 Attic Orators (3) **VLPA** *Bliquez, Langdon, Power*

GREEK 428 Imperial Greek Literature (3-5, max. 15) **VLPA** *Clauss, Gowing* Readings in imperial Greek prose and poetry from the first century CE onward, including Dio Chrysostom, Applan, Plutarch, Aelius Aristides, Lucian, Athenaeus, and New Testament Koine.

GREEK 442 Greek Drama (3) **VLPA** *Blondell, Levaniouk, Power*

GREEK 443 Greek Drama (3) **VLPA** *Blondell, Levaniouk, Power*

GREEK 444 Greek Drama (3) **VLPA** *Blondell, Levaniouk, Power*

GREEK 449 Greek Epic (3) **VLPA** *Levaniouk*

GREEK 451 Lyric Poetry (3) **VLPA** *Blondell, Levaniouk, Power*

GREEK 453 Pindar: The Epinician Odes (3) **VLPA** *Levaniouk, Power*

GREEK 461 Early Greek Literature (3-5, max. 15) **VLPA** Readings and discussion of selected authors of the early Greek period.

GREEK 462 Literature of Classical Athens (3-5, max. 15) **VLPA** Readings and discussion of selected authors of classical Athens.

GREEK 463 Hellenistic Greek Literature (3-5, max. 15) **VLPA** *Clauss* Readings and discussion of selected authors of the Hellenistic Age.

GREEK 490 Supervised Study (*, max. 18) Special work in literary and philosophical texts for graduates and undergraduates.

Courses for Graduates Only

GREEK 500 Grammar and Composition (5) *Bliquez, Blondell* Translation of passages from English to Greek for the purpose of acquiring advanced knowledge of the grammar and the style of the classical tongue.

GREEK 501 Homer (5) *Levaniouk* Readings from the *Iliad* or the *Odyssey*.

GREEK 503 Aristophanes (5) *Bliquez* Select comedies.

GREEK 504 Plato (5) *Blondell* The Republic or other dialogues.

GREEK 506 Aristotle (5) *Blondell*

GREEK 508 Lysias and Demosthenes (5) *Bliquez* Select speeches, oratorical theory, historical questions.

GREEK 510 Greek Historians (5, max. 10) *Bliquez*

GREEK 512 Greek Tragedy (5, max. 10) Aeschylus, Sophocles, and/or Euripides.

GREEK 515 Greek Epigraphy (5) *Langdon* Selected inscriptions from various Greek states and sanctuaries and evidence they provide for religious and social practices, literature, and political history. Classification and editing of inscriptions, and epigraphical techniques.

GREEK 520 Seminar (5, max. 45)

GREEK 590 Supervised Study (*, max. 18) Prerequisite: permission of graduate program coordinator.

GREEK 600 Independent Study or Research (*)

Latin

LATIN 401 Medieval Latin Literature to 1200 (3) **VLPA** *Hinds* Texts read in Latin; cultural and historical contexts discussed. Presupposes year and a half of Latin or equivalent. Informal individual guidance available to members of class handling medieval or renaissance Latin texts in their research. Recommended: LATIN 306.

LATIN 402 Later Medieval and Renaissance Latin Literature (3) **VLPA** *Hinds* Texts read in Latin; cultural and historical contexts discussed. Presupposes year and a half of Latin or equivalent. Informal individual guidance available to members of class handling medieval or renaissance Latin texts in their research. Recommended: LATIN 306.

Recommended background for the following 400-level Latin courses is four years of high-school Latin, LATIN 307, or permission of instructor.

LATIN 412 Lucretius (3) **VLPA** *Blondell, Clauss*

LATIN 414 Seneca (3) **VLPA** *Blondell, Stroup*

LATIN 422 Livy (3) **VLPA** *Clauss, Gowing*

LATIN 423 Cicero and Sallust (3) **VLPA** *Clauss, Gowing, Stroup*

LATIN 424 Tacitus (3) **VLPA** *Clauss, Gowing*

LATIN 447 Roman Lyric (3) **VLPA** *Clauss, Harmon*

LATIN 449 Roman Elegy (3) **VLPA** *Harmon, Hinds*

LATIN 451 Roman Satire (3) **VLPA** *Connors, Stroup*

LATIN 457 Roman Drama (3) **VLPA** *Connors*

LATIN 458 Roman Epic (3) **VLPA** *Clauss, Connors, Harmon, Hinds*

LATIN 461 Latin Literature of the Republic (3-5, max. 15) **VLPA** Readings and discussion of selected authors from the era of the Roman Republic.

LATIN 462 Latin Literature of the Augustan Age (3-5, max. 15) **VLPA** Readings and discussion of selected authors from the Augustan era.

LATIN 463 Latin Literature of the Empire (3-5, max. 15) **VLPA** Readings and discussion of selected authors from the Roman Empire.

LATIN 465 Roman Topography and Monuments (5, max. 10) **VLPA** *Clauss, Gowing, Harmon, Stroup* Study of the material remains of ancient Rome from the archaic period through the imperial age. Reading of source materials and inscriptions in Latin. Conducted in Rome. Offered: Sp.

LATIN 490 Supervised Study (*, max. 18) Special work in literary and philosophical texts for graduates and undergraduates.

Courses for Graduates Only

LATIN 500 Grammar and Composition (5) *Clauss, Gowing, Hinds, Stroup* Translation of passages from English to Latin for the purpose of acquiring advanced knowledge of the grammar and style of the classical tongue.

LATIN 501 Vergil (5) *Clauss, Harmon, Hinds*

LATIN 502 Horace (5) *Clauss, Harmon*

LATIN 503 Plautus and Terence: Early Republican Literature (5) *Blondell, Connors, Stroup*

LATIN 504 Philosophy at Rome (5) *Blondell, Stroup* Selected philosophical works of Cicero and other sources for Hellenistic and Roman philosophy.

LATIN 506 Cicero (5) *Gowing, Stroup* Select speeches, with attention to rhetorical theory and/or letters.

LATIN 508 Silver Latin Literature (5) *Connors, Hinds*

LATIN 510 Roman Historians (5, max. 10) *Clauss, Gowing*

LATIN 512 Augustan Poetry (5, max. 10)

LATIN 520 Seminar (5, max. 45)

LATIN 565 Seminar in Rome (5, max. 10) *Clauss, Gowing, Harmon, Stroup* Study of selected topics and authors in Latin literature. Conducted in Rome.

LATIN 590 Supervised Study (*, max. 18) Prerequisite: permission of graduate program coordinator.

LATIN 600 Independent Study or Research (*)

Communication

102 Communications



General Catalog Web page:
www.washington.edu/students/genccat/academic/communication.html



Department Web page:
www.com.washington.edu

Communication is a process that creates and reveals meanings, relationships, and cultural patterns. The mission of the Department of Communication is to advance the study and practice of communication across a range of contexts, including face-to-face interactions, public discourse, mass media, and digital media.

Graduate Program

Graduate Program Coordinator
221 Communications, Box 353740
206-543-7269
cmuinfo@u.washington.edu

Graduate study in communication engages students in the complexity of modern communication and its centrality to society and, in doing so, prepares them to become thoughtful scholars teachers, practition-

ers, and leaders related to this field. The Department of Communication offers graduate programs leading to the degrees of Master of Arts, Doctor of Philosophy, and Master of Communication (M.C.).

Graduate study in the Department of Communication is guided by four related principles: intellectual and cultural pluralism, interdisciplinary theorizing, collaboration, and public scholarship. Coursework brings together humanistic and social scientific intellectual traditions through a unified core curriculum and a wide selection of graduate seminars. Research and teaching in the department focus on six interrelated areas: communication and culture, communication technology and society, international communication, social interaction, political communication, and rhetoric and critical studies.

The M.A. degree program provides training in research and scholarship and can be either preparation for doctoral study or a terminal degree. The M.A. degree requires a minimum of 45 credits of approved coursework and a research thesis. The Ph.D. degree program develops conceptual and methodological capabilities in a substantive area of communication. The Ph.D. degree requires completion of a minimum of 45 post-master credits, general examinations, and a dissertation demonstrating an original scholarly contribution to the field.

The Department of Communication also offers three M.C. degrees, each of which has specific requirements tailored to that degree. The general M.C. degree is targeted for mid-career communication professionals who seek to develop an understanding of communication theory related to a special area of interest. The M.C. in digital media is a professional degree focused on digital media content creation, management, and policy (www.com.washington.edu/mcdigital/). Native Voices is an M.C. degree offered in conjunction with American Indian Studies. It is designed for documentary filmmakers who focus their work on subjects relevant to the Native American Community (depts.washington.edu/native/).

Special Requirements

Students are admitted to programs in the autumn quarter only. Admission into the Ph.D. program requires completion of a master's degree in communication or a related field. Visit the department Web site noted above for application forms and details. Applicants for M.A. and Ph.D. degrees may be considered for financial assistance in the form of teaching or research assistantships. The application deadline for those wishing to be considered for financial assistance is February 1. For all others, the final application deadline is April 1. In all cases, international students are strongly advised to apply by November 1.

Research Facilities

In addition to the University's research facilities available to all students, the Department of Communication houses a collection of specialized research laboratories, including the Digital Media Lab, Graduate Computer Lab, Observational Research Facility, Instructional Resources Center, and Video Editing Lab.

Faculty

Professors

Baldasty, Gerald J. * 1974; MA, 1974, University of Wisconsin, PhD, 1978, University of Washington; communications history and law, government-press relations, First Amendment philosophy and theory.

Bennett, W. Lance * 1974; MPhil, 1973, PhD, 1974, Yale University; American politics, comparative poli-

tics, political communication, mass media, political culture.

Bosmajian, Haig A. * 1965, (Emeritus); PhD, 1960, Stanford University; rhetoric, freedom of speech.

Carter, Richard Fremont * 1967, (Emeritus); PhD, 1957, University of Wisconsin.

Coney, Mary B. * 1976, (Adjunct); PhD, 1973, University of Washington; writing style and theories of technical communication, rhetoric, reader response theory.

Giffard, Charles A. * 1978; PhD, 1968, University of Washington; international news systems, news flow, editing and reporting.

Lang, Gladys Engel * 1984, (Emeritus); PhD, 1954, University of Chicago; political effects of mass media, sociology of art, political movements and crowd behavior.

Lang, Kurt * 1984, (Emeritus); PhD, 1953, University of Chicago; political and social effects of the media on mass communication; arts and society; public opinion.

Nilsen, Thomas R. 1946, (Emeritus); MA, 1948, University of Washington, PhD, 1953, Northwestern University; contemporary rhetorical theory, ethics of rhetoric.

Pember, Don R. * 1969; PhD, 1969, University of Wisconsin; contemporary law and mass communication, First Amendment history, regulation of mass communication.

Philipsen, Gerry F. * 1978; PhD, 1972, Northwestern University; ethnography of communication.

Scheidel, Thomas M. * 1976, (Emeritus); MA, 1955, PhD, 1958, University of Washington; communication theory and research, small group processes.

Shadel, Willard F. 1974, (Emeritus); MA, 1953, University of Michigan; broadcasting.

Stamm, Keith R. * 1973; PhD, 1968, University of Wisconsin; communities and newspapers, new media technology, dynamic models of communication behavior.

Staton, Ann Q. * 1977, (Affiliate); PhD, 1977, University of Texas (Austin); instructional communication.

Warnick, Barbara P. * 1980; PhD, 1977, University of Michigan; rhetorical theory and criticism.

Yerxa, Fendall Winston * 1965, (Emeritus); BA, 1936, Hamilton College; journalism.

Associate Professors

Bowen, Lawrence * 1973, (Emeritus); PhD, 1974, University of Wisconsin; advertising, media research, consumer information-seeking and -processing behaviors.

Ceccarelli, Leah M. * 1996; MA, 1992, PhD, 1995, Northwestern University; rhetoric of science, rhetorical criticism.

Chan, Anthony B. * 1990; PhD, 1980, York University (Canada); Chinese communications, especially information technology, ecommerce, especially dot-com enterprise.

Cranston, Patricia * 1954, (Emeritus); MA, 1954, University of Texas (Austin); broadcast journalism, history, writing and production of docudramas.

Domke, David S. * 1998; PhD, 1996, University of Minnesota; communication effects; political cogni-

tion; political elites and public opinion; race, gender, media.

Fearn-Banks, Kathleen A. 1990; MS, 1965, University of California (Los Angeles); crisis communications, history.

Gastil, John W. * 1997; PhD, 1994, University of Wisconsin; deliberation and democracy, group decision making, political discourse, political philosophy, civic.

Jackson, Kenneth M. * 1974, (Emeritus); PhD, 1970, University of Washington; institutional communications, media research, mass media and public policy, cultural communications.

Kielbowicz, Richard B. * 1984; PhD, 1984, University of Minnesota; communication history/law, impact of technology on press and society, Canadian media.

Lau, Tuen-Yu 2001; MA, 1982, Stanford University, PhD, 1991, Michigan State University; media management, international communication, mass media, journalism, social impact of digital media.

Manusov, Valerie L. * 1993; PhD, 1989, University of Southern California; the interplay between communication behaviors and cognitions in interpersonal interactions.

Parks, Malcolm R. * 1978; PhD, 1976, Michigan State University; communication theory, interpersonal communication, social uses of the Internet, social network and o.

Post, Robert M. * 1960; PhD, 1961, Ohio University; oral interpretation of literature.

Rivenburgh, Nancy * 1989; MS, 1982, Boston University, PhD, 1991, University of Washington; international communications; the role of media in international and intercultural relations.

Samuelson, Merrill * 1962, (Emeritus); PhD, 1960, Stanford University; research methods, processes of reading, patterns in reader selection of new stories.

Simpson, Roger A. * 1968; PhD, 1973, University of Washington; communication history, law of communication, media economics, editorial journalism.

Underwood, Douglas M. * 1987; MA, 1974, Ohio State University; newspaper economics and management, press and politics, literature and journalism.

Assistant Professors

Bonus, Enrique C. * 1998, (Adjunct); PhD, 1997, University of California (San Diego); race and ethnicity; communication, education and culture; Asian American studies.

Foot, Kirsten A. 2001; MA, 1990, Wheaton College; PhD, 1999, University of California (San Diego); international communication, technology and society, Internet studies, research methods.

Howard, Philip 2002; MS, 1994, London School of Economics and Political Science, PhD, 2002, Northwestern University; political communication, new media and social problems, organizational behavior in new economy firms.

Kawamoto, Kevin Y. * 1992; PhD, 1997, University of Washington; new media technologies, computer-mediated communication and computer crime.

Moy, Patricia * 1998; PhD, 1998, Cornell University; political communication, public opinion, media effects and research methodology.

Proise, Theodore O. * 2001; PhD, 2000, University of California (Los Angeles); rhetorical theory and criticism, argument, the rhetoric of nuclearism.

Silver, David M. 2001; PhD, 2000, University of Maryland; new media, social construction of technology, discourses of cyberculture.

Wulff, Donald H. * 1982, (Affiliate); PhD, 1985, University of Washington; communication in instructional settings, including interpersonal and small-group communication.

Senior Lecturer

Nyquist, Jody D. * 1966; MA, 1967, University of Washington; communication occurring in higher education and/or business/industry training units.

Lecturer

Coutu, Lisa 1990; PhD, 1996, University of Washington; culture and communication.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat/.

COM 401 Telecommunication Policy and Convergent Media (5) I&S Examines contemporary media and telecommunications industries since 1980 and their accelerating convergence. Attention given to economic, policy, and mass use issues. Review of major industry leaders, promising technologies, and new services. Social issues, government initiatives, and new legislation covered for both North American and international markets. Recommended: COM 301.

COM 402 New Media as Virtual Communities (5) I&S Technologically-mediated virtual communities considered through analysis of historical precedents and influences and through an exploration of the concept of community. Issues include a focus on social interactions; the social, political, economic, and technological contexts of virtual communities and the limits for their sustenance.

COM 405 New Media Criticism (5) I&S/VLPA Examines critically the content of new media forms, contrasting them with traditional media. Stresses influences of social, economic, political, and technological forces on content and developing strategies for critical analysis.

COM 406 Public Discourse on the Internet (5) I&S/VLPA Study of public advocacy and persuasion in internet environments, including public interest advocacy sites, political campaigns, advertisements, editorials, and essays. Various critical models applied to analyze narratives, style, argument structure, and credibility of internet discourse. Recommended: COM 331, COM 435, or COM 436.

COM 411 Seminar in Political Communication (5, max. 10) I&S Topics vary.

COM 414 Mass Media and Public Opinion (5) I&S Examines the foundations of the idea of public opinion in a democratic environment and the role of mass communication in the organization, implementation, and control of that opinion. Considers these relationships from the perspectives of societal elites, media, and citizens. Offered: jointly with POL S 452.

COM 417 Political Deliberation (5) I&S Exploration of philosophical and empirical writings on political deliberation in small groups, campaigns, and other public settings. Contemporary deliberative theory. Participation in face-to-face discussions on current issues. Recommended: either COM 273 or COM 373.

COM 418 Communications and the Environment (5) I&S Examines the role of mass media in the resolution of environmental problems. Topics include strengths and weaknesses of media coverage, use of media by environmental groups and government agencies, media effects on public opinion, and mass communication and social movements. Offered: jointly with ENVIR 470.

COM 420 Comparative Media Systems (5) I&S Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with SIS 419/POL S 468.

COM 423 Communication and Social Change (5) I&S Examines both theory and application involved in using communications media as a tool for addressing political, social, and economic development issues. Utilizes a case study approach to look at localized applications of traditional and new communications tools in the pursuit of sustainable development.

COM 425 European Media Systems (5) I&S Examines media systems in selected countries in Europe and policy issues that link (or divide) members of the European Union and other major media producers. Media studied in context of the contemporary economic, social, political, and cultural milieu in which they operate. Offered: jointly with EURO 425.

COM 426 International Media Images (5) I&S Ways in which media construct images of international peoples and events. Develops a set of critical tools for assessing media portrayals of international affairs and cultures.

COM 427 International Communications Law and Policy (5) I&S Examines the international and comparative aspects of traditional press law, broadcast regulation, and telecommunications policy. Also examines freedom of the press in international reporting and the efforts of countries to limit foreign media influences within their borders.

COM 428 Asian Media Systems (5) I&S Examines the media systems and communication policies in selected Asian countries. Identifies and analyzes the cultural, economic, historical, and political parameters that influence these media.

COM 429 Chinese Communications Systems (5) I&S Analyzes the economic, historical, intellectual, social, and political foundations of communications systems in the region of Chinese Asia: China, Hong Kong, Singapore, and Taiwan. Focus primarily on print and broadcast journalism.

COM 430 Canadian Documentary Film Traditions (5) I&S/VLPA History and development of non-fiction film documentary traditions, especially in Canada, the first institutionally defined area in which documentaries became prominent through the National Film Board and the Canadian Broadcasting Corporation. Discussion of Flaherty, Greirson, and independent network producers who developed present-day style of documentaries. Offered: jointly with SISCA 430.

COM 431 Rhetorical Criticism (5) I&S/VLPA Study of approaches to rhetorical inquiry that aid in the description, analysis, interpretation, and evaluation of discourse. Applies various critical models to a chosen artifact.

COM 433 Speech Composition (5) I&S/VLPA Preparation and delivery of public speeches with emphasis on style, thought organization, and proof. Analysis of model speeches. Recommended: SP COM 220.

COM 434 Argumentation Theory (5) I&S/VLPA Theory and research on the structure and properties of argument, argument fields, argument modeling, the influence of audience, argument criticism, and related topics. Prerequisite: either COM 220 or COM 334.

COM 435 Historic American Public Discourse (5) I&S/VLPA Rhetorical criticism of historical public speeches, essays, and declarations. Includes readings of public texts in their historical and political context to increase understanding of those texts, their rhetorical construction, and the culture from which they arose. Covers the beginnings of the nation to the middle of the 20th century.

COM 436 Contemporary American Public Discourse (5) I&S/VLPA Rhetorical criticism of contemporary public messages. Includes reading of public texts in their context to increase understanding of those texts, their rhetorical construction, and the culture from which they arose. Covers mid-20th century to the present.

COM 437 Rhetorical Perspectives in Intellectual Revolutions (5) I&S/VLPA Rhetorical investigation of selected major writings. Examines the rhetorical dimension in the progress of ideas through analysis of documents of major intellectual revolutions as persuasive works. Relates principal revolutions in Western thought to contemporary controversy. Examines Rights of Man, Communist Manifesto, The Origin of Species.

COM 440 Mass Media Law (5) I&S Survey of laws and regulations that affect the print and broadcast media. Includes material on First Amendment, libel, invasion of privacy, freedom of information, copyright, obscenity, advertising and broadcast regulation, and matters relating to press coverage of the judicial system. Offered: jointly with POL S 461.

COM 441 United States Media History (5) I&S Development of mass communication in the United States with emphasis on role of mass media in politics, economics, gender, and race.

COM 442 History of Media Technology and Regulation (5) I&S Impact of pre-1980s media technologies—printing, telecommunications, broadcasting, photography, and more—on individuals and institutions, especially government, business, and the mass media. How laws and policies have changed to govern new media forms.

COM 444 Public Relations and Society (5) I&S Overview of issues, strategies, and role of public relations professionals in various areas of American society, including media relations, government relations, community affairs, and consumer relations.

COM 445 Journalism and Literature (5) I&S/VLPA Explores the relationship between journalism and fiction writing in the United States. Examines writers who began their careers as journalists and forged a fiction-writing philosophy related to what they learned in journalism. Readings in fiction and journalism.

COM 451 Mass Media and Culture (5) I&S/VLPA Empirical and theoretical framework for analyzing role of mass media in cultural change. Historical and contemporary cases consider ethnic, gender, class, and urban-rural conflicts and cultural roles of sports, elections, and national rituals. Focus on visual electronic media.

COM 452 Crisis Communications (5) I&S Study of the functions of communications professionals during crises. Covers public relations professionals as advocates for organizations and companies in crisis and the news media as advocates of the mass public. Discussion of cases.

COM 460 Special Reporting Topics (4) I&S Topics vary.

COM 461 Computer-Assisted Journalism (5) I&S Introduction to computer-assisted journalism and other advanced reporting techniques. Includes hands-on electronic data analysis, exploration of on-line investigative tools, and the fashioning of electronically-retrieved information into news stories. Students examine ethical and technical challenges these tools present to media and society.

COM 462 Magazine Writing (5) I&S Techniques of writing and marketing the full-length magazine article.

COM 463 Copy Editing and Design (5) I&S Focus on editing copy for publications, covering grammar and style, production methods, news criteria, use of wire services, headlines, make-up and design, pagination, and online publication.

COM 465 Legislative Reporting (12) I&S Coverage of Washington legislature for a daily newspaper. Selected students live in Olympia, interview legislative delegations, report on committee and floor sessions, and attend and report on gubernatorial and other press conferences.

COM 466 Digital Journalism (5) I&S *A. Chan* Introduction to digital journalism. Integrates Web design, video, still, and sound to develop an Internet Webcast called DIA (Digital Interactive) News. Students serve as sole initiator of DIA news, utilizing journalistic standard of storytelling, video production, and editing and design. Prerequisite: COM 300.

COM 468 Journalism Ethics (5) I&S *Simpson* Provides a method and substantive context based on ethical theory, media history, and value systems analysis for analyzing and resolving dilemmas raised by journalistic practices.

COM 469 Intellectual Foundations of American Journalism (5) I&S Examines the thinkers and philosophers who have influenced modern journalism. Studies the main ideas in the development of world thought and their impact on today's journalists. Explores the role communications systems have played in the creation of the world's cultures.

COM 471 Persuasion (5) I&S/VLPA Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication.

COM 472 Empirical Approaches to Interpersonal Communication (5) I&S Examination of theories and research on the development and deterioration of interpersonal relationships. Emphasis on the nature of interpersonal interaction, the role of language and nonverbal communication in relationships, functional and dysfunctional interaction patterns, and the dynamics of interpersonal networks.

COM 473 Problems of Discussion Leadership (3) I&S/VLPA Critical analysis of leadership in committee and conference, with emphasis on the development of speech effectiveness in the cooperative achievement of goals. Prerequisite: COM 373.

COM 474 Communication, Conflict, and Cooperation (5) I&S/VLPA Role of communication in resolving informal conflicts and in facilitating interpersonal and intergroup cooperation. Review of empirical literature. In-class simulations and exercises.

COM 475 Organizational Communication (5) I&S/VLPA Role of communication in organizations, the types of problems arising, and approaches to their resolution. Communication in the human relations and productivity of organizations. Applying communication skills in various organization roles.

COM 476 Models and Theories in Speech Communication (5) I&S Examination of selected theories and models of speech communication 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, interpretive, and critical study of speech communication phenomena.

COM 478 Intercultural Communication (5) I&S Investigates intercultural communication theory and its application for varying levels of human interaction: interpersonal, intergroup, and international.

COM 479 Communication in Children's Environments (5) I&S/VLPA Study of the communication capacity of children with emphasis on the analysis of the communication process in formal and informal learning environments. Includes examination of communication-based educational approaches and instructional strategies.

COM 480 Communication in Adolescent Environments (5) I&S/VLPA Study of the communication process in youth environments with a primary focus on formal and informal learning. Includes critical analysis of communication in contemporary instructional settings and the development of communication strategies for teaching and learning.

COM 482 Computer-Mediated Interpersonal Communication (5) I&S Examination of relationships and groups formed through computer-mediated interpersonal communication. Focus on how people manage interactions and identities, develop interpersonal relationships, engage in collaboration and conflict, and develop communities in virtual environments. Involves both the study and use of network-based computer-mediated systems.

COM 484 Cultural Codes in Communication (5) I&S/VLPA Social and cultural codes in interpersonal communication, with special reference to contemporary American subcultural groups and their communication patterns.

COM 485 Fieldwork in Communication Studies (5) I&S/VLPA Theory and practice of participant observation, intensive interviewing, and discourse analysis in the study of communicative practices. Prerequisite: COM 484.

COM 489 Ethnicity, Gender, and Communication (5) I&S Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with AES 489/WOMEN 489.

COM 495 Special Topics in Speech Communication (2-5, max. 15) Lecture, seminar, and/or team study. Topics vary.

COM 496 Honors Seminar (5) I&S/VLPA Preparation for researching and writing senior honors thesis.

COM 497 Honors Thesis (5, max. 15) I&S/VLPA Researching and writing honors thesis.

COM 498 Independent Research (2-6, max. 6) Work on research projects designed and conducted by undergraduate students. Credit/no credit only.

COM 499 Directed Research (1-5, max. 10) Work on research projects designed by faculty members.

Courses for Graduates Only

COM 500 Communication Theory Development (5) Covers the philosophy behind theory development, discusses the basic components of theories, and reviews significant theoretical contributions in communication from social scientific and humanistic traditions. Introduces students to the process of conceptualization and theory design through reading

and discussion of relevant bodies of communication scholarship.

COM 501 Methods of Inquiry (5) Overviews some of the most important methods of inquiry used to investigate communication phenomena. Includes textual criticism, content analysis, ethnography, experimentation, survey research, and historical approaches. Explores the utility of different methods for investigating research topics, defining and measuring concepts, reading texts, and investigating theories.

COM 502 Communication Scholarship and Public Life (5) Examines potential connections between communication scholarship and government, markets, civil society, and the general public.

COM 507 Interdisciplinary Communication Theory (5) Introduces students to challenges, benefits, and processes of interdisciplinary research. Explores formation of disciplinary boundaries. Considers significant theories that have influenced communication research. Considers how synthetic theoretical arguments are made and how to integrate work from fields with different epistemologies.

COM 509 Collaboration and Scholarship (5) Examines the collaborative research process. Students identify and conceptualize a group project, carry it out, and present findings. Topic varies. Prerequisite: COM 501 or equivalent.

COM 511 Content Analysis (5) Content analysis as a technique for making inferences from texts. Includes quantitative, qualitative, and computer-assisted approaches to analysis.

COM 512 Critical, Social, and Practice-Based Approaches (5) Explores approaches to communication research developed from understandings of human communication as inherently social, grounded in tool-mediated action, and interwoven with power relations. Covers a range of theories that are associated with these approaches, and the implications of these theories for methods of data collection and analysis.

COM 513 Fieldwork Research Methods (3-6, max. 12) Methods of fieldwork research in communication studies, with emphasis on participant observation, ethnography, and discourse analysis.

COM 515 Rhetorical Criticism (5) History and method of rhetorical criticism. Application of critical standards to various rhetorical artifacts.

COM 516 Descriptive and Analytic Communication Research Methods (5) Development of the historical approach to communications research. Study of historical methods, bibliography, and criticism.

COM 517 Survey Research (5) Faculty-directed project in survey research in which basic principles of survey design, including sampling, observation, measurement, data analysis, and data interpretation, are all applied. Prerequisite: elementary statistics or permission of instructor.

COM 520 Statistical Methods in Communication (5) Reviews the steps taken in social scientific research on communication, with emphasis on the conceptualization, operationalization, and analysis of quantifiable variables. Highlights understanding of computer application of univariate and bivariate statistics, focusing on both parametric and nonparametric tests.

COM 521 Advanced Statistical Methods in Communication (4) Discusses complexities in quantitative research on communication. Focus on multivariate data design and analysis, including multiple and logistic regression, ANOVA and MANOVA, and factor analysis. Prerequisite: COM 520.

COM 527 International Communication Research Methods (5) Methodological issues particular to the design or analysis of research that deals with data from different countries, cultures, or sub-cultures. Prerequisite: COM 501 or equivalent.

COM 530 Philosophical Issues in Rhetorical and Communication Theory (5) Survey of selected philosophical controversies among speech communication theorists, and analysis of one philosopher's approach to communication. Topics include paradigm descriptions of communication, rhetoric and knowledge, linguistic analysis and communication, hermeneutics and dialogue.

COM 531 Rhetoric in Society (5) Selected works of major rhetorical theorists such as Aristotle, Cicero, Augustine, Campbell, Whately, Perelman, and Burke. Examines how rhetorical themes are responsive to and symptomatic of societal conditions and values.

COM 532 Classical Rhetoric (5) Development of the classical tradition in rhetorical theory, criticism, and pedagogy from the sophists to Augustine; analysis of the contributions of major figures and works to that tradition.

COM 534 Studies in Contemporary Rhetoric (5) Critical analysis of theories of twentieth-century rhetoric.

COM 535 Critical Theory Applications in Communication (5) Major approaches in critical theory: Marxism, psychoanalysis, structuralism, and semiology. Synthesizes these approaches by viewing the "cultural studies" tradition. Assesses critical theory through empirical study of network television in the United States and the United Kingdom.

COM 538 Theories and Criticism of Communication Technologies (5) Potential of the computer for use in behavioral science. Prerequisite: elementary programming, elementary statistics.

COM 540 The Rhetoric of Science (5) Examines selected topics in the rhetoric of science, underscoring the interplay of language, situation, culture, and prior tradition in the quest for exact knowledge of the natural world. Scrutinizes scientific communication in intradisciplinary, interdisciplinary, and extradisciplinary contexts.

COM 542 Readings in Communication History (5) Selected readings on the history of communication.

COM 543 Research Seminar in Historic and Contemporary Communication (5) Topical research seminar in historic and contemporary communication.

COM 545 Development of Mass Communication (5) Institutions of mass communication. Political and social roles.

COM 548 Telecommunications Policy and Convergent Media (5) Structures and policies governing the functioning of communication technologies and data flow: United States and international perspectives. Interdisciplinary approach.

COM 549 Mass Communication Process and Effects (5) Analytic approach to conceptualization and research in the field since 1900.

COM 550 European Union Information Society Policy (5) *Giffard* Analysis of European Union policy and regulatory documents relating to cultural, economic, political, social, and technological aspect of the new information society, including efforts to promote transborder flows of television programs in Europe.

COM 551 Political Communication (5) Survey of contemporary and some historical political communications research, emphasizing quantitative

aspects. May include discussions and demonstrations of experimental, survey, aggregate, and content analysis methods. Designed to foster substantive comprehension of political communication literature, familiarity with research techniques, and creation of empirical projects. Offered: jointly with POL S 551.

COM 553 Public Opinion and Communication (5) Conceptual and methodological approaches to public opinion and communication as historical and behavioral phenomena. United States and international perspectives.

COM 555 Political Deliberation (5) VLPA I&S *Gastil* Exploration of deliberative theories of democracy and research on political discussion in campaigns, face-to-face meetings, on-line forums, and informal conversations. Presents different uses and understandings of deliberation and its role in democratic governance. Recommended: COM 577, POL S 551/COM 551.

COM 556 Political Communication Research Practicum: Community, Communication, and Civic Engagement (5) Overview of the research process, including literature review, hypothesis generation, data gathering, empirical analysis, and writing for publication. Topics vary with instructor, but generally address questions of how communication affects democracy and citizen engagement in national or international contexts. Offered: jointly with POL S 594.

COM 557 Government and Mass Communication (5) Legal problems of mass communication, institutions, and media operations.

COM 559 Media and Foreign Policy (5) The role of communications media in how nations interact. The media as source, actor, and catalyst in international affairs. Interdisciplinary focus.

COM 561 Regional Communication Systems (5) Communication as a factor in economic, sociocultural, and political relations among nations of a region. Focus varies with specialization of instructor. Consult graduate secretary for details. Interdisciplinary focus.

COM 562 International Communication Systems (5) International communications and contemporary issues that affect the functioning of global communication systems. Interdisciplinary focus.

COM 565 Mass Media Structure (5) Research on the structural aspects of mass communication.

COM 567 Gender, Race, and Communication (5) Analysis of the role of media in the construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with WOMEN 589.

COM 570 Organizational Communication (5) Examination of social scientific theory and research on communication in organizations. Topics include quantitative and qualitative approaches to process of organizational communication, function and structure of macro networks, superior-subordinate relationships, and the role of communication in organizational change, development, and effectiveness.

COM 576 Interpersonal Communication (5) Social scientific research and theory on the role of communication in developing and maintaining interpersonal relationships. Nature of interpersonal communication, relationship change processes, interpersonal control through communication, and personal communication networks.

COM 577 Communication in Small Groups (5) Reviews major small group communication theories and the history of research on small groups. Topics include structuration, democratic decision making,

symbolic convergence, and the influence of personality, gender, and ethnicity on group communication. Involves students in original research projects on communication in small group settings.

COM 580 Nonverbal Communication (5) Reviews primary theories and research on nonverbal communication. Focus on developmental and social aspects of nonverbal cues, including review of communicative functions served by nonverbal channels. Topics include paralinguistic systems, relational messages, deception, acquisition of cue use, and emotional expression. Emphasizes research methods and influences of culture and context.

COM 582 Communication Education Research (5) Communication in instructional environments. Nature of instructional communication, paradigms for instructional communication research, quantitative and qualitative approaches to instructional communication, verbal and nonverbal classroom interaction.

COM 584 Ways of Speaking (5) Theory and literature of the ethnography of communication, with special emphasis on the descriptive-comparative approach to culturally patterned styles of communicative conduct. Offered: jointly with ANTH 584.

COM 590 Selected Readings (1-5, max. 10) Selected readings assigned by faculty.

COM 591 Independent Research (1-5, max. 10) Research projects designed and led by students with faculty supervision.

COM 592 Directed Research (1-5, max. 10) Student participation in faculty-directed research projects.

COM 593 Communication Internship (1-5, max 15) Provides students an opportunity to connect their scholarship with communities outside academia by engaging in a project that uses communication theory to inform practical work.

COM 594 Professional Proseminar (1, max. 6) Helps students develop a range of professional competencies. Focuses on a particular topic such as computer-assisted research, technology in the classroom, obtaining funding for research, writing for academic publication, career choices after graduate school, and ethics in research and teaching.

COM 596 Communication Pedagogy (1, max. 3) Development of effective teaching and professional skills. Emphasizes interactive teaching, leading discussions, lecturing, planning courses, evaluating resource materials, grading and evaluation, teaching philosophies, and effective classroom management and communications. Required of all graduate students who accept teaching assistantships. Credit/no credit only.

COM 597 Special Topics in Communication (5, max. 10)

COM 600 General Exam Preparation or M.C. Project (*) Prerequisite: permission of supervisory committee chairperson.

COM 700 Master's Thesis (*)

COM 800 Doctoral Dissertation (*)

Comparative Literature

B531 Padelford



General Catalog Web page:
www.washington.edu/students/genocat/academic/comp_lit.html



Department Web page:
depts.washington.edu/complit/

The comparative literature program works across national and regional boundaries to explore the relationships among multiple literary traditions. Comparative literature also focuses on the relationship of literature to the other arts and to fields of knowledge such as philosophy, anthropology, history, or cultural studies. Departmental courses deal with a range of topics in literary and cultural studies, from specific investigations of the patterns of influence and reception across national traditions to the general study of literary theory and criticism.

Graduate Program

Graduate Program Coordinator
B531 Padelford, Box 354338
206-543-7542
clitgrad@u.washington.edu

The Department of Comparative Literature offers a program of study with faculty members from the following participating departments: Asian Languages and Literature, English, French and Italian Studies, Germanics, Near Eastern Languages and Civilization, Scandinavian Studies, Slavic Languages and Literatures, Spanish and Portuguese Studies, and Women Studies. Study in this program leads to a Master of Arts or Doctor of Philosophy degree. Students concentrate on graduate courses in comparative literature and specialize in two or more national literatures of major interest to them, studied in the original language. With permission, a Ph.D. aspirant may choose as a third area of study a field outside of literature (e.g., philosophy, religion, art, political thought). On receiving the advanced degree, the student is qualified for teaching and research in comparative and general literature, as well as the language and literature of specialization.

Special Requirements

Applicants for the M.A. program are required to have a B.A. degree in comparative literature, English, or any foreign literature, or an equivalent background; applicants for the Ph.D. program are required to have an M.A. in one of the above areas. M.A. students are required to demonstrate advanced reading knowledge in one language other than English and a basic reading knowledge of a second. Ph.D. students are required to demonstrate advanced reading knowledge in two languages other than English and a basic reading knowledge of a third. Language competence is evaluated by Comparative Literature faculty through departmental examinations or by evidence of completion of satisfactory advanced (400- or 500-level) course work in the language.

Financial Aid

The department awards teaching assistantships annually to qualified students and provides up to five years of support toward the Ph.D. to students who enter with a B.A. Teaching assistantships can be assigned in Comparative Literature, Cinema Studies, or in any of the national literature departments affiliated with Comparative Literature.

Ph.D. Program in Theory and Criticism

This is a joint-doctoral program with eleven participating doctoral programs (Asian Languages and Literature; Classics; Comparative Literature; Drama; English; Germanics; French and Italian Studies; Scandinavian Studies; Slavic Languages and Literatures; Spanish and Portuguese Studies; and Speech Communication). The program combines the doctoral program in one of the participating departments with an additional set of courses in theory and criticism into an integrated course of study. The purpose is to broaden a student's perspective and to increase awareness of different critical approaches to literature and related fields. Study in this program leads to a Ph.D. in the respective major field and theory and criticism.

Admission Requirements

Applicants must have been admitted to one of the participating departments and have received a Master's degree in a subject represented by these departments or in a related field.

Faculty

Chair

Gary J. Handwerk

Professors

Adams, Hazard S. * 1977, (Emeritus); MA, 1949, PhD, 1953, University of Washington; romanticism, history of literary theory, Anglo-Irish literature.

Ammerlahn, Hellmut H. * 1968; PhD, 1965, University of Texas (Austin); classicism and comparative literature.

Behler, Diana I. * 1973; MA, 1966, PhD, 1970, University of Washington; romanticism, nineteenth century, comparative literature.

Borch-Jacobsen, Mikkel * 1986; Doct, 1981, University of Strasbourg (France); French twentieth-century literature, theory and criticism, psychoanalysis.

Brown, Jane K. * 1988; PhD, 1971, Yale University; seventeenth, eighteenth and nineteenth century, comparative literature.

Brown, Marshall J. * 1988; PhD, 1972, Yale University; eighteenth- and nineteenth-century literature, literary theory, music and literature.

Christofides, Constantine * 1966, (Emeritus); PhD, 1956, University of Michigan; medieval, seventeenth century, Romanesque.

Handwerk, Gary J. * 1984; PhD, 1984, Brown University; British, German, and French nineteenth- and twentieth-century narrative; Romantic and post-Romantic.

Hruby, Antonin F. * 1961, (Emeritus); PhD, 1946, Charles University (Czechoslovakia); medieval literature.

Kramer, Karl D. * 1970, (Emeritus); MA, 1957, PhD, 1964, University of Washington; Russian literature.

Leiner, Jacqueline * 1963, (Emeritus); DResLE, 1969, University of Strasbourg (France); modern French literature.

Leiner, Wolfgang * 1963, (Emeritus); PhD, 1955, University of Saarlandes (Germany); seventeenth- and twentieth-century French and Italian literature.

Modiano, Raimonda * 1978; PhD, 1973, University of California (San Diego); romanticism.

Reinert, Otto * 1956, (Emeritus); PhD, 1952, Yale University; comparative literature, eighteenth-century literature.

Rossel, Sven H. * 1974, (Affiliate); PhD, 1968, University of Copenhagen (Denmark); Danish language and literature, Scandinavian ballads, comparative literature.

Shaviro, Steven * 1984; PhD, 1981, Yale University; film, cyberstudies, postmodernism, contemporary popular culture.

Staten, Henry J. * 1998; PhD, 1978, University of Texas (Austin); 19th- and 20th-century British literature, history of literary criticism, contemporary theory.

Steele, Cynthia * 1986; PhD, 1980, University of California (San Diego); Latin American literature and society, cinema, postcolonial and feminist theory.

Steene, Birgitta * 1973, (Emeritus); PhD, 1960, University of Washington; Scandinavian drama and film, children's literature, comparative literature.

Vance, Eugene * 1990; PhD, 1964, Cornell University; medieval literature, the history of criticism, and discourse analysis.

Wang, Ching-Hsien * 1971; PhD, 1971, University of California (Berkeley); Chinese poetry.

Ziadeh, Farhat J. * 1966, (Emeritus); LLB, 1940, University of London (UK); Arabic language and literature, Islamic law, Islamic institutions.

Associate Professors

Collins, Douglas P. * 1980; PhD, 1978, University of Missouri; twentieth-century French literature.

Crnkovic, Gordana * 1993, (Adjunct); MA, 1991, PhD, 1993, Stanford University; East European literature, film and cultural studies, former Yugoslavia, theory, American literature.

Ellrich, Robert J. * 1964, (Emeritus); PhD, 1960, Harvard University; eighteenth-century French literature.

Fisher, Alan S. * 1968; PhD, 1969, University of California (Berkeley); Renaissance, seventeenth- and eighteenth-century literature, history of literary criticism.

Geist, Anthony L. * 1987; PhD, 1978, University of California (Berkeley); twentieth-century Spanish literature: ideology and literary form.

Kapetanac, Breda * 1975, (Emeritus); LittD, 1966, University of Zagreb (Yugoslavia); theory of comparative literature, 19th and 20th century European literature.

Konick, Willis * 1950; PhD, 1964, University of Washington; Russian literature, nineteenth-century European literature, cinema studies.

McLean, Sammy * 1967, (Emeritus); PhD, 1963, University of Michigan; Western drama, 20th-century poetry, psychoanalysis and literature, literary translation.

Sbragia, Albert J. * 1989; PhD, 1988, University of California (Berkeley); modern and contemporary Italian literature and cinema.

Searle, Leroy F. * 1977; MA, 1968, PhD, 1970, University of Iowa; twentieth-century literature, critical theory, American studies.

Sehmsdorf, Henning K. * 1967, (Emeritus); PhD, 1968, University of Chicago; folklore and mythology,

Norwegian language and literature, comparative literature.

Vaughan, Miceal F. * 1973; PhD, 1973, MA, 1973, Cornell University; medieval European languages and literature; textual studies.

Warme, Lars G. * 1975, (Emeritus); PhD, 1974, University of California (Berkeley); Swedish language and literature, Scandinavian novel, comparative literature.

Assistant Professors

Bean, Jennifer M. * 1998; PhD, 1998, University of Texas (Austin); film studies, American literature and culture, studies in gender and sexuality.

Braester, Yomi 2000; PhD, 1998, Yale University; modern Chinese literature, film, literary criticism, theory of art.

Senior Lecturer

Dornbush, Jean M. * 1980; PhD, 1976, Princeton University; medieval period, women and literature, writing in comparative literature.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat/.

C LIT 400 Introduction to the Theory of Literature (5) VLPA A selection of major theoretical statements in the history of literary theory, with emphasis on fundamental issues of lasting concern and with attention to some recent emphases.

C LIT 410 Studies in Literary History (5, max. 15) VLPA Introduction to a major figure or movement associated with the development of literary history. Through the study of one aspect of literary history students gain a thorough understanding of a particular point of view, while exploring the breadth of contemporary approaches to literature.

C LIT 421 Studies in Connections: Literature and Other Disciplines (5, max. 15) VLPA Examines the links between literature and other disciplines or art forms. Literature and history, literature and philosophy, literature and music, literature and the visual arts are all appropriate topics. Selection of focus depends on instructor.

C LIT 422 Studies in Genre (5, max. 15) VLPA Major genres of world literature: poetry, fiction, drama. Readings, in English from a wide selection of national literatures.

C LIT 424 The Epic Tradition (5) VLPA Ancient and medieval epic and heroic poetry of Europe in English: the Iliad, Odyssey, and Aeneid; the Roland or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material varies. Literary background recommended. Offered: jointly with CLAS 424.

C LIT 431 The Northern European Ballad (5) VLPA Integrative study of the Northern European Ballad, with an emphasis on texts, performance, context, history, theory, genre classification, and interpretive approaches. Offered: jointly with SCAND 431.

C LIT 460 Cinematic Production (5) VLPA Examines fictional or documentary filmmaking/video produc-

tion from concept, focus, treatment, research, data gathering, story development, scripting, narrating, performing and postproduction. Students will be exposed to a wide variety of filmmaking styles and will engage in a group creative project.

C LIT 490 Directed Study or Research (1-5, max. 10) Individual study of topics in comparative literature by arrangement with the instructor and the Comparative Literature office.

C LIT 491 Internship (1-5, max. 5) Supervised experience in local businesses and other agencies. Open to upper-division Comparative Literature and Cinema Studies majors. Recommended: 25 credits of C LIT courses.

C LIT 493 Comparative Literature Honors Seminar (5, max. 15) VLPA Special topics in comparative literature. Required of honors students in comparative literature.

C LIT 495 Honors Thesis (5) VLPA Preparation of an honors thesis under the direction and supervision of a faculty member.

C LIT 496 Special Studies in Comparative Literature (3-5, max. 15) VLPA Offered occasionally by visitors or resident faculty. Content varies.

C LIT 497 Special Topics in Cinema Studies (3-5, max. 10) VLPA Varying topics in Cinema Studies. Offered by resident or visiting faculty.

Courses for Graduates Only

C LIT 502 The Theory of Literature III: Special Topics (5, max. 15) Offerings vary to cover topics such as individual theorists, theoretical movements, or the intersection of literary theory with other disciplines or arts (psychoanalysis, structuralism, ethics, aesthetics).

C LIT 507 History of Literary Criticism and Theory I (5, max. 15) A general introduction to the major issues in the history of criticism followed by the study of the classical theorists, including Plato, Aristotle, Longinus, and the major medieval critics. Offered: jointly with ENGL 507.

C LIT 508 History of Literary Criticism and Theory II (5, max. 15) Literary criticism and theory from the Middle Ages and the Renaissance through the eighteenth century to, but not including, Kant. Offered: jointly with ENGL 508.

C LIT 509 History of Literary Criticism and Theory III (5, max. 15) Literary Criticism and theory from Kant's *Critique of Judgment* to the mid-twentieth century and the work of Northrop Frey. Offered: jointly with ENGL 509.

C LIT 510 History of Literary Criticism and Theory IV (5, max. 15) A study of the major issues in literary criticism and theory since about 1965. Offered: jointly with ENGL 510.

C LIT 511 Literary Translation (5, max. 15) 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 516 Colloquium in Criticism (5, max. 15) Recent trends in literary criticism, taught by representatives from various literature departments, covering critical trends such as structuralism, poststructuralism, hermeneutics, reception theory, and sociological approaches to literature.

C LIT 518 Colloquium in Medieval Studies (5) Salient literary aspects of the European Middle Ages, taught by representatives from various literature departments as well as from related disciplines, such

as philosophy, art history, history, and comparative religion.

C LIT 530 Cultural Criticism and Ideology Critique I (5, max. 15) A study of the main attempts to come to an understanding of the humanities and the nature of historical interpretation in a cultural context.

C LIT 535 Cultural Criticism and Ideology Critique II (5, max. 15) Offerings vary to cover individual theorists and particular manifestations of cultural criticism and ideology critique.

C LIT 545 Medieval Studies (3/5, max. 15) Literature, intellectual history, and sociology of the Middle Ages, 500-1200. Topics may include "renaissance" of the twelfth century; the educational ideal; rise of universities; philosophical concepts.

C LIT 546 Studies in Renaissance and Baroque (3-5, max. 10) Aspects of Western European literature during the Renaissance and Baroque period. Course content varies.

C LIT 547 Studies in Eighteenth-Century Literature (3-5, max. 10) Examination of various trends in eighteenth-century literature including the Enlightenment, Rationalism, Pre-Romanticism, and Neo-Classicism. Course content varies with instructor.

C LIT 548 Studies in Nineteenth-Century Literature (3-5, max. 10) Examination of various trends in nineteenth century literature including Romanticism, Realism, Naturalism, and Symbolism.

C LIT 549 Twentieth-Century Literature (3-5, max. 10) Selected movements, schools, and trends of significance in twentieth-century literature of Europe and Americas. Symbolism, surrealism, dada, expressionism, neorealism, existentialism, nouveau roman, and absurd may be considered. Texts in English, French, and German figure most prominently, but Spanish, Italian, Russian, and other materials may be examined. Content and emphasis vary.

C LIT 570 The Novel: Theory and Practice (3-5, max. 15) Study of the novel as a genre, examining two or more novels of varying national literatures. Course content varies.

C LIT 573 The Drama: Theory and Practice (3-5, max. 15) Examination of various aspects of the drama as a major literary genre, as approached from international and multilingual points of view. Course content varies.

C LIT 576 Seminar in East-West Literary Relations (3-5, max. 15) Comparative investigation of literary topics requiring the study of both Eastern and Western documents. Explores parallels and contradictions between the two, in concepts, ideas, and specific topics. A comparative paper on a chosen topic with qualified conclusions is required. Emphasis varies. Prerequisite: at least one East Asian language.

C LIT 590 Master of Arts Essay (5/10, max. 10) Research and writing project under the supervision of a faculty member.

C LIT 596 Special Studies in Comparative Literature (3-5, max. 15) Offered occasionally by visiting or resident faculty. Course content varies.

C LIT 599 Special Seminar or Conference (1-9, max. 30) Group seminars or individual conferences scheduled to meet special needs. Prerequisite: permission of graduate program adviser.

C LIT 600 Independent Study or Research (*)

C LIT 700 Master's Thesis (*)

C LIT 800 Doctoral Dissertation (*)

Comparative Religion

See International Studies.

Dance

258 Meany



General Catalog Web page:
www.washington.edu/students/genecat/academic/dance.html



Department Web page:
depts.washington.edu/uwdance/

The dance program is designed as part of a liberal arts curriculum and provides students with a foundation for future advanced work in performance or movement-related work. It is recommended that majors supplement their dance studies with course work in other disciplines that will provide a foundation for later specialization in dance ethnology, dance history and criticism, performance art, education, movement therapy, or movement science.

Graduate Program

Graduate Program Coordinator
259 Meany, Box 351150
206-543-1640
uwdance@u.washington.edu

The dance program offers graduate study leading to a Master of Fine Arts degree. This program is designed specifically for professional dance performers who wish to prepare for a transition into college teaching careers. All graduate students will comprise the Chamber Dance Company and will hold teaching assistantships.

During the two-year program, a student must complete at least 72 credits, of which a minimum of 24 must be in an area of specialization (e.g., history, criticism, aesthetics, anatomy, ethnology).

Admission Requirements

(1) A letter of application and résumé. (2) An undergraduate degree. (3) A minimum of eight years of professional performing experience. (4) The ability to demonstrate movement skills at a professional level in at least one idiom, and an in-person audition or performance video tape. (5) Three letters of reference verifying success and responsibility in the professional dance arena. Neither a foreign language nor the Graduate Record Examination is required. Application deadline is January 15.

Financial Aid

All graduate students will receive tuition waivers and teaching assistant stipends.

Faculty

Chair

Elizabeth Cooper

Professors

Knapp, Joan S. * 1981, (Emeritus); MA, 1964, University of Illinois; dance composition, improvisation, kinesthetic training.

Wiley, Hannah * 1984; MA, 1981, New York University; ballet, scientific aspects of dance, choreography, dance in higher education.

Associate Professor

Cooper, Elizabeth A. 2001; MFA, 1997, University of Washington; dance history, ballet, modern, research methods.

Assistant Professor

Simpson, Maria Quinlan * 1994; MFA, 1996, University of Washington; dance science, dance pedagogy, and the application of both to the dance technique class.

Lecturer

Cohen, Pamela 2001; MFA, 2001, University of Washington; modern, psychology for dance.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

DANCE 420 Dance Aesthetics (3) I&S/VLPA Philosophical investigation of the expressive elements of dance. Reading and discussion of the concepts of beauty, style, and aesthetic theory.

DANCE 480 Senior Seminar (3) VLPA Culminating project emphasizing a synthesis of experiences in the Dance Program with a focus on individual interests.

DANCE 490 Special Studies in Dance (1-3, max. 10) VLPA Special studies designed to address contemporary and historical concerns in the field of dance.

DANCE 493 Anatomy for Dance (3-5) NW/VLPA *Simpson* Anatomy of the musculoskeletal system and its applications in dance movement.

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

Courses for Graduates Only

DANCE 510 Chamber Dance Production (3, max. 9) Dance production in the university environment. Publicity, programming, budgeting. Rehearsal, rehearsal direction, and performance of Chamber Dance Company repertoire. Credit/no credit only.

DANCE 515 Dance Research Methods (3) Seminar in problem identification and definition, theory development, research design, data analysis, and interpretation. Examples of various types of dance research.

DANCE 520 Dance in Higher Education (3) Readings, discussion, and observation of teaching methods. Students assist faculty in the instruction of lower-level classes. Selected anatomical, historical, and aesthetic concepts as they relate to dance pedagogy. Development of a personal teaching style appropriate for university-level dance courses.

DANCE 521 Dance Administration (3) Readings and discussion relating to dance administration in college and professional settings. Topics include: curricular development, academic advising, budgetary procedures, personnel issues, and problems related to dance as a performing art within the university structure.

DANCE 530 Choreographer/Composer Collaboration (2, max. 6) Collaboration between choreographers and composers: models and creative workshop projects, in preparation for a concert of collaborative work in DANCE 531. Offered: Sp.

DANCE 531 Choreographer/Composer Collaborative Performance (3, max. 9) Collaboration between choreographers and composers culminating in public performance. Offered: A.

DANCE 544 Early Dance History (3-5) Study of the evolution of dance from ritual to a theatre art form.

DANCE 545 Late Dance History (3-5) Roots of contemporary dance as an art form and its relationship to developments in ballet since the turn of the century.

DANCE 590 Dance Teaching Methodologies (3-5) Wiley Introduction to dance pedagogy with an emphasis on motor learning skills and biomechanics. Practical teaching experience.

DANCE 595 Master's Project (3) Project in area of interest developed in consultation with faculty advisor and supported by elective courses. Full faculty approval of proposed project by end of first year. Formal presentation, appropriate to project's content, presented to full faculty during second year. Project culminates in the teaching of an undergraduate dance course.

DANCE 600 Independent Study or Research (*, max. 10)

Digital Arts and Experimental Media

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

DXARTS 498 Special Topics in Digital Arts and Experimental Media (3-5, max. 15) Taught by UW faculty and visiting artists, engineers, scientists, and humanities scholars.

DXARTS 499 Undergraduate Research (1-5, max. 12)

Courses for Graduates Only

DXARTS 598 Advanced Topics in Digital Arts and Experimental Media (3-5, max 21) Covers recent advances and current trends in digital arts and experimental media research. Various topics may include in-depth examination of new art work and research by faculty, students, and visiting professions.

DXARTS 600 Independent Study or Research (1-9, max. 27)

Drama

101 Hutchinson



General Catalog Web page:
www.washington.edu/students/genocat/academic/drama.html



Department Web page:
artsci.washington.edu/drama

The School of Drama offers instruction in acting, directing, design, theatre history, and dramatic theory. The School uses various theatres including the Penthouse (the first theatre-in-the-round built in the United States), the thrust-stage Playhouse, the end-stage Studio Theatre, and the proscenium opera house in Meany Hall. Faculty- and student-directed plays drawn from the full range of world dramatic literature are produced throughout the year. The School also produces operas in association with the School of Music and utilizes two performance spaces in Hutchinson Hall for student work. All of these provide a rich opportunity for student participation in all aspects of dramatic art.

Graduate Program

Graduate Program Coordinator
 101 Hutchinson, Box 353950
 206-543-5140
uwdrama@u.washington.edu

The School of Drama offers programs of graduate study leading to the Master of Fine Arts and Doctor of Philosophy degrees. Areas of study for the M.F.A. degree are acting, stage direction, scene design, lighting design, and costume design. Most students should expect to spend three years to complete requirements for the M.F.A. degree.

The Ph.D. program provides students with training for scholarly research in theatre history, dramatic literature, theory, and criticism. Students are also encouraged to do interdisciplinary work with such allied programs as the Ph.D. program in critical theory.

Admission Requirements

Students may enter only in autumn quarter. Since admission requirements vary for each of the graduate programs, applicants should contact the School for current application information and deadlines.

Faculty

Chair

Sarah N. Gates

Professors

Blau, Herbert * 2000, (Adjunct); PhD, 1954, Stanford University; drama and performance, literary and cultural theory.

Clay, Jack D. * 1986, (Emeritus); MA, 1956, Northwestern University; acting.

Comtois, Mary Elizabeth * 1985, (Emeritus); PhD, 1970, University of Colorado (Boulder); playwriting.

Crider, James R. * 1983, (Emeritus); MA, 1950, University of Washington; costume design.

Dahlstrom, Robert A. * 1971; MA, 1967, University of Illinois; design.

Gates, Sarah N. * 1983; MA, 1974, University of California (Santa Barbara), MFA, 1983, Boston University; costume design.

Haaga, Agnes M. 1978, (Emeritus); MA, 1952, Northwestern University; child drama.

Hostetler, Paul S. * 1974, (Emeritus); PhD, 1965, Louisiana State University; theatre history, directing.

Jory, Jon V. 2000; acting, directing.

Pearson, J. Steven * 1989; MFA, 1978, Carnegie Mellon University; professional actor training and modern Japanese theatrical techniques.

Siks, Geraldine B. 1977, (Emeritus); MA, 1940, Northwestern University; child drama.

Sydow, John D. 1970, (Emeritus); MFA, 1950, Yale University; directing.

Witham, Barry B. * 1979; PhD, 1968, Ohio State University; theatre history.

Associate Professors

Bryant-Bertail, Sarah * 1990; PhD, 1986, University of Minnesota; Western and Asian drama, theater history, performance practices, film, critical theory.

Forrester, William D. * 1972; MFA, 1969, Yale University; scene design.

Hunt, Robyn * 1988; MFA, 1978, University of California (San Diego); actor training, cross cultural performances, techniques, and script writing.

Jenkins, Mark F. * 1989; the Stanislavski approach to acting; acting, directing.

Valentinetti, Aurora, 1943, (Emeritus); MA, 1949, University of Washington; puppetry.

Assistant Professors

Curtis-Newton, Valerie * 1998; MA, 1996, University of Washington; theatrical production, theatre technique, theatre history.

Johnson, David Odai * 1998; PhD, 1994, University of Texas (Austin); theatre history with an area of emphasis in English Restoration and 18th century.

Madden, Catherine M. 1987; MA, 1977, Washington University; Alexander technique, acting.

Parker, Shanga Kyle Gerard * 1994; MFA, 1991, University of California (San Diego); acting in Shakespearean verse.

Redd, Tina * 1999; PhD, 1996, University of Washington; dramatic theory and criticism, emphasis on representations of race and gender.

Wolcott, John R. * 1967, (Emeritus); PhD, 1967, Ohio State University; theatre history, computing in theatre research.

Senior Lecturers

Harrison, Mark Jeffrey * 1997; PhD, 1989, New York University; director of theatre and opera, head of the Professional Director Training Program.

Shahn, Judith * 1990; BFA, 1977, Carnegie Mellon University; voice production for the theatre, dialects, Shakespeare and modern text.

Lecturers

Collum, Jerry L. 2001; BFA, 1984, Auburn University; technical direction.

Trout, Deborah L. * 1994; MFA, 1994, Yale University; design for the theatre; costume and set design.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

DRAMA 401 Senior Seminar (1, max. 2) VLPA *Gates* A professional seminar featuring guest artists and career development specialists. Credit/no credit only. Offered: A.

DRAMA 405 Computer Graphics Systems (3) VLPA Introduction to CAD applications in theatre design and technology. Focus on learning to use general purpose graphics software for CAD. Discussion of available hardware and software. Recommended: DRAMA 420.

DRAMA 410 Advanced Theatre Technical Practices (2-4, max. 20) VLPA Production-related apprenticeship, in the areas of scene construction, scene painting, costume, or lighting. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 418. Offered: AWSp.

DRAMA 413 Advanced Scene Construction (3) VLPA Special problems in scene construction materials and rigging. Recommended: DRAMA 210; DRAMA 212; DRAMA 290; DRAMA 292; DRAMA 410; DRAMA 420.

DRAMA 414 Scene Design (3, max. 6) VLPA *Dahlstrom, Forrester* Theory, practice, and rendering of scene designs. Repeat of course involves intermediate designs and models. Recommended: ART H 203; DRAMA 210.

DRAMA 415 Stage Costume Design (3, max. 6) VLPA *Trout* Theory, practice, and rendering of costume designs for the theatre. Repeat of course involves intermediate designs. Recommended: ART H 203; DRAMA 211; DRAMA 416 if repeating.

DRAMA 416 History of Western Dress (5) VLPA *Gates* Survey history of Western dress. Emphasis on use of this information by theatrical costume designers. Includes development of costume for drama, ballet, and opera. Prerequisite: DRAMA 302.

DRAMA 417 Stage Costume Patterning and Construction (3, max. 6) VLPA Techniques of costume construction, including study of fabrics; emphasis on creating patterns by draping. Recommended: DRAMA 211; DRAMA 416.

DRAMA 418 Scene Painting (3, max. 6) VLPA *Forrester* Lecture-laboratory with focus on techniques and principles of scene painting. Uses of various media and types of equipment as applicable to varied scenic pieces. Recommended: DRAMA 210.

DRAMA 419 Advanced Stage Lighting Design (3, max. 9) VLPA Development of a working process consistent with current professional practice. Includes drafting, worksheets, study of color. Students read plays and develop analytical skills. Recommended: DRAMA 212.

DRAMA 420 Design and Technical Drafting (2, max. 4) VLPA *Forrester* Laboratory and project critique covering stage design graphics and technical drawing; specifically: designer's elevations, ground plans, sections, detail drawing, transposition of design drawing information to technical drawings. Recommended: DRAMA 210.

DRAMA 421 Drawing and Rendering Techniques for the Theatre (2, max. 10) VLPA *Forrester* Weekly figure-drawing laboratories with live model and weekly field trips for laboratories in drawing natural

phenomena and architectural detail. Studies in historical drawing styles. Practice in use of several media and techniques of expression. Recommended: DRAMA 210; DRAMA 211.

DRAMA 441 Beginning Playwriting (1-6, max. 12) VLPA Writing exercises and drafts of a one-act play provide first experience in writing for performance. Readings of representative one-act plays introduce genres and writing styles. Recommended: DRAMA 253 or DRAMA 353; DRAMA 210; DRAMA 211; DRAMA 212.

DRAMA 450 Rehearsal Laboratory (2, max. 6) VLPA Acting in projects directed by graduate directing students. Recommended: DRAMA 253.

DRAMA 451 Advanced Acting—Production Workshop (4) VLPA Improvisation skills. Methodology employed develops one five-minute solo work, using either original or adaptations of non-dramatic texts. Culminates in two public showings of the five-minute one-person works. Offered: A.

DRAMA 452 Advanced Acting—Scene Study (4) VLPA Invites actor to create a role. Script reading for action and consequence. Use and employment of five senses to express a character's life, presenting a coherent and alive person to the stage. Culminates in public performance. Offered: W.

DRAMA 453 Advanced Acting—Physical Training (4) VLPA Introduction to physical training methods of Tadashi Suzuki, Kenji Suzuki, and the relationship of their methodologies to Constantin Stanislavsky. Contemporary monologues analyzed for psychological motivation, while exploring the physical analog of "action" as expressed and accessed by the new physical training. Offered: Sp.

DRAMA 454 Projects in Acting (3, max. 9) VLPA Rehearsal and classroom performance of dramatic literature of various periods and styles.

DRAMA 455 Alexander Technique (3) VLPA Madden A practical and theoretical introduction to the Alexander Technique, a psychophysical re-education process developed by F. M. Alexander (1869-1955). Studio application of this work improves physical/vocal coordination, enhances creativity, and clarifies thinking.

DRAMA 460 Introduction to Directing (3) VLPA Curtis-Newton, Harrison Student is introduced to the art of the stage director. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 253 or DRAMA 353; DRAMA 302. Offered: A.

DRAMA 461 Elementary Directing (3) VLPA Curtis-Newton, Harrison Elementary study of the art of the stage director. Recommended: DRAMA 460.

DRAMA 462 Elementary Directing (3) VLPA Harrison Elementary study of the art of the stage director. Recommended: DRAMA 461.

DRAMA 466 Stage Management (2-5, max. 15) VLPA Stewart Study and practice of stage management. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 290; DRAMA 291; DRAMA 292.

DRAMA 471 History of the English Restoration and 18th Century Theatre (5) VLPA Johnson Examination of the relationship of the physical theatre and the productions that took place within that theatre. Particular emphasis on the text performed, styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. Prerequisite: DRAMA 302.

DRAMA 472 European and American Theatre, Revolution to Modernism (1780-1920) (5) VLPA Johnson Survey of the drama, theatre, and theatre culture from the French Revolution into the begin-

nings of Modernism; social and political aspects of theatre, rise of Romanticism, melodrama, and variety entertainment through the 19th century to the artistic revolution that paved the way for modern theatre. Prerequisite: DRAMA 302.

DRAMA 473 Modern European Theatre and Drama (5) VLPA Witham Major movements and figures in contemporary European theatre from French absurdism to the present. Prerequisite: DRAMA 302.

DRAMA 475 Modern English Theatre and Drama (5) VLPA Witham Major trends in contemporary English theatre, post-World War II to the present. Performers, dramatists, and designers who shaped the course of the theatre following the "angry young rebellion" of the 1950s. Prerequisite: DRAMA 302.

DRAMA 476 Modern American Theatre and Drama (5) VLPA Witham Major forces shaping modern American theatre, Eugene O'Neill to the present. Leading dramatists, directors, and designers of the post-World War II era. Experiments such as the Federal Theatre Project, Group Theatre, and Living Theatre. Prerequisite: DRAMA 302.

DRAMA 490 Special Studies in Acting-Directing (1-6, max. 12) VLPA

DRAMA 491 Special Studies in Design-Technical (1-6, max. 6) VLPA

DRAMA 494 Special Studies in Theatre and Drama (5, max. 20) VLPA Bryant-Bertail, Johnson, Redd, Witham Topics in drama, history, and criticism. See Time Schedule for specific topic. Prerequisite: DRAMA 302.

DRAMA 495 Practicum in Design and Technical Theatre (2-6, max. 15) VLPA Emphasis on

developing design and technology problem-solving skills through laboratory and project evaluation. Recommended: DRAMA 211, DRAMA 212, DRAMA 313.

DRAMA 496 Stage Costume Problems (2, max. 8) VLPA Specific research problems of stage costume design and execution: accessories, masks, wigs, fabric modification, millinery or construction analysis for specialized costumes. Topics vary. Recommended: DRAMA 211; DRAMA 416.

DRAMA 498 Theatre Production (1-2, max. 9) VLPA Laboratory course for students participating in School of Drama major productions. Credit/no credit only. Offered: AWSp.

DRAMA 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

DRAMA 502 Designer-Director Analysis (4) Dahlstrom Methods of examining plays to make the collaboration of director and designer productive. Attempts to create a structural whole from visual and verbal approaches to analysis. Prerequisite: graduate standing in drama.

DRAMA 510 Design Studio (3, max. 18) Dahlstrom, Forrester, Trout Investigation of space, form, light, texture, and color in total theatre design, stressing mastery of the media, methods of presentation and execution, and intelligent and appropriate visual reaction to a dramatic text. Prerequisite: graduate standing in drama.

DRAMA 512 Lighting Design Seminar (1/4, max. 18) Forum for graduate lighting students to further explore the art of lighting design. Assignments include paper projects, School of Drama production, and field trips to local theatres. Prerequisite: graduate standing.

DRAMA 514 Design and Technical Theatre Colloquium (2, max. 18) Discussion of work in progress or completed in production, centering on the conceptual work of the designer/director on the production and the methods of execution in the shops and on stage. Offered: AWSp.

DRAMA 518 Studies in Historic Design (3) Dahlstrom Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods.

DRAMA 519 Studies in Historic Design (3) Dahlstrom Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods. Prerequisite: DRAMA 518, or permission of instructor.

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

DRAMA 551 Teaching of Acting (1-3, max. 3) Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

DRAMA 552 Teaching of Acting (1-3, max. 3) Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

DRAMA 553 Teaching of Acting (1-3, max. 3) Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

DRAMA 555 Studies in Acting (2-6, max. 18) Individual or group work on special skills for the actor. Topics vary. Prerequisite: admission to the Professional Actor Training Program. Offered: AWSp.

DRAMA 557 Studio I (12, max. 36) Hunt, Jenkins, Jory, Madden, Pearson, Shahn Skill development in acting, voice, speech, and movement necessary for professional training in acting. Prerequisite: admission to the Professional Actor Training Program. Offered: AWSp.

DRAMA 558 Studio II (12, max. 36) Hunt, Jenkins, Jory, Madden, Pearson, Shahn Continuation of 557. Prerequisite: DRAMA 557 and completion of the first year of the Professional Actor Training program. Offered: AWSp.

DRAMA 559 Studio III (6, max. 18) Hunt, Jenkins, Jory, Madden, Pearson, Shahn Specialized and individualized work relating to the main curriculum of the third year of the Professional Actor Training Program. Prerequisite: DRAMA 558 and completion of the second year of the Professional Actor Training Program. Offered: AWSp.

DRAMA 560 Managing the Rehearsal and Production Process (2) Harrison Introduction to graduate-level directing. Play analysis, research, performance theory, and concept development as it relates to process-acting and rehearsal, design, staging techniques, and production management. Reading and writing assignments augmented by faculty and professional guests in performance, design, production, and dramaturgy.

DRAMA 561 Directing Projects (2-3, max. 12) Harrison Rehearsal techniques and staging skills in a variety of spatial configurations. One-act and full-length plays which follow a prescribed sequence. Prerequisite: graduate standing in the directing program.

DRAMA 562 Performance Studio (1-3, max. 12) Performance techniques in specialized areas of importance to the professional director, including stage combat, speech and dialect, mask, physical comedy, improvisation, and puppetry.

DRAMA 563 Seminar in Directing (2, max. 18) *Harrison* Seminar discussion of current productions; focused readings and discussion in specific areas of dramatic literature and problems related to stage direction. Prerequisite: graduate standing in drama and permission of instructor.

DRAMA 564 Theatre Studies: History, Theory, Criticism (3, max. 15) Special topics in history, theory, and criticism.

DRAMA 565 Verse Workshop (4) Techniques necessary to direct and perform plays of Shakespeare, Moliere, and other verse playwrights: scansion and imagery; period and style using verse text; crowd scenes, transformations of time and space, and other staging exercises; direction of scenes or acts from verse plays.

DRAMA 566 Directing for the Camera (3) Storyboarding, setting up camera shots, improvisation, and rehearsal techniques for directing actors on camera (both in studio and on location). Students direct one- and two-camera scenes; and write, direct, and edit a short screenplay.

DRAMA 567 Acting Process (1-3, max. 12) Development of acting skills necessary for the professional director. Emphasis on physical training, playing action, strong internal technique, imagination and clarity of expression.

DRAMA 568 Writing for the Stage (3, max. 6) Focus on adaptation for the stage of non-dramatic sources, such as literature, poetry, history, and contemporary events. Emphasis on structure, dialogue, dramatic action, rhythm, characterization. Writing exercises using fictive and non-fictive sources, biographical sources, and found objects. For MFA Directing students only.

DRAMA 569 Directing/Teaching Apprenticeship (3) Assisting faculty or professional guest director in production for the entire rehearsal period, or assisting faculty in performance training.

DRAMA 571 Problems in Theatre History Research (5) *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

DRAMA 572 Problems in Theatre History Research (5) *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

DRAMA 573 Problems in Theatre History Research (5) *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

DRAMA 575 Seminar in Theatre History (5) *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

DRAMA 576 Seminar in Theatre History (5) *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

DRAMA 577 Seminar in Theatre History (5) *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

DRAMA 581 Analysis of Dramatic Texts (5) *Bryant-Bertail, Redd* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

DRAMA 582 Analysis of Dramatic Texts (5) *Bryant-Bertail, Redd* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

DRAMA 583 Analysis of Dramatic Texts (5) *Bryant-Bertail, Redd* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

DRAMA 585 Seminar in Dramatic Theory (5) *Bryant-Bertail, Redd* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

DRAMA 586 Seminar in Dramatic Theory (5) *Bryant-Bertail, Redd* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

DRAMA 587 Seminar in Dramatic Theory (5) *Bryant-Bertail, Redd* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

DRAMA 599 Advanced Studies in Theatre Arts (1-5, max. 10) Independent projects or group study of specialized aspects of theatre arts. Prerequisite: permission of instructor.

DRAMA 600 Independent Study or Research (*)

DRAMA 700 Master's Thesis (*)

DRAMA 800 Doctoral Dissertation (*)

Earth and Space Sciences

63 Johnson



General Catalog Web Page:
www.washington.edu/students/gencat/academic/ess.html



Department Web page:
www.ess.washington.edu

The Department of Earth and Space Sciences seeks to further the understanding of the Earth, the solar system, and their histories. The department's scope extends from the center of Earth to the rim of the solar system, and its activities cut across traditional disciplines of physics, chemistry, biology, geology, and mathematics. The department's faculty, students, and staff examine Earth's interior structure, chemistry, motion, and dynamics; geologic hazards; processes affecting the surface environment and climate; the surrounding space environment; planetary processes; and geobiology.

Graduate Program

Graduate Program Coordinator
63 Johnson, Box 351310
206-543-1190
advising@ess.washington.edu

The Department of Earth and Space Sciences offers graduate programs leading to the Master of Science (M.S.) degree and the Doctor of Philosophy (Ph.D.) degree in Geological Sciences and in Geophysics. Both programs emphasize a rigorous quantitative approach in conjunction with detailed in-situ and/or laboratory observations to address significant prob-

lems that will lead to a better understanding of the Earth and its environment.

Major areas of interest are the internal and surface structures and materials of the Earth and planets, dynamic processes within the earth, oceans, atmosphere, and space environments, their history and the interaction of life with these environments. The required curriculum is flexible to facilitate interdisciplinary research approaches. The department is also one of the core departments (with the Departments of Atmospheric Sciences and Oceanography) in the interdisciplinary graduate Program on Climate Change and a participant in the Astrobiology program.

Research Facilities

Extensive laboratory facilities are available for a wide range of experimental/field work. These include a wet chemistry laboratory, a JEOL 733 Superprobe with EDS/WDS and a high resolution laser Raman spectrometer for mineral analysis, a thermal-ionization mass spectrometer and clean laboratory for separation of radiogenic and trace elements (Rb/Sr, Sm/Nd, U/Pb), a computer laboratory, a remote-sensing laboratory with an image-processing system with LANDSAT tape library and spectral reflectance equipment, and high temperature controlled atmosphere furnaces. There is also field equipment for electromagnetic induction studies; a high-pressure/temperature laboratory, including a laser-induced phonon spectrometer and diamond anvil cells for studying such rock and mineral properties as compression, sound velocities, and thermal conductivity; a permanent, regional seismic network; a portable telemetered seismic network for studying volcanoes and active faults in western North America; geodetic-quality global-positioning-system receivers; a cold laboratory for studying problems in snow-cover geophysics, glaciology, and sea-ice research; a geophysical-fluids laboratory; two cloud microphysics laboratories; a space physics and aeronomy laboratory for preparing ground-based, balloon, rocket, and satellite experiments; and a laboratory for the study of advanced plasma propulsion concepts. Additional facilities are provided by the Quaternary Research Center (which houses state-of-the-art cosmogenic isotope and stable-isotope research laboratories, palynology, snow and ice research, and a periglacial laboratory) and the Burke Memorial Washington State Museum (which houses paleontological laboratories and extensive reference collections of invertebrate, vertebrate, and plant fossils, and minerals).

Master of Science

Graduation Requirements: With Thesis — 36 credits, of which 18 must be in courses at the 400 level or above and up to 9 may be for thesis (ESS 700). Final examination consists of oral presentation and defense of thesis. *Without Thesis* — 45 credits, of which 18 must be in courses at the 400 level or above, which includes a 5-credit research paper (ESS 600). Final examination is oral and is administered by a supervisory committee.

Doctor of Philosophy

Graduation Requirements: Completion of two years of graduate study, passage of the Ph.D. candidacy requirement (which includes the defense of a proposal), General Examination, completion of acceptable dissertation and passage of Final Examination; one-half total program, including dissertation, must be in courses at the 500 level or above; a minimum of 27 credits for thesis (ESS 800); at least 18 credits completed with numerical grade in courses at the 400 and 500 levels.

Financial Aid

Most graduate students receive support in the form of teaching or research assistantships, and endowed fellowships and scholarships.

Faculty

Chair

J. Michael Brown

Professors

Adams, John B. * 1975, (Emeritus); MS, 1958, PhD, 1961, University of Washington; remote sensing, planetary geology.

Atwater, Brian F. * 1986, (Affiliate); MS, 1974, Stanford University, PhD, 1980, University of Delaware; Quaternary geology, earthquake hazards.

Baker, Marcia B. * 1980; MS, 1960, Stanford University, PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Bergantz, George W. * 1988; PhD, 1988, Johns Hopkins University; volcanology, surface processes, physical petrology.

Booker, John R. * 1971; PhD, 1968, University of California (San Diego); magnetotellurics, tectonics, inverse theory.

Bostrom, Robert C. * 1964, (Emeritus); MA, 1952, PhD, 1961, Oxford University (UK); geotectonics, geophysics.

Brown, J. Michael * 1984; MS, 1978, University of Washington, PhD, 1980, University of Minnesota; experimental and theoretical mineral and rock physics.

Businger, Joost A. * 1983, (Emeritus); PhD, 1954, University of Utrecht (Netherlands); energy transfer.

Charlson, Robert J. * 1962, (Emeritus); MS, 1959, Stanford University, PhD, 1964, University of Washington; atmospheric chemistry.

Clark, Kenneth C. * 1948, (Emeritus); PhD, 1947, Harvard University; optical spectroscopy, upper atmosphere.

Cowan, Darrel S. * 1974; PhD, 1972, Stanford University; structural geology, regional tectonics.

Creager, Joe S. * 1958, (Emeritus); PhD, 1958, Texas A&M University; geological oceanography, sedimentology.

Creager, Kenneth C. * 1986; PhD, 1984, University of California (San Diego); seismology, geophysical inverse theory.

Criminale, William O. * 1968; PhD, 1960, Johns Hopkins University; fluid dynamics, nonlinear mechanics, stability theory.

Crosson, Robert S. * 1966; MS, 1963, University of Utah, PhD, 1966, Stanford University; seismology, earth structure, tectonics, earthquake hazards.

Delaney, John R. * 1977, (Adjunct); PhD, 1977, University of Arizona; geological oceanography, origin of oceanic crust, igneous petrology.

Dunne, Thomas * 1973, (Affiliate); PhD, 1969, Johns Hopkins University; geomorphology, hydrology.

Evans, Bernard W. * 1969, (Emeritus); PhD, 1959, Oxford University (UK); mineralogy, metamorphic petrology.

Ghiorsio, Mark S. * 1980; MA, 1978, PhD, 1980, University of California (Berkeley); geochemistry.

Ghose, Subrata * 1972; MS, 1955, Calcutta University (India), PhD, 1959, University of Chicago; mineral physics, crystallography, mineralogy.

Gillespie, Alan R. * 1985; MS, 1977, PhD, 1982, California Institute of Technology; Quaternary geology, glacial geomorphology, remote sensing.

Hallet, Bernard * 1980; PhD, 1975, University of California (Los Angeles); glacial and periglacial geomorphology (alpine and Arctic).

Hernandez, Gonzalo * 1988; PhD, 1962, University of Rochester; aeronomy, optics.

Holzworth, Robert * 1982; MA, 1974, PhD, 1977, University of California (Berkeley); experimental space plasma physics, atmospheric/magnetospheric electric fields, thunderstorms.

Johnson, Harlan Paul * 1976, (Adjunct); PhD, 1972, University of Washington; paleomagnetism and marine geophysics.

LaChapelle, Edward R. * 1982, (Emeritus); ScD, 1967, University of Puget Sound; snow-ice physics.

Leovy, Conway B. * 1967, (Emeritus); PhD, 1964, Massachusetts Institute of Technology; climatic role of clouds, planetary atmospheres, astrobiology, atmospheric circulation and dynamics.

Mallory, V. Standish * 1952, (Emeritus); PhD, 1952, University of California (Berkeley); invertebrate paleontology.

Malone, Stephen * 1972; PhD, 1972, University of Nevada; seismicity of Cascade volcanoes and eastern Washington, computers in seismic network analysis.

Maykut, Gary * 1969, (Research); PhD, 1969, University of Washington; polar air-sea-ice interaction, radiative transfer in ice and snow.

McCallum, I. Stewart * 1970; PhD, 1968, University of Chicago; lunar science, physics of meteorites, petrology.

Merrill, Ronald T. * 1967; MS, 1961, University of Michigan, PhD, 1967, University of California (Berkeley); geomagnetism, paleomagnetism.

Montgomery, David R. * 1991; PhD, 1991, University of California (Berkeley); geomorphology (fluvial and hillslope).

Nelson, Bruce K. * 1986; MS, 1979, University of Kansas, PhD, 1985, University of California (Los Angeles); isotope geochemistry, volcanism, mantle chemistry and evolution.

Newhall, Christopher * 1994, (Affiliate); MS, 1977, University of California (Davis), PhD, 1980, Dartmouth College; volcanic processes, eruption forecasting.

Nittrouer, Charles * 1998; PhD, 1978, University of Washington; geological oceanography, continental-margin sedimentation.

Parks, George K. * 1971, (Emeritus); PhD, 1966, University of California (Berkeley); magnetospheric and space plasma physics.

Porter, Stephen C. * 1962; MS, 1958, PhD, 1962, Yale University; Quaternary stratigraphy, geochronology, paleoclimatology.

Raymond, Charles F. * 1969; PhD, 1969, California Institute of Technology; glaciology, ice sheet dynamics.

Rensberger, John M. * 1966; MA, 1961, PhD, 1967, University of California (Berkeley); vertebrate paleontology and evolution.

Sack, Richard O. * 1993, (Affiliate); MA, 1975, PhD, 1979, Harvard University; petrology, thermochemistry of rock-forming minerals, chemical transport.

Smith, Stewart W. * 1970, (Emeritus); PhD, 1961, California Institute of Technology; earthquake processes.

Stuiver, Minze * 1969, (Emeritus); PhD, 1958, University of Groningen (Netherlands); geochronology, isotope geology.

Swanson, Donald A. * 1992, (Affiliate); PhD, 1964, Johns Hopkins University; volcanology, regional geology.

Untersteiner, Norbert * 1957, (Emeritus); PhD, 1950, University of Innsbruck (Austria); air-sea-ice interaction, polar climatology, sea ice physics.

Waddington, Edwin D. * 1984; MS, 1973, University of Alberta (Canada), PhD, 1981, University of British Columbia (Canada); glacier and ice sheet dynamics, paleoclimatology.

Ward, Peter D. * 1984; PhD, 1976, McMaster University (Canada); paleontology, paleobiology, regional coastal stratigraphy.

Warren, Stephen G. * 1981; MA, 1969, PhD, 1973, Harvard University; atmospheric radiation, radiative properties of clouds, snow and sea ice, Antarctic climate.

Winglee, Robert M. * 1991; PhD, 1984, University of Sydney (Australia); space plasma physics, numerical simulation of space plasmas.

Associate Professors

Anderson, Patricia M. * 1982; MA, 1976, PhD, 1982, Brown University; paleoecology, paleoclimatology, Quaternary environments (Arctic).

Booth, Derek B. * 1980, (Adjunct Research); PhD, 1984, University of Washington; environmental geology, particularly human influences on hillslopes, runoff, and rivers.

Bourgeois, Joanne (Jody) * 1980; PhD, 1980, University of Wisconsin; stratigraphy, sedimentology, Quaternary paleoseismology.

Buick, Roger * 2001; PhD, 1986, Western Australia University; Precambrian life, environments, astrobiology.

Cheney, Eric S. * 1964; PhD, 1964, Yale University; economic and regional geology, sequence stratigraphy.

Conway, Howard B. * 1987, (Research); PhD, 1986, University of Canterbury (New Zealand); glacier and ice sheet history, snow avalanches.

Iverson, Richard M. * 1990, (Affiliate); PhD, 1984, Stanford University; volcano hazards, landslides, debris flows, lahars, geomechanics.

McCarthy, Michael P. * 1978; PhD, 1988, University of Washington; solar wind and magnetospheric physics.

Mercer, James A. * 1968; PhD, 1983, University of Washington; ocean acoustic tomography, global climate measurements, and ocean dynamic modeling.

Odom, Robert I., Jr. * 1990; PhD, 1980, University of Washington; theoretical seismology; ocean acoustic tomography; wave propagation and scattering.

Gamar, Anthony * 1983; MA, 1968, PhD, 1971, University of California (Berkeley); regional tectonics, earthquakes associated with volcanoes/glaciers, earthquake hazards.

Sahr, John D. * 1991, (Adjunct); PhD, 1990, Cornell University; radar remote sensing, ionospheric physics; signal processing; wireless communications.

Stewart, Richard J. * 1969; PhD, 1970, Stanford University; sedimentary petrology, fission-track dating.

Unsworth, Martyn J. * 1993, (Affiliate); PhD, 1991, Cambridge University (UK); geomagnetic induction, magnetotellurics, electromagnetic geophysics.

Vance, Joseph A. * 1957, (Emeritus); PhD, 1957, University of Washington; igneous and metamorphic petrology.

Wilcock, William S. D. * 1993, (Adjunct); PhD, 1992, Massachusetts Institute of Technology; marine seismology, dynamics of mid-ocean ridges, geological fluid dynamics.

Winebrenner, Dale P. * 1986, (Adjunct Research); PhD, 1985, University of Washington; optical and radiowave propagation and scattering, remote sensing of planetary surfaces and subsurfaces.

Assistant Professors

Kress, Victor C. * 1990, (Research); PhD, 1990, University of California (Berkeley); igneous petrology, physics/chemistry of volcanoes.

Nesbitt, Elizabeth A. * 1993, (Affiliate); PhD, 1982, University of California (Berkeley); paleoenvironments and stratigraphy of the Pacific Northwest of Tertiary rocks.

Putkonen, Jaakko K. 2001, (Research); MS, 1990, Helsinki University (Finland), PhD, 1997, University of Washington; Quaternary geology, frozen ground research, cosmogenic isotope dating.

Sletten, Ronald S. * 1997, (Research); MS, 1987, PhD, 1995, University of Washington; soils, environmental chemistry.

Steig, Eric J. * 1998; MS, 1992, PhD, 1996, University of Washington; stable and cosmogenic isotope geochemistry, glaciology.

Stone, John O. H. * 1998; PhD, 1986, Cambridge University (UK); cosmogenic isotope geochemistry.

Swanson, Brian * 1997, (Research); MS, 1985, PhD, 1992, University of Washington; atmospheric geophysics, cloud physics, physics of ice.

Weeks, Robin J. * 1992, (Research); PhD, 1988, University of California (Santa Barbara); remote sensing, model inversions.

Willett, Sean D. * 1998; PhD, 1988, University of Utah; geodynamics, earthquake hazards, modelling.

Senior Lecturers

Chernicoff, Stanley E. 1983; PhD, 1980, University of Minnesota; quaternary geology, geomorphology.

Swanson, Terry W. 1988; MA, 1989, University of California (Davis), PhD, 1994, University of Washington; Quaternary geology, geochronology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ESS 400 Field Geology (12) NW Six weeks of geologic mapping in a variety of rock types in the western United States. Enhances students' knowledge of geologic phenomena and processes. Development of skills in mapping, field interpretation, and report writing. Students responsible for own living expenses while in the field. Prerequisite: either ESS 213 or GEOL 203; two courses selected from ESS 311/GEOL 392, ESS 312/GEOL 391, and ESS 313/GEOL 393. Offered: S.

ESS 401 Regional Geology of the Pacific Northwest (5) NW *Cheney* Explores the geological diversity of the Pacific Northwest temporally (Archean to Pleistocene), tectonically (craton, terranes, and cover sequences), and lithologically (ophiolites to coal). Three weekend field trips required. Offered: A.

ESS 402 International Field Geology (12) NW Supervised geological field work in classic, instructive international sites. Venue varies from year to year. Work may include geologic mapping, construction of cross sections, measurement and analysis of stratigraphic sections, field excursion, and supervised individual research projects. Prerequisite: either ESS 400 or GEOL 401. Offered: S.

ESS 403 Global Geophysics and Plate Tectonics (5) NW *Willett* Introduction to geophysical features of the earth including gravity, magnetic, and temperature fields. Use of geophysical methods including seismology, heat flow, and paleomagnetism to study geophysical and geological processes in the context of plate tectonic theory. Prerequisite: PHYS 121. Offered: A.

ESS 404 Great Geological Issues (3) NW *Bourgeois* History and development of geological and paleontological theories and controversies; philosophy and methodology that have driven scientific inquiry in the earth sciences. Recommended: HIST 311; HIST 312. Offered: alternate years.

ESS 406 Earth Sciences for Middle and High School Science Teachers: Solid Earth (3) NW *Nesbitt* Topics of contemporary interest selected to meet state academic standards. Topics include Pacific Northwest earthquakes and volcanoes, global and regional plate tectonics, history of the Earth, the Earth's interior, planetary geology, and surface processes on the Earth. Prerequisite: ESS 101.

ESS 411 Geophysical Continuum Mechanics (3) NW Analysis of stress and strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's lithosphere. Creep of solids and flow of geological materials. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: A.

ESS 412 Seismology (3) NW Introduction to theoretical and observational seismology. Elastic plane wave propagation through stratified media. Surface waves, eigenvibrations, ray theory. Structure of the Earth's mantle and core. Seismicity distributions, earthquake focal mechanisms and relationship to tectonics. Prerequisite: either ESS 411 or GPHYS 401; recommended: concurrent registration in ESS 466. Offered: W.

ESS 413 Geophysics: The Earth (3) NW The earth and its interior; gravity, magnetism, heat flow, seis-

mology. Earth's outer structure, studied through the unifying concepts of plate tectonic theory. Quantitative approaches to problems, using techniques of classical physics. Prerequisite: either ESS 412 or GPHYS 402; PHYS 322. Offered: Sp.

ESS 414 Geophysics: Fluids (3) NW 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 oceanography and solid earth geophysics. Prerequisite: either MATH 136 or both MATH 307 and MATH 308; PHYS 322. Offered: A.

ESS 415 Space and Plasmas (3) NW Survey of various phenomena occurring in outer regions of Earth's atmosphere, ionosphere, magnetosphere, and Van Allen radiation belts. Laboratory applications include plasma thrusters and fusion. Concepts include charged particles in magnetic fields, drift motion, plasma, magnetohydrodynamic waves. Prerequisite: PHYS 321. Offered: W.

ESS 416 Geophysics: The Atmosphere (3) NW Phenomena of the lower atmosphere: some simple applications of the principles of classical thermodynamics, fluid dynamics, and radiative transfer to the atmospheric hydrological cycle, global energy balance, and atmospheric dynamics and climate. Prerequisite: either ESS 414 or GPHYS 404. Offered: Sp.

ESS 421 Introduction to Geological Remote Sensing (4) NW *Gillespie* Principles of image interpretation for geologists. Study of land forms, structure, lithology, surface processes using aircraft and satellite data. Use of digital multispectral images and radar images for geological mapping. Offered: A.

ESS 422 Intermediate Spectral Remote Sensing (4) NW *Gillespie, Weeks* Explores spectral image processing with ENVI software, used in individualized projects involving satellite or aircraft images. Emphasis on integration of remote sensing and field measurement using process models and Geographic Information Systems (GIS). Recommended: introductory courses in physics, chemistry, calculus, geology, and field geology. Prerequisite: either ESS 421 or GEOL 410. Offered: W.

ESS 424 Water in the Environment (3) NW *Baker, Raymond, Waddington, Warren* Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with ATM S 460/PHYS 460. Offered: A.

ESS 426 Fluvial Geomorphology (5) NW *Montgomery* Hydraulic and morphological characteristics of streams and valley floors. Landscape evolution by stream erosion and deposition. Field exercises emphasize quantitative analysis of fluvial processes, channel forms, acquisition of various skills, such as mapping, topographic surveying, report writing. Prerequisite: either ESS 311, ESS 326, GEOL 392, or GEOL 411.

ESS 427 Hillslope Geomorphology (5) NW *Montgomery* Theoretical, laboratory, and field study of hillslope evolution by mass wasting and water erosion. Prerequisite: either ESS 311, ESS 326, GEOL 392, or GEOL 411. Offered: alternate years; W.

ESS 428 Landscape Evolution (5) NW *Hallett* Advanced examination of landscape evolution. Emphasis on interactions among tectonics, climate, and hillslope, fluvial, and glacial processes. Intended for seniors and graduate students in geomorphology and related disciplines. Prerequisite: either ESS 426,

ESS 427, GEOL 412, GEOL 413, or GEOL 418. Offered: alternate years; W.

ESS 431 Principles of Glaciology (3) NW *Hallet, Porter, Raymond, Waddington, Warren* Snow deposition and metamorphism, avalanches, heat and mass balance at snow and ice surfaces, glacier flow, ice sheets, sea ice, permafrost, methods of paleoclimate reconstruction, Ice Age theories. Prerequisite: PHYS 121; PHYS 122. Offered: A.

ESS 432 Glacial Geology (3) NW *Porter* Interpretation of glacial environments and history through study of sediments and landforms; stratigraphic approaches, chronology, reconstructions, applications. Recommended: either ESS 431 or GEOL 415.

ESS 433 Environmental Change in the Glacial Ages (3) NW *Porter* Physical, biological evidence of climatic change during Quaternary Period; emphasizing stratigraphy, chronology. Impact of alternating glacial/interglacial cycles on earth's terrestrial, marine environments. Theories on causes of climatic variation. Offered: jointly with QUAT 417.

ESS 437 Mineralogy (5) NW *Ghiorso, McCallum* Symmetry of crystals and crystal structures. Rules of crystal chemistry. Microscopic, diffraction, and spectroscopic techniques of mineral characterization. Transformation processes in minerals: order-disorder, phase transition, and exsolution. Crystal chemistry and phase relations. Reactions on mineral surfaces. Physical properties, deformation, and creep. Prerequisite: CHEM 142; PHYS 123; either ESS 212 or GEOL 202; either ESS 312 or GEOL 391. Offered: A.

ESS 438 Optical Mineralogy (2) NW *McCallum* Petrographic microscopy and recognition of common minerals in thin section. Prerequisite: either ESS 212 or GEOL 202. Offered: A.

ESS 439 Petrology of Igneous Rocks (5) NW *McCallum* Systematic study of the major families of volcanic and plutonic igneous rocks with emphasis on tectonic setting, phase relations, geochemistry, and models of their origin and evolution throughout geologic time. Laboratory emphasizes thin-section study of rocks using transmitted and reflected light. Prerequisite: either ESS 312 or GEOL 391; either ESS 438 or GEOL 423. Offered: W.

ESS 440 Petrography and Petrology of Metamorphic Rocks (5) NW *Evans* Mineralogy, textures, and origins of metamorphic rocks; metamorphic facies and metamorphic phase equilibria; controls of metamorphism. Prerequisite: either ESS 312 or GEOL 391; either ESS 438 or GEOL 423. Offered: Sp.

ESS 441 Petrology and Petrography of Sedimentary Rocks (5) NW *Stewart* Mineralogy, textures, and origin of sedimentary rocks, using petrographic microscope. Prerequisite: either ESS 312 or GEOL 391.

ESS 445 Geology of Ore Deposits (5) NW *Cheney* The geologic principles, environmental aspects, and exploration strategies of selected types of metallic and nonmetallic ore deposits and coal. Prerequisite: either ESS 312 or GEOL 391.

ESS 450 Principles of Paleobiology (4) NW *Ward* Fossil record and methods of analysis. Biologic systems in geologic time, including preservation, variation, population structure, adaptation, functional morphology, biostratigraphy, paleoecology, evolution, and biogeography.

ESS 451 Invertebrate Paleontology (5) NW *Ward* Important larger invertebrate groups; morphology, classification, stratigraphic distribution, evolution, paleoecology.

ESS 452 Fossil Vertebrates (5) NW *Rensberger* Highlights in evolutionary history of the fossil vertebrates, from early Paleozoic fishes through late Cenozoic mammals. Morphology, adaptations, relationships of the major groups. Bone structures and systematic relationships. Field trip. Prerequisite: either BIOL 101, ESS 100, or GEOL 100.

ESS 453 Fossil Mammals (5) NW *Rensberger* Evolutionary relationships of fossil mammals, from mammal-like reptiles of late Paleozoic to diverse Cenozoic groups. Morphology, adaptations, extinctions, evolutionary patterns. Structures and relationships of most major groups. Field trip. Prerequisite: either BIOL 101, ESS 100, ESS 452, GEOL 100, or GEOL 437.

ESS 455 Stratigraphy (4) NW *Bourgeois* Systematic study of stratified rocks and space-time implications. Principles of stratigraphy, including biostratigraphy, magnetostratigraphy, seismic stratigraphy, subsurface analysis. Basin analysis, evolution of sedimentary basins and continental margins. Prerequisite: either ESS 213 or GEOL 203. Offered: A.

ESS 456 Depositional Environments (4) NW *Bourgeois* Principles of sedimentary facies analysis, including survey of modern processes that produce sedimentary sequences. Recognition of various depositional environments represented in the geologic record, including terrestrial, marine terrigenous, and carbonate environments. Two field trips required. Prerequisite: either ESS 213 or GEOL 203. Offered: Sp.

ESS 458 Isotope and Trace Element Geology: Lithosphere (3) NW *Nelson* Radiogenic isotopes and trace element as petrogenetic indicators; evolution of earth's major geochemical reservoirs; application to problems in igneous, metamorphic, sedimentary petrology; stable isotope geothermometry; nucleosynthesis, origin, and chronology of solar system formation; U-Th disequilibrium series. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155; either ESS 312 or GEOL 391.

ESS 459 Isotope Geology (3) NW *Steig* The geochemistry of stable isotopes. Topics covered include the chemical properties of isotopes, a survey of isotopic variations in nature, application of isotopes as natural tracers in surficial processes, and the use of isotopic proxy indicators for interpreting paleoclimate. Prerequisite: either ESS 312 or GEOL 391.

ESS 461 Geological Time (3) NW *Stone* Principles of radiometric dating. Methods applicable to Earth history from planetary formation to the recent past. Radiocarbon dating; geological dating with long-lived isotopes; uranium series, trapped charge and cosmogenic isotope techniques. Applications in archaeology, climate change, geomorphology, tectonics, and Earth evolution. Offered: odd years; W.

ESS 462 Volcanic Processes (3) NW *Bergantz, Nelson, Newhall, Qamar* Pre-eruption, eruption, and post-eruption processes. Examines triggers of magma ascent, controls on volatile build-up and loss, magma fragmentation, magma-groundwater interaction, eruption column dynamics, gravity-controlled eruptive phenomena, syn- and post-eruption lahars and other re-working of deposits. Prerequisite: either ESS 311, ESS 312, GEOL 391, or GEOL 392. Offered: Sp.

ESS 463 Structure and Tectonics (5) NW *Cowan* Geometry, kinematics, and tectonic setting of major types of structures, including those in contractional fold-and-thrust belts; extended crust; strike-slip-dominated regimes; and shear zones. Laboratory exercises develop basic tools of structural geology. Prerequisite: either ESS 213 or GEOL 203; either ESS 311 or GEOL 392. Offered: Sp.

ESS 464 Geodynamics (4) NW Principles of continuum mechanics, their application to flow of water, mud, magma; deformation of soil, rock, ice. Emphasis on sound physical understanding of these principles and use of elementary mathematics in their application to earth sciences problems. Prerequisite: either ESS 311 or GEOL 392; either MATH 126, MATH 129, or MATH 136; PHYS 121.

ESS 466 Applied Seismology (2) NW *Qamar* Interpretation methods in seismology. Seismogram interpretation, including body and surface waves. Seismic instrumentation. Earthquake location, magnitude, and fault-plane solutions. Seismic reflection and refraction methods. Measurement and interpretation of strong ground motion near the epicenter of large earthquakes. Recommended: concurrent registration in ESS 412. Offered: W.

ESS 467 Seismic Exploration (5) NW *Brown* Introduction to theory and practice of seismic exploration. Application of refraction and reflection techniques to problems in engineering geology and mineral exploration. Constraints in the interpretation of subsurface structure. Prerequisite: either ESS 311 or GEOL 392; either MATH 126, MATH 129, or MATH 136; PHYS 123.

ESS 471 Introduction to Space Physics (3) NW *Holzworth, Winglee* Introduces several areas of space physics, the physical principles that apply therein, and the methods by which significant observations are made. Covers electromagnetic and plasma processes from the center of the sun to the surface of the earth. Prerequisite: PHYS 123. Offered: A.

ESS 490 Special Topics (2-10, max. 20) NW

ESS 492 Undergraduate Teaching Experience and Outreach (1-2, max. 2) NW Designed to help undergraduate majors acquire effective teaching skills at the college and public school level. Teaching experience gained through assisting graduate student teaching assistant or K-12 public school outreach. Involves classroom teaching experience and improving communications and presentation skills. Offered: AWSpS.

ESS 495 NASA Science and Engineering Research Seminar (1, max. 4) NW *DeCosmo* Review of current space science-related research. Emphasis varies, but topics may include planetary geology, astronomy, global change, aeronautical engineering, and remote sensing. Credit/no credit only. Offered: Sp.

ESS 498 Undergraduate Thesis (5) NW The thesis must be submitted at least one month before graduation.

ESS 499 Undergraduate Research (* max. 15)

Courses for Graduates Only

ESS 504 Great Geological Issues (3) *Bourgeois* History and development of geological and paleontological theories and controversies; philosophy and methodology that have driven scientific inquiry in the earth sciences. Requires a term paper analyzing primary material. Prerequisite: either ESS 404 or GEOL 409, and graduate standing in earth sciences, or in history of science, or permission of instructor.

ESS 511 Geophysical Continuum Mechanics (3) Analysis of stress and strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's lithosphere. Creep of solids and flow of geological materials. Includes advanced, research-oriented problems. Prerequisite: MATH 307 and MATH 308 or equivalent. Offered: A.

ESS 512 Seismology (3) Theoretical and observational seismology. Elastic plane wave propagation through stratified media. Surface waves, eigenvibra-

tions, ray theory. Structure of Earth's mantle and core. Seismicity distributions, earthquake focal mechanisms and relationship to tectonics. Advanced, research-oriented problems. Prerequisite: either ESS 511 or GPHYS 501; recommended: concurrent registration in ESS 466. Offered: W.

ESS 513 Geophysics: The Earth (3) Study of gravity, magnetism, heat flow, seismology. Earth's outer structure studied through unifying concepts of plate tectonic theory. Quantitative approaches to problems, using techniques of classical physics. Includes advanced, research-oriented problems. Prerequisite: either ESS 512 or GPHYS 502; PHYS 322. Offered: Sp.

ESS 514 Geophysics: Fluids (3) Geophysical fluid dynamics. Fluids in geophysics with emphasis on the oceans. Development of the equations of motion with examples drawn from oceanography and solid earth geophysics. Includes advanced, research-oriented problems. Prerequisite: PHYS 322, MATH 307 and MATH 308 or equivalent. Offered: A.

ESS 515 Geophysics: Space (3) Various phenomena occurring in outer regions of Earth's atmosphere, ionosphere, magnetosphere, and Van Allen radiation belts. Laboratory applications include plasma thrusters and fusion. Concepts include charged particles in magnetic fields, drift motion, plasma, magnetohydrodynamic waves. Includes advanced, research-oriented problems. Prerequisite: PHYS 321 or equivalent. Offered: W.

ESS 516 Geophysics: The Atmosphere (3) Phenomena of the lower atmosphere: some simple applications of the principles of classical thermodynamics, fluid dynamics, and radiative transfer to the atmospheric hydrological cycle, global energy balance, and atmospheric dynamics and climate. Includes advanced, research-oriented problems. Prerequisite: either ESS 514 or GPHYS 504. Offered: Sp.

ESS 521 Remote Sensing of the Atmosphere and Climate System (3) *Leovy, Warren* Satellite systems for sensing the atmosphere and climate system. Recovery of atmospheric and surface information from satellite radiance measurements. Applications for research. Prerequisite: ESS 571 or GPHYS 532; ESS 572 or GPHYS 533. Offered: jointly with ATM S 534.

ESS 522 Geophysical Data Collection and Analysis (3) *Crosson* Theory and practical application of data collection and analysis applied to geophysical problems. Digital processing of signals; filtering and spectral analysis. Laboratory sessions include problem solving on computer-based processing system. Offered: A.

ESS 523 Geophysical Inverse Theory (3) *Booker* Introduction to the mathematical techniques for estimating properties of physical systems, such as the earth or atmosphere, from data that is insufficient for a precise specification of the system. Emphasis is on the concept of the resolving power of data sets. The ideas developed are quite general and have a wide range of applicability in the field of data interpretation. Prerequisite: either ESS 522 or GPHYS 563, or permission of instructor. Offered: odd years; Sp.

ESS 526 Sediment Dynamics and Boundary-Layer Physics (4) *Parsons* Theoretical descriptions of sediment transport processes constrained by laboratory demonstrations. The physics of boundary layers, initiation of motion, suspended load, bedload, bedforms, and continua transport (turbidity currents, debris flows, and suspensions) and its application to the geological record. Offered: jointly with OCEAN 542; W.

ESS 528 Interpretation of Sedimentary Structures (2-4, max. 4) *Bourgeois* Physical and environmental

analysis of sedimentary structures, including biogenic sedimentary structures. Clastic sediments and rocks. Field trips required.

ESS 529 Transport Theory and Applications in Geology (3) *Bergantz* Introduction to the quantitative treatment of transport phenomena with applications to igneous processes and metamorphism, magma and mantle convection, flow and reaction in regional and contact metamorphism. Emphasis on the governing equations of heat transfer, fluid and porous media flow, rheology, and analytical, numerical, and scaling solutions. Prerequisite: AMATH 402.

ESS 531 Physics of Ice (3) *Raymond* Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from vapor and liquid phases. Prerequisite: permission of instructor. Offered: jointly with ATM S 510; alternate years.

ESS 532 Formation of Snow and Ice Masses (3) *Warren* Snow and ice climatology. Formation of the ice crystals in clouds. Snow metamorphism. Transfer of radiative, sensible, and latent heat at snow and ice surfaces. Remote sensing of snow and ice. Growth and melt of sea ice. Climatic records from ice. Prerequisite: permission of instructor. Offered: jointly with ATM S 511; alternate years.

ESS 533 Dynamics of Snow and Ice Masses (3) *Raymond* Rheology of snow and ice. Sliding and processes at glacier beds. Thermal regime and motion of seasonal snow, glaciers, and ice sheets. Avalanches and glacier surges. Deformation and drift of sea ice. Response of natural ice masses to change in climate. Prerequisite: permission of instructor. Offered: jointly with ATM S 512; odd years.

ESS 534 Structural Glaciology (3) *Raymond* Physical and chemical processes in snow, stratigraphy, and metamorphism. Interpretation of ice sheet stratigraphy in terms of paleoenvironment. Dynamic metamorphism of ice from flow. Structures formed at freezing interfaces. Structure of river, lake, and sea ice. Relationship between structures and bulk physical properties. Prerequisite: permission of instructor. Offered: jointly with ATM S 513; even years.

ESS 535 Ice and Climate Modeling (3) *Warren* Principles of global climate modeling. Modeling seasonal cycles of snow cover and sea ice. Ice-sheet mass balance and flow. Solar radiation anomalies due to changes in earth's orbit. Climate/ice-sheet models of Pleistocene ice ages. Prerequisite: permission of instructor. Offered: jointly with ATM S 514; alternate years.

ESS 537 Advanced Mineralogy (3) *Ghose* Crystal symmetry: point groups, space groups. Mathematical description of crystal structures; group theory, irreducible representations; tensor description of physical properties: stress, strain, piezoelectricity, elasticity; structural and magnetic phase transitions, Landau theory, deformation and creep crystals; elasto-viscous properties of earth's mantle, crystal chemistry, solid state reactions. Offered: jointly with MSE 518.

ESS 538 Petrogenesis of Igneous Rocks (3) *McCallum* Origin of one or more of the major groups of igneous rocks. Selected petrogenetic problems in light of tectonic setting, petrography, geochemistry, and experimental studies. Prerequisite: either ESS 439 or GEOL 424 or equivalent. Offered: alternate years.

ESS 540 Advanced Igneous Petrology (4) *Ghiorso, McCallum* Crystal-liquid-vapor equilibria in magmatic systems. Physical properties of silicate melts. Geothermometry and geobarometry in igneous rocks. Models of fractionation, assimilation, and magma mixing. Trace elements, radiogenic isotopes, and stable isotopes as tracers in magmatic process-

es. Nucleation, crystal growth, and diffusion in melts. Prerequisite: either ESS 312 or GEOL 391; either ESS 439 or GEOL 424. Offered: alternate years.

ESS 545 Economic Geology of Sedimentary Rocks (5) *Cheney* Description and origin of metallic and nonmetallic ore deposits indigenous to regoliths, sediments, and sedimentary rocks. Prerequisite: either ESS 445 or GEOL 485, or equivalent or permission of instructor. Offered: alternate years.

ESS 548 Geodynamics (3) Advanced study of various aspects of the dynamics of the solid Earth. Topics may include plate tectonics, mantle convection, rotational dynamics, post-glacial rebound, fault mechanics, and geodetic measurement of crustal deformation. Offered: odd years.

ESS 549 Geomagnetism (3) *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. Prerequisite: permission of instructor. Offered: even years.

ESS 550 Electromagnetic and Potential Field Methods (3) *Booker* Development of equations of electromagnetic fields in conducting media. Solution of forward and inverse problems with natural and controlled sources: magnetotelluric and related methods. Includes the special case of static fields: DC resistivity, gravity, and magnetic interpretation. Prerequisite: either ESS 413, ESS 513, GPHYS 403, or GPHYS 503; either ESS 522 or GPHYS 563; PHYS 323; or permission of instructor. Offered: even years; W.

ESS 551 Mineral Physics (3) *Brown, Merrill* Applications of solid-state physics to various geophysical problems. Topics vary, but usually include the thermal properties of relevant geophysical materials, the equation of state for the earth's mantle and core, defects in solids and their roles in tectonophysics. Prerequisite: permission of instructor. Offered: alternate years.

ESS 552 Solution Geochemistry (4) *Ghiorso* Solution chemistry and thermodynamics as applied to solid and liquid silicates and aqueous fluids. Modeling configurational entropies in solids, activity coefficients and complexes in aqueous solution, and modeling chemical mass transfer in geologic systems. Prerequisite: either ESS 312 or GEOL 391, or equivalent.

ESS 553 Electron Beam Microanalysis (4) *Kuehner* Materials analysis using electron beams, including electron-target interactions, wave and energy dispersive x-ray analysis, scanning electron microscopy, and applications of these and related techniques to geological problems. Credit/no credit only.

ESS 555 Physics and Chemistry of the Earth's Interior (3) *Brown, Creager, Irving, Merrill* Emphasizes current issues in global tectonics and mantle dynamics. Examples include global seismic tomography and its bearing on geodynamics, the fate of subducted lithosphere and geochemical constraints on mantle convection. Prerequisite: permission of instructor.

ESS 556 Magma Physics (3) *Bergantz* The quantitative treatment of magmatic processes: thermo-mechanical state of the lithosphere, solidification, convection, conjugate heat transfer, crystal settling, magma mixing, diapirism and melt extraction, hydrothermal convection. Emphasis on continental lithosphere. Prerequisite: either ESS 529 or GEOL 571; AMATH 403.

ESS 562 Observational Seismology (1, max. 18) *Creager, Crosson, Malone, Qamar* Quarterly

research themes introduce students to a variety of digital and analog seismograms and techniques for their interpretation. Students present results of short investigations in an informal seminar setting. Credit/no credit only. Prerequisite: either ESS 412, ESS 512, GPHYS 402, or GPHYS 502, or permission of instructor. Offered: A/WSp.

ESS 563 Theoretical Seismology I (3) *Creager, Crosson* Advanced theoretical seismology. Attenuation and physical dispersion. Waves in anisotropic media. Moment-tensor source representation. Lamb's problem. Waves in stratified media: propagator methods, asymptotic ray theory, WKBJ seismograms. Inverse methods and analysis of seismological data. Prerequisite: either ESS 412, ESS 512, GPHYS 402, or GPHYS 502, or permission of instructor. Offered: even years; Sp.

ESS 564 Theoretical Seismology II (3) *Creager, Crosson* Advanced theoretical seismology. Attenuation and physical dispersion. Waves in anisotropic media. Moment-tensor source representation. Lamb's problem. Waves in stratified media: propagator methods, asymptotic ray theory, WKBJ seismograms. Inverse methods and analysis of seismological data. Prerequisite: either ESS 563 or GPHYS 541. Offered: even years; A.

ESS 565 Low-Frequency Seismology (3) *Creager* Represent seismic displacement field, including surface and body waves, as superposition of normal modes. Rigorous development of equations of motion, their solution, energy integrals, Rayleigh's Principle, perturbation theory, attenuation, and excitation formulae. Moment-tensor representation of seismic sources. Prerequisite: either ESS 412, ESS 512, GPHYS 402, or GPHYS 502, or permission of instructor. Offered: odd years; Sp.

ESS 568 Physics of the Oceanic Lithosphere I (3) Physical processes responsible for the formation and evolution of the oceanic lithosphere. Thermodynamic mechanisms of mantle creep; fluid dynamics of mantle flow, decompressional melting, formation of oceanic crust, and cooling of the oceanic lithosphere. Prerequisite: either ESS 511 or GPHYS 501; either ESS 514 or GPHYS 504; or permission of instructor. Offered: jointly with OCEAN 545.

ESS 571 Atmospheric Radiation: Introductory (3) Fundamentals of radiative transfer; absorption and scattering by atmospheric gases; elementary applications to constraints on the thermal structure, photochemistry, and remote sensing. Prerequisite: PHYS 225 or permission of instructor. Offered: jointly with ATM S 532; Sp.

ESS 572 Atmospheric Radiation: Advanced (3) Optical properties and particle absorption and scattering; solutions of radiative transfer equation in multiple scattering atmospheres; applications to atmospheric and surface energy balance and remote sensing. Prerequisite: ATM S 532/ESS 571 or permission of instructor. Offered: jointly with ATM S 533; A.

ESS 573 Cloud Microphysics and Dynamics (3) *Baker, Houze* Basic concepts of cloud microphysics, water continuity in clouds, cloud dynamics, and cloud models. Prerequisite: ATM S 501 or permission of instructor. Offered: jointly with ATM S 535; W.

ESS 574 Atmospheric Electrical Dynamics (3) *Holzworth* Global and local dynamic electric field models, including upper atmospheric and tropospheric sources as modified by propagation delays, orographic features, and transient phenomena. Radiation and plasma waves along with microphysics of corona discharge and charge separation mechanisms. Prerequisite: either ESS 415 or GPHYS 405; either ESS 416 or GPHYS 406; or permission of instructor. Offered: A.

ESS 576 Space and Laboratory Plasma Physics (3) *Holzworth, Parks, Winglee* Discussion of waves, equilibrium and stability, diffusion and resistivity, basic plasma kinetic theory, and wave-particle interactions. Prerequisite: either ESS 415 or GPHYS 405, or equivalent or permission of instructor. Offered: jointly with A A 556; Sp.

ESS 577 Advanced Space Plasma Physics (3) *Holzworth, Parks, Winglee* Formation by the interaction of solar wind with geomagnetic field. Trapped particles. Electromagnetic waves in anisotropic plasma. Dynamic disturbances and plasma instabilities. Prerequisite: either ESS 415 or GPHYS 405, or permission of instructor. Offered: A.

ESS 578 Kinetic Theory and Simulation of Space Plasmas (3) *Winglee* Wave-particle interactions in space plasmas. Generation of different wave modes, electrostatic and electromagnetic, Langmuir waves to Alfvén waves. Beam, Weibel, and maser instabilities, heavy ion interactions. Particle simulations, electrostatic and electromagnetic, for non-linear wave evolution and particle heating. Offered: even years; W.

ESS 579 Computational Methods and Modeling in Geophysics I (3) *Winglee* Solution of complex dispersion equations including multiple root finding. Data analysis, fitting, smoothing, fast integration. Ray tracing and particle tracking in 2-D and 3-D. Computer simulation of fluid interactions, unmagnetized and magnetized, compressible and incompressible, and flow around objects. Offered: odd years; W.

ESS 581 Planetary Atmospheres (3) *Leovy* Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all planetary atmospheres; roles of radiation, chemistry, and dynamic processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar-system objects in the context of comparative planetology. Offered: jointly with ASTR 555/ATM S 555; alternate years.

ESS 583 Origin of the Solar System (3) Nebular and nonnebular theories of the origin of the solar system; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; examination of the physical and chemical evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with ASTR 557.

ESS 586 Current Research in Climate Change (2, max. 20) Weekly lectures focusing on a particular aspect of climate (topic to change each year) from invited speakers (both UW and outside), plus one or two keynote speakers, followed by class discussion. Offered: jointly with ATM S 586/OCEAN 586.

ESS 587 Climate Dynamics (3) *Hartman, Thompson* Examines Earth's climate system; distribution of temperature, precipitation, wind ice, salinity, and ocean currents; fundamental processes determining Earth's climate; energy and constituent transport mechanisms; climate sensitivity; natural climate variability on interannual to decadal time scales; global climate models; predicting future climate. Offered: jointly with ATM S 587/OCEAN 587. Offered: A.

ESS 588 The Global Carbon Cycle and Climate (3) *Quay* Oceanic and terrestrial biogeochemical processes controlling atmospheric CO₂ and other greenhouse gases. Records of past changes in the earth's carbon cycle from geological, oceanographic and terrestrial archives. Anthropogenic perturbations to cycles. Develop simple box models, discuss results of complex models. Offered: jointly with ATM S 588/OCEAN 588; W.

ESS 589 Paleoclimatology: Data, Modeling and Theory (3) *Battisti, Emerson, Steig* Evidence for past changes in land and sea surface temperature, in precipitation and atmospheric dynamics, and in ocean circulation: both long and interannual timescales. Paleoclimate modeling and theory. Time series analysis and climate noise. Rapid climate change. Statistical reconstruction of interannual variability. Offered: jointly with ATM S 589/OCEAN 589; Sp.

ESS 590 Special Topics (2-10, max. 20)

ESS 594 Introduction to Earth and Space Sciences Research (1-2, max. 4) Introduces research of faculty and advanced graduate students to first-year graduate students and provides experience for the formulation, oral presentation, and defense of research proposals and results. Offered: A/WSp.

ESS 595 Earth and Space Sciences Research Methods (2, max. 12) Current research methodology and results based on recent literature and on faculty and student research. Designed to develop student perspective on observational and theoretical methods and on relation of specific research to broader developments in geophysics and interdisciplinary aspects of geophysics through faculty-guided presentations and discussion by students. Offered: A/WSp.

ESS 599 Seminar (1, max. 15) Review of current literature in geophysics and graduate student research with faculty participation. Credit/no credit only. Offered: A/WSp.

ESS 600 Independent Study or Research (*) Credit/no credit only.

ESS 700 Master's Thesis (*)

ESS 800 Doctoral Dissertation (*)

Economics

302 Savery

 *General Catalog Web page:*
www.washington.edu/students/genecat/academic/economics.html

 *Department Web page:*
www.econ.washington.edu

The Department of Economics is concerned with the analysis of the ways in which societies organize the production of goods and services and the distribution of these among groups and individuals.

Graduate Program

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The department offers programs of study leading to the Master of Arts and the Doctor of Philosophy degrees. The academic programs in economics are designed to develop trained economists for careers in teaching, private industry, government, and international agencies. Frequent seminars led by U.S. and foreign visitors as well as by faculty and students are conducted as an integral element of the department's graduate program.

Special Requirements

Applicants should have completed undergraduate training that includes courses in at least intermediate-level microeconomic and macroeconomic theory. In

addition, applicants must have had at least one year of calculus, one term of linear algebra, and one term of statistics. A course in differential equations is strongly recommended. Additional work in calculus, matrix algebra, and probability and statistics is also strongly recommended. An undergraduate major in economics is not required for admission to the graduate program provided that the above prerequisites have been met. All applicants are required to take the General Test of the Graduate Record Examination (GRE).

Graduate requirements for the M.A. degree include ECON 500, 501, 502, 503, 508, 580, 581, and 582. In addition to this core program, M.A. students must take at least seven elective courses in economics at the graduate level. At least three of these courses must be in applied areas, and at least two must be in the same area (the field of specialization). M.A. students also must complete 6 credits of a supervised internship. Well-prepared students should be able to complete the M.A. program in two years.

Graduate requirements for the Ph.D. degree include ECON 500, 501, 502, 503, 508, 509, 580, 581, and 582. Ph.D. students are required to pass core examinations in microeconomics and macroeconomics. In addition to this core program, Ph.D. students must take eight other elective field courses in economics at the graduate level. Each Ph.D. student must satisfy the requirements for two fields of specialization. The fields of specialization include advanced macroeconomic theory, advanced microeconomic theory, comparative systems and development, econometrics, finance, health economics, industrial organization, international economics, labor economics, natural resource economics, and public finance.

The doctoral dissertation is the final major requirement for the Ph.D. degree. Each Ph.D. student chooses a dissertation topic and a doctoral supervisory committee is appointed. After the dissertation topic has been developed, Ph.D. students take the General Examination, an oral defense of the dissertation proposal. When the dissertation is completed, Ph.D. students take the Final Examination, an oral defense of the completed dissertation. A foreign language is not required. The doctoral program is designed to be completed in four years, although most students take slightly longer.

Financial Aid

The principal form of financial aid available to graduate students in economics is a teaching assistantship. A number of such assistantships are available to entering graduate students with promising academic records.

Research and Computing Resources

The Institute for Economic Research houses a computer laboratory that provides hardware and software for economic modeling, economic estimation, word processing, and other faculty and graduate student research functions. Access is restricted to economics graduate students and faculty. In addition, the Center for Social Science Computation and Research (CSSCR) maintains an extensive library of computer software and data, and offers free consulting services to aid faculty and students with computing problems.

Faculty

Chair

Neil Bruce

Professors

Barzel, Yoram * 1961; MA, 1956, Hebrew University (Israel), PhD, 1961, University of Chicago; price theory.

Brown, Gardner * 1965, (Emeritus); PhD, 1964, University of California (Berkeley); resource economics.

Bruce, Neil * 1990; PhD, 1975, University of Chicago; public finance (economics of the public sector), especially taxation.

Crutchfield, James A. * 1960, (Emeritus); PhD, 1954, University of California (Berkeley); natural resources economics, policy and management, especially marine and environmental resources.

Deolalikar, Anil B. * 1989; PhD, 1981, Stanford University; economic development, economics of human capital, economics of population, technology transfer.

Halvorsen, Robert * 1972; PhD, 1973, Harvard University; natural resource economics.

Hartman, Richard C. * 1971; PhD, 1971, University of California (Berkeley); economic theory.

Lundberg, Shelly J. * 1984; PhD, 1981, Northwestern University; labor economics.

Mah, Feng-Hwa * 1961, (Emeritus); PhD, 1959, University of Michigan; Chinese economy and foreign trade.

McCaffree, Kenneth M. * 1981, (Emeritus); PhD, 1950, University of Chicago; labor economics and the economics of medicine.

McGee, John S. 1966, (Emeritus); PhD, 1952, Vanderbilt University; industrial organization.

Morris, Morris D. 1949, (Emeritus); PhD, 1954, University of California (Berkeley); economic history and the economy of India.

Nelson, Charles R. * 1975; PhD, 1969, University of Wisconsin; time series analysis, economic statistical analysis, advanced macroeconomic theory.

North, Douglas C. 1950, (Emeritus); PhD, 1952, University of California (Berkeley); economic history.

Parks, Richard * 1970; PhD, 1966, University of California (Berkeley); econometrics.

Plotnick, Robert D. * 1984, (Adjunct); MA, 1973, PhD, 1976, University of California (Berkeley); economics of poverty, labor and social welfare policy.

Silberberg, Eugene 1967; PhD, 1964, Purdue University; price theory.

Startz, Richard * 1984; PhD, 1978, Massachusetts Institute of Technology; macroeconomics, econometrics, finance, economics of tace.

Thornton, Judith Ann * 1961; PhD, 1960, Harvard University; economics of transition, resources.

Turnovsky, Stephen J. * 1987; PhD, 1968, Harvard University; monetary and macroeconomics, international economics, theory of economic stabilization.

Watts, Carolyn A. * 1975, (Adjunct); MA, 1974, PhD, 1976, Johns Hopkins University; health economics and policy.

Wong, Kar-Yiu * 1983; PhD, 1983, Columbia University; international trade, commercial policy, Asian growth and Asian crisis.

Associate Professors

Brock, Philip L. * 1991; PhD, 1982, Stanford University; economic liberalization with emphasis on financial markets and capital accumulation.

Eicher, Theo S. * 1994; MA, 1991, MPhil, 1993, PhD, 1994, Columbia University; international, development, and macroeconomics, with emphasis on economic growth.

Hadjimichalakis, Michael * 1969; PhD, 1970, University of Rochester; monetary theory and policy, macroeconomics, growth.

Huppert, Daniel D. * 1987, (Adjunct); PhD, 1975, University of Washington; economics and management of natural resources, especially marine fisheries.

Khalil, Fahad A. * 1991; PhD, 1991, Virginia Polytechnic Institute and State University; information economics and the theory of contracts.

Kochin, Levis A. * 1972; PhD, 1975, University of Chicago; macroeconomics, industrial organization.

Lawarree, Jacques P. * 1990; PhD, 1990, University of California (Berkeley); industrial organization, contract theory, game theory.

Leffler, Keith B. * 1978; PhD, 1977, University of California (Los Angeles); industrial organization, microeconomics.

Rose, Elaina 1993; PhD, 1993, University of Pennsylvania; economics of the household in developed and developing countries.

Thomas, Robert P. * 1968; PhD, 1964, Northwestern University; economic history.

Zivot, Eric W. * 1993; PhD, 1992, Yale University; time series, econometrics, applied macroeconomics, empirical finance.

Assistant Professor

Liu, Wen-Fang * 1998; PhD, 1998, University of Chicago; macroeconomics, financial economics, risk and uncertainty.

Senior Lecturers

Salehi-Esfahani, Haideh 1990; PhD, 1985, University of Pennsylvania; international economics, economic development.

Turnovsky, Michelle H. L. 1987; MBA, 1965, Harvard University, PhD, 1978, Australian National University; international economics, economics of the European Union.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsca/.

ECON 400 Advanced Topics in Microeconomics (5) NW Application of calculus to microeconomics. Development of comparative statics used in production and consumption theory, including derivation of the Slutsky equation and duality results. Prerequisite: ECON 300; either MATH 124, MATH 127, MATH 134, or MATH 145; recommended: MATH 126.

ECON 401 Advanced Topics in Macroeconomics (5) NW Application of mathematics to macroeconomics. Possible topics include economic dynamics and growth, rational expectations, real business cycle models, and New Keynesian approach. Prerequisite: ECON 301; either MATH 126, MATH 129, or MATH 136.

ECON 403 The Economics of Property Rights (5) I&S Property rights as an economic concept. Delineation of rights as a subject of optimization. Formation of contracts to maximize the value of personal property. Formation of organizations to induce efficient use of resources and minimize losses to public domain. Prerequisite: ECON 300; recommended: two 400-level microeconomics classes.

ECON 404 Industrial Organization and Price Analysis (5) I&S Analysis of firm behavior in imperfectly competitive markets. Topics include monopoly, oligopoly, product differentiation, entry deterrence, and the role of asymmetric information. Game theoretic tools and empirical evidence used to analyze topics. Prerequisite: ECON 300.

ECON 406 Undergraduate Seminar in Economics (5, max. 10) I&S 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 is available in the departmental office. Prerequisite: ECON 200.

ECON 407 Development of Economic Thought (5) I&S From the early modern period to the present. The main subjects treated are Adam Smith and the classical school, Karl Marx, the neoclassical reformulation and its critics, the impact of J. M. Keynes, and the evolution of economics in the twentieth century. Prerequisite: ECON 300.

ECON 409 Undergraduate Seminar in Political Economy (5, max. 10) I&S Marxian and public choice approaches to political economy. Explores the questions raised by each approach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Recommended: ECON 300; POL S 270. Offered: jointly with POL S 409.

ECON 421 Money, Credit, and the Economy (5) I&S Role of money and the banking system in the United States economy. Relation of money to inflation, interest rates, and business fluctuations. Monetary policy and Federal Reserve System. Prerequisite: ECON 301.

ECON 422 Investment, Capital, and Finance (5) I&S Intertemporal optimization: consumption and portfolio allocation decisions of households, investment and financing decisions of firms. Introduction to financial decisions under uncertainty. Portfolio theory, asset pricing, options, and futures. Financial market institutions and efficiency. Prerequisite: ECON 300; either ECON 311, STAT 311, QMETH 201, or STAT 220.

ECON 431 Government and Business (5) I&S Economic effects of various governmental regulatory agencies and policies. Antitrust legislation as a means of promoting desired market performance. Observed economic effects of policies intended to regulate business practices, control prices, conserve resources, or promote competition. Prerequisite: ECON 300.

ECON 435 Natural Resource Economics (5) I&S Survey of the economics of renewable and nonrenewable resources including fisheries, forest, minerals, and fuels. Optimal trade-offs between benefits and costs of resource use, including trade-offs between current and future use. Effects of property rights on resource use. Prerequisite: ECON 300.

ECON 436 Economics of the Environment (5) I&S Microeconomic analysis of environmental regulation. The problem of social cost, policy instrument choice, enforcement of regulations, methods for damage assessment, and estimating benefits of environmental improvement. Prerequisite: ECON 300.

ECON 437 Economics of Biological Resources (5) I&S Application of economic concepts to biology and biological concepts to economics. Examination of theory of species maximization, parallels in behavior between humans and other biota, animal choices among alternative food sources, games animals play, evidence of risk aversion in animals. Prerequisite: ECON 300.

ECON 443 Labor Market Analysis (5) I&S Determinants of employment and incomes in the United States: analysis of individual and firm decisions and of equilibrium in the labor market. Topics include decisions to work and retire, education and occupation choices, compensation, discrimination, poverty, unemployment and unions. Examination of policy issues affecting the labor market. Prerequisite: ECON 300.

ECON 444 Topics in Labor Market Analysis (5) I&S In-depth analysis of special topics in the operation of labor markets and public policies affecting incomes and employment. Course content varies by instructor. Prerequisite: ECON 300.

ECON 447 Economics of Gender (5) I&S Microeconomic analysis of the sources of gender differences in earnings, labor force participation, occupational choice, education, and consumption. Economic theories of discrimination, human capital, fertility and intrahousehold resource allocation. Economics of the family in developed and developing countries. Prerequisite: ECON 300. Offered: jointly with WOMEN 447.

ECON 448 Population and Development (5) I&S Survey of topics in population economics, including history of thought, demographic experience of currently developing countries, household production models, fertility demand, quantity-quality models of fertility, mortality, health and nutrition, migration, macroeconomic-demographic linkages. Prerequisite: ECON 300.

ECON 450 Public Finance: Expenditure Policy (5) I&S Application of normative microeconomic theory to analysis of government expenditures. Rationale for government economic activity, collective choice, public goods, and externalities, income redistribution, public sector pricing, and specific expenditure programs. Prerequisite: ECON 300.

ECON 451 Public Finance: Tax Policy (5) I&S Microeconomics of taxation: efficiency, incidence, effect on distribution of income, personal and corporate income taxes, sales and consumption taxes, taxation of property and estates. Prerequisite: ECON 300.

ECON 454 Cost-Benefit Analysis (5) I&S Theory and practice of cost-benefit analysis of public sector projects and policies. Welfare criteria, investment criteria, shadow prices, social discount rate, marginal-willingness-to-pay for non-market goods, social risk, and special topics. Prerequisite: ECON 300.

ECON 460 Economic History of Europe (5) I&S Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Recommended: ECON 201. Offered: jointly with HIST 481.

ECON 462 Economic History of the United States to the Civil War (5) I&S Systematic study of the changing pre-Civil War economic conditions and the

consequences of these changes for the American society. Prerequisite: ECON 201.

ECON 463 Economic History of the United States From the Civil War to the Present (5) I&S Systematic study of the changing economic conditions since the Civil War and the consequences of these changes for the American society. Prerequisite: ECON 201.

ECON 468 China's Economic Reforms-Integration Into World Economy (5) I&S Systematic survey of China's economic reforms since 1978, including China's increasing integration into the world economy. Prerequisite: ECON 201. Offered: jointly with SISEA 468.

ECON 471 International Trade (5) I&S Theory of comparative advantage and different models of international trade. Trade and welfare. Factor mobility and trade flows. Economic integration. Theory and practice of commercial policy. Prerequisite: ECON 300.

ECON 472 International Macroeconomics (5) I&S International monetary theory and open economy macroeconomics. Balance of payments and foreign exchange markets. Different exchange rate arrangements and their adjustment mechanisms. Money and international capital movements. Policy issues. The international monetary system. Prerequisite: ECON 301.

ECON 473 Topics in International Trade (5) I&S Advanced theory of trade and analysis of government trade policies. International trade and factor mobility. Theory of commercial policy. Prerequisite: ECON 301; ECON 471.

ECON 475 Economics of the European Union (5) I&S Analysis of economic issues relating to the European union. Explores the institutional aspects, the attempt to coordinate social and economic policies-welfare, employment, commercial, fiscal, and monetary-and the economic linkages between the European Union and the rest of the world. Prerequisite: ECON 301.

ECON 481 Introduction to Mathematical Statistics (5) NW Probability, generating functions; the δ -method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and ECON 580.) Prerequisite: STAT/ECON 311; either MATH 129, MATH 136, or MATH 126 with either MATH 308 or MATH 309. Offered: jointly with STAT 481; A.

ECON 482 Econometric Methods (5) NW Application of statistical modeling to empirical work in economics. A mixture of theory and applied computer work. Primary focus is regression analysis. Prerequisite: ECON 300; ECON/STAT 311.

ECON 483 Applied Econometric Modeling (5) NW Provides undergraduates the opportunity to learn econometric model building for a particular problem while applying the theory learned in various courses to specific economic cases. Students estimate, test, and forecast economic models. Extensive use of the computer and econometric programs. Prerequisite: ECON 301; either ECON/STAT 311, STAT 341, STAT 390, or QMETH 300; either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145.

ECON 485 Game Theory with Applications to Economics (5) NW Introduction to the main concepts of game theory: strategy, solution concepts for games, strategic behavior, commitment, cooperation, and incentives. Application to economics oligopoly theory, bargaining theory, and contract theory. Prerequisite: either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145; recommended: ECON 300; ECON 404.

ECON 490 Comparative Economic Systems (5) I&S Study of resource allocation, growth, and income distribution in capitalist, market socialist, and centrally planned economies. Prerequisite: ECON 301.

ECON 491 Issues in Economic Development (5) I&S Examines factors contributing to the economic problems of developing countries and possible solutions. Theory and applications in economic development and international trade. Prerequisite: ECON 301.

ECON 494 Economy of Japan (5) I&S Analysis of the economic growth of Japan since about 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: ECON 201. Offered: jointly with SISEA 494.

ECON 495 Economic Transformation of Russia and Eastern Europe (5) I&S Analytical survey of the economic institutions and economic structures of the transforming socialist economies. Socialist resource allocation. Market institutions. Structural change and the sequencing of economic reform. Primary focus on Russia and Eastern Europe. Prerequisite: ECON 301.

ECON 496 Honors Seminar (5) I&S Honors and other students in high standing have the opportunity to develop research techniques, to pursue topics in breadth and depth, and to apply tools of economic analysis to selected topics in economic theory and current issues of national and international economic policy. For seniors only.

ECON 497 Honors Directed Study (5) Students write their honors thesis on the topic chosen in the Honors Seminar working under the previously arranged supervision of an economics faculty adviser. Prerequisite: ECON 496

ECON 498 Senior Seminar (5) I&S Advanced undergraduate research in economics. Students formulate some underlying economic issue, organize its study, gather necessary information, and analyze results. Does not satisfy graduation requirement for the major. Prerequisite: ECON 301; one 400-level ECON course; recommended: two 400-level ECON courses.

ECON 499 Undergraduate Research (1-5, max. 10) May not be applied toward an advanced degree.

Courses for Graduates Only

ECON 500 Microeconomic Analysis I (4) Duality and comparative statics analysis. Consumer and firm behavior. Uncertainty. Prerequisite: ECON 300.

ECON 501 Microeconomic Analysis II (4) General equilibrium and welfare economics. Introduction to game theory. Prerequisite: ECON 500.

ECON 502 Macroeconomic Analysis I (4) An introduction to advanced macroeconomics. Theories of income, employment, inflation, and growth. Prerequisite: ECON 300 and ECON 301.

ECON 503 Macroeconomic Analysis II (4) Rational expectations in macroeconomic models. Dynamic optimizing models under uncertainty. Empirical examination of consumption, asset-pricing, and real business cycles.

ECON 508 Microeconomic Analysis III (4) Information economics. Prerequisite: ECON 500, ECON 501.

ECON 509 Macroeconomic Analysis III (4) Modern macroeconomic dynamics, presenting a range of approaches based on intertemporal optimization. Representative agent models with special emphasis on the analysis of government policy. More advanced

discussion of economic growth. Prerequisite: ECON 502, ECON 503 or equivalent.

ECON 511 Advanced Microeconomic Theory: Selected Topics (3, max. 12) Seminar in advanced microtheory. Selected topics of special interest and significance. Prerequisite: ECON 500, ECON 501.

ECON 512 Advanced Macroeconomic Theory: Selected Topics (3, max. 12) Seminar in advanced macrotheory. Selected topics of special interest and significance.

ECON 515 Special Topics in Mathematical Economics (3, max. 12)

ECON 516 Introduction to Noncooperative Game Theory (3) Study of both pure game theory and its applications to such problems as oligopoly pricing, non-cooperative bargaining, entry deterrence, reputation phenomena. Focus on game theory as a modeling tool as opposed to a body of known results. Prerequisite: ECON 508.

ECON 518 Contract Theory (3) Basic contract theory models, including hidden action and hidden information models. Current developments in contract theory. Prerequisite: ECON 508 and ECON 516 or permission of instructor.

ECON 520 The Economics of Property Rights (3) 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. Prerequisite: ECON 500 and ECON 501, or permission of instructor.

ECON 523 Emergence of the State (3) Using tools of property rights, industrial organization, and game theory, explores the emergence of the state. Specifies conditions conducive to constitutional rule. Analyzes circumstances amenable to state-promoted exchange as opposed to self-enforced agreements. Prerequisite: ECON 500 and ECON 501 or permission of instructor.

ECON 530 Government Regulation of Business (3) Public policy in the United States with respect to industrial organization and business conduct. Economic issues in antitrust policy emphasized. Prerequisite: ECON 500, ECON 501.

ECON 532 Theory of Industrial Organization II (3) The application of game theory to problems of strategic behavior that arise in the study of imperfectly competitive markets. Topics include vertical integration, short- and long-run price competition, folk theorems, empirical tests of oligopoly pricing models, entry deterrence, research and development, and product differentiation. Prerequisite: ECON 500, ECON 501.

ECON 535 Economics of Natural Resources I (3) First half of integrated two-course sequence. Non-renewable resource extraction and exploration, including effects of market structure, uncertainty, and taxation. Externality theory and pollution-control policies. Prerequisite: ECON 500, ECON 501, or permission of instructor.

ECON 536 Economics of Natural Resources II (3) Second half of integrated two-course sequence. Renewable resources, including fisheries and forests. Valuation of environmental amenities. Prerequisite: ECON 535.

ECON 537 Economic Aspects of Marine Policy (3) *Huppert* Development of pertinent economic concepts and their application to selected topics in marine policy decision making, including maritime policy, OCS oil and gas development, and wetlands

management. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with SMA 537; W.

ECON 538 Economics of Living Marine Resources (3) *Huppert* Develops pertinent economic concepts and applications for conservation, regulation, and restoration of fisheries and other living resources. Gives special attention to fishery management, including harvest regulation and enforcement, recreational fisheries evaluation, property rights regimes, contemporary issues, and marine protected area management. Offered: jointly with SMA 538; Sp.

ECON 541 Labor Economics (3) Theoretical and empirical analysis of the labor market. The determinants of labor supply and demand, human capital investment, the pattern of compensation, employment contracts and incentives, unemployment and labor market dynamics.

ECON 546 Health Economics (3) Theoretical and empirical models of the demand for health and health care; supply of health care from physicians and hospitals; government programs that subsidize health care; occupational health; cost-benefit analyses of preventive health care and new medical technologies. Prerequisite: graduate-level microeconomics, HSERV 585, or permission of instructor.

ECON 547 Health Policy Economics (3) Selected topics in health economics, including risk and insurance, medical malpractice, the market for physician services, and industry regulation. Prerequisite: a course in intermediate microeconomics or permission of instructor. Offered: jointly with HSERV 587.

ECON 550 Public Finance: Expenditure Policy (3) Theory of public finance with emphasis on public expenditures. Social welfare maximization, public goods and externalities, decreasing cost industries, theory of collective choice, second-best analysis. Prerequisite: ECON 500, ECON 501, or permission of instructor.

ECON 551 Public Finance: Tax Policy (3) Theory of public finance with emphasis on taxation. Second-best analysis, optimal taxation, general equilibrium incidence analysis, issues in personal income taxation and corporate income taxation. Prerequisite: ECON 500, ECON 501, or permission of instructor.

ECON 554 Cost-Benefit Analysis (3) Covers the theoretical foundations of cost-benefit analysis using graduate microeconomics. Stresses both the conceptual and practical problems encountered in the subject. Emphasis on problem solving and term project. Prerequisite: ECON 500, ECON 501.

ECON 571 International Trade Theory (3) Comparative advantage, resource allocation, income distribution, and foreign trade. Different theories of trade, with or without perfect competition and constant returns. International factor mobility. Prerequisite: ECON 500, ECON 501.

ECON 572 International Financial and Monetary Economics (3) Analysis of open economy macro models with emphasis on exchange rates and balance of payments determination. Prerequisite: ECON 502, ECON 503.

ECON 573 International Commercial Policy (3) Analysis of welfare aspects of international trade and factor mobility. Costs and benefits of protection; implications of different government policies. Import competition and response. Prerequisite: ECON 571 or permission of instructor.

ECON 574 International Macroeconomics (3) Surveys recent developments in international macroeconomics, placing particular emphasis on the dynamic aspects. One sector, multisector, and two-country international models discussed. Fiscal issues treated in depth. Stochastic aspects intro-

duced and related to the literature on international real business cycles. Prerequisite: ECON 509 or equivalent.

ECON 580 Econometrics I (4) Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Students may receive credit for only one of MATH/STAT 390, ECON/STAT 481, and ECON 580.

ECON 581 Econometrics II (4) Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Prerequisite: ECON 580.

ECON 582 Econometrics III (4) Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Prerequisite: ECON 581.

ECON 583 Econometric Theory I (3) Estimation and testing in linear and nonlinear regression models. Asymptotic theory, bootstrapping. Theoretical developments are reinforced with a variety of empirical examples and applications. Prerequisite: ECON 580, ECON 581, ECON 582 or equivalent.

ECON 584 Econometric Theory II (3) Continuation of 583. Analysis of stationary and nonstationary, univariate, and multivariate time series models. Emphasis on empirical applications. Prerequisite: ECON 583.

ECON 585 Applied Microeconometrics (3) Econometric issues that arise in applied microeconomic research. Topics include the use of panel data and models with limited and qualitative dependent variables. Prerequisite: ECON 582 or equivalent.

ECON 591 Theoretical Issues in Economic Development (3) Analysis of issues in economic development with application to the less-developed countries of the world today. Prerequisite: ECON 500, ECON 501, or permission of instructor.

ECON 592 Development Policy (3) Theoretical and empirical analysis of macroeconomic policies pursued by developing countries. Topics include the determination of exchange rates and relative prices in small economies; the examination of government spending, taxation, banking, trade, and labor market policies; and the evaluation of market-oriented economic reform programs. Prerequisite: ECON 503; recommended: ECON 591.

ECON 595 Analysis of the Transforming Socialist Economies (3) Applications of economic analysis to the economic problems of transforming socialist economies. Economic institutions. The role of the state. Privatization and the behavior of decentralized organizations. Integration into the world market. Prerequisite: micro- and macroeconomic theory and permission of instructor.

ECON 596 Research Practicum in Microeconomics (1, max. 6) Provides opportunity to practice research and presentation skills in applied and theoretical microeconomics. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

ECON 597 Research Practicum in Macroeconomics (1, max. 6) Provides opportunity to practice research and presentation skills in applied and theoretical macroeconomics. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of partici-

tion requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

ECON 598 Research Practicum in Labor and Development (1, max. 6) Provides opportunity to practice research and presentation skills in economics of labor and development. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

ECON 599 Research Issues in Demography and Population Studies (1-2, max. 7) Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Credit/no credit only. Offered: AWSp.

ECON 600 Independent Study or Research (*) Credit/no credit only.

ECON 601 Internship (3-9, max. 9) Credit/no credit only.

ECON 602 Teaching Introductory Economics (1) Examines problems encountered in preparing and presenting courses in introductory economics. Credit/no credit only.

ECON 800 Doctoral Dissertation (*) Credit/no credit only.

English

A101 Padelford



General Catalog Web page:
www.washington.edu/students/genocat/academic/english.html



Department Web page:
depts.washington.edu/engl/

The Department of English offers courses in English, American, and related literatures. Courses in literature emphasize techniques of literary analysis; theoretical problems in the interpretation of texts; the social, historical, and political context of literary production and reception; and the pleasures of reading. Most require significant written work and stress critical thinking skills. Courses in language study examine the structural, historical, social, and aesthetic dimensions of English. The Creative Writing Program offers workshops in verse, short story, novel, and expository writing. English majors are exposed to many critical perspectives, and pursue interests in literary history, critical theory, language study, cultural studies, and creative writing.

Graduate Program

Graduate Program Coordinator
A105 Padelford, Box 354330
206-543-6077
englgrad@u.washington.edu

The Department of English offers a complete program of graduate courses and seminars designed to provide aspirants for the Master of Arts and Doctor of Philosophy degrees with a knowledge of English literature and language and the necessary scholarship for training in literary criticism and theory, literary history, and English-language study, including rhetoric and composition. It is possible to pursue a literature- or language-study emphasis. The Master of Fine Arts program in creative writing emphasizes projects in imaginative writing in fiction and poetry, supported by courses in criticism and literary peri-

ods and types. A special degree program, the Master of Arts for Teachers, is offered for English teachers in secondary schools and community colleges and a Master of Arts for Teachers (English as a Second Language) for those interested in teaching English to speakers of other languages. The graduate program permits completion of master's degree requirements in four to six quarters and doctoral degree requirements in five years (including the master's degree). In a typical five-year Ph.D. program, a student is encouraged to complete course requirements (75 credits) during the first three years, the General Examination for the doctorate in the fourth year, and the dissertation in the fifth year. Those admitted with a master's degree from another university can complete the doctorate in four years: two years of course work, exam year, and dissertation year.

Financial Aid

The department annually awards 20 or more new teaching assistantships. To be considered for the following autumn, applicants must submit an assistantship application and supporting materials for admission to the graduate program by January 15. A statement of purpose, three recommendations, the GRE general test, and a critical-writing sample are required [except M.A.T. (E.S.L.)]. The GRE (literature in English) subject test is recommended for applicants to the M.A., M.A.T., and Ph.D. programs. Teaching assistantship applicants who are not native speakers of English must submit as part of their application a score of 290 or better on the Test of Spoken English (TSE) or UW-administered SPEAK test.

Master of Arts

Admission Requirements: Bachelor of Arts degree: Major in English equivalent to that awarded by the UW preferred. Graduate Record Examination general test [GRE (literature in English) subject test recommended]. Three letters of recommendation, statement of purpose, and a critical writing sample.

Graduation Requirements: Intermediate-level proficiency in a language other than English. 40 credits, including 30 credits in graduate English seminars. For students continuing to the doctoral program, a 10-credit master's essay. For a terminal master's degree, students may substitute 10 additional credits in graduate English seminars for the master's essay. A maximum of 5 credits may be transferred from an accredited graduate program elsewhere.

Master of Fine Arts

Admission Requirements: Bachelor of Arts degree, Graduate Record Examination general test, three letters of recommendation, statement of purpose, a critical-writing sample, and a creative-writing sample.

Graduation Requirements: 55 credits, including 20 credits in creative writing, 15 credits in graduate English seminars (5 credits must be from an approved course in criticism), 5 elective credits, 15 thesis credits (including a creative thesis, an MFA essay, and a final oral examination); demonstration of proficiency in a language other than English.

Master of Arts for Teachers

Admission Requirements: Same as for the Master of Arts degree, but usually including prior teaching experience.

Graduation Requirements: 45 credits, of which 25 must be in courses numbered 500 or above; including at least one course each in English language or linguistics, rhetoric and/or composition, literary criticism or critical theory, and literature; three courses must have a stated orientation on teaching English; and 5 credits of M.A.T. essay. In addition to the 45

credits, a student with no regular or formal teaching experience is required to complete at least 6 credits of ENGL 601 (Internship). 15 of these may be taken outside the department in courses related to the teaching of English, subject to approval.

Master of Arts for Teachers (English as a Second Language)

Admission Requirements: Bachelor of Arts degree, Graduate Record Examination general test, statement of purpose, three letters of recommendation. Students without training in linguistic method and theory must take LING 400 as a prerequisite for 400-level linguistics courses.

Graduation Requirements: 45-54 credits, including ENGL 571, 572, 574, 576; LING 446 or 450, ENGL 575 or LING 461; three courses from ENGL 471, 478, 479, 560, 561, 562, 563, 564, 567, 569, 575, LING 433/ANTH 464, LING 457/PSYCH 457, LING 451, 462; one elective course; 3-6 credits of ENGL 570. Intermediate-level proficiency in a language other than English.

Doctor of Philosophy

Admission Requirements: By petition to the Graduate Studies Committee upon completion of the M.A. degree option in literature. Students with recent master's degrees from other institutions are admitted at the post-master's level following the guidelines for admission to the M.A. option and must complete two quarters before petitioning the Graduate Studies Committee for admission to the doctoral program. Students transferring with a master's degree from other institutions may be required to submit an equivalent to the master's essay. Students with M.F.A., M.A.T., or M.A.T. (E.S.L.) degrees from this University must complete course-work and language requirements for the M.A. degree option and submit an equivalent to the master's essay.

Graduation Requirements: 75 graded credits of electives in graduate English seminars. Students with a recent master's degree from another university may count up to 30 credits from their master's program, upon approval of the Director of Graduate Studies. Students with a master's degree from the UW may count up to 40 credits in courses taken before admission to the doctoral program. Fluency in at least one language other than English, plus whatever additional language study the supervisory committee advises. Written examinations for literature emphasis: (1) historical period, (2) specialized field of study, (3) second period, genre, or topic; written examinations for language emphasis: (1) major approach to English-language study, (2) second approach to language study, (3) textual focus (can be literary period); an oral General Examination; 27 credits of ENGL 800 (Dissertation) and a Final Examination based on the dissertation.

Faculty

Chair

Shawn H. Wong

Professors

Alexander, Edward * 1962; MA, 1959, PhD, 1963, University of Minnesota; Romantic and Victorian literature.

Allen, Carolyn * 1972; MA, 1966, Claremont Graduate School, PhD, 1972, University of Minnesota; twentieth-century literature, women writers, contemporary critical theory.

Bierds, Linda L. * 1981; MA, 1971, University of Washington; poetry writing; contemporary American poetry.

Blake, Kathleen * 1971; PhD, 1971, University of California (San Diego); Victorian literature, children's literature, women's studies.

Blau, Herbert * 2000; PhD, 1954, Stanford University; drama and performance, literary and cultural theory.

Brown, Marshall J. * 1988; PhD, 1972, Yale University; eighteenth- and nineteenth-century literature, literary theory, music and literature.

Burns, Wayne 1979, (Emeritus); MA, 1940, Harvard University, PhD, 1946, Cornell University; Victorian literature.

Butler, Johnella E. * 1987, (Adjunct); EdD, 1979, University of Massachusetts; Afro-American literature, American ethnic women's literature, Afro-Caribbean literature, pedagogy.

Coldewey, John C. * 1972; PhD, 1972, University of Colorado (Boulder); medieval and Renaissance drama and literature.

Dillon, George L. * 1986; PhD, 1969, University of California (Berkeley); rhetoric, composition.

Dunn, Richard J. * 1967; PhD, 1964, Case Western Reserve University; Victorian literature, English novel.

Fowler, David C. * 1952, (Emeritus); PhD, 1949, University of Chicago; medieval literature, comparative religion.

Frey, Charles Hubbard * 1970; PhD, 1971, Yale University; Renaissance literature, Shakespeare.

Gerstenberger, Donna * 1960, (Emeritus); PhD, 1958, University of Oklahoma; twentieth-century literature, Anglo-Irish literature, feminist criticism.

Handwerk, Gary J. * 1984; PhD, 1984, Brown University; British, German, and French nineteenth- and twentieth-century narrative; Romantic and post-Romantic.

Heilman, Robert B. 1976, (Emeritus); MA, 1930, Ohio State University, MA, 1931, PhD, 1935, Harvard University; drama.

Irmischer, William F. * 1985, (Emeritus); PhD, 1950, Indiana University; rhetoric and theory of composition.

Jeffords, Susan E. * 1985; MA, 1977, PhD, 1981, University of Pennsylvania; feminist theory, American popular culture, and the representation of Vietnam.

Johnson, Charles R. * 1983; MA, 1973, Southern Illinois University, PhD, 1988, State University of New York (Stony Brook); fiction writing.

Kaplan, Sydney J. * 1971; PhD, 1971, University of California (Los Angeles); twentieth-century literature, women writers, feminist criticism.

Kenney, Richard L. * 1987; BA, 1970, Dartmouth College; poetry writing.

Korg, Jacob * 1955, (Emeritus); PhD, 1952, Columbia University; Victorian, twentieth-century literature.

Lockwood, Thomas * 1967; PhD, 1967, Rice University; eighteenth-century literature.

Matchett, William H. * 1983, (Emeritus); PhD, 1957, Harvard University; Renaissance literature, Shakespeare.

McCracken, J. David * 1966; PhD, 1966, University of Chicago; eighteenth-century literature; Blake; Wordsworth; biblical literature (esp. gospels, parables).

McElroy, Colleen J. * 1972; PhD, 1973, University of Washington; Black literature, women writers, poetry writing.

Modiano, Raimonda * 1978; PhD, 1973, University of California (San Diego); romanticism.

Reinert, Otto * 1956, (Emeritus); PhD, 1952, Yale University; comparative literature, eighteenth-century literature.

Russ, Joanna * 1977, (Emeritus); MFA, 1960, Yale University; fiction writing.

Sale, Roger H. * 1962, (Emeritus); PhD, 1957, Cornell University; Renaissance literature.

Shaviro, Steven * 1984; PhD, 1981, Yale University; film, cyber studies, postmodernism, contemporary popular culture.

Shields, David * 1988; MFA, 1980, University of Iowa; fiction writing, screen writing, twentieth-century literature, autobiography, mass media, film.

Shulman, Robert * 1961; PhD, 1959, Ohio State University; American literature.

Silberstein, Sandra V. * 1982; PhD, 1982, University of Michigan; applied/critical linguistics; TESOL, ethnicity and gender.

Simonson, Harold P. * 1967, (Emeritus); PhD, 1958, Northwestern University; American literature.

Staten, Henry J. * 1998; PhD, 1978, University of Texas (Austin); 19th- and 20th-century British literature, history of literary criticism, contemporary theory.

Stevick, Robert D. * 1962, (Emeritus); PhD, 1956, University of Wisconsin; medieval language and literature.

Streitberger, William R. * 1973; PhD, 1973, University of Illinois; Renaissance literature, textual criticism, paleography.

Tollefson, James W. * 1984; PhD, 1978, Stanford University; English as a second language, language planning.

Wagoner, David R. * 1957, (Emeritus); MA, 1949, Indiana University; twentieth-century literature, fiction and poetry writing.

Wong, Shawn H. * 1984; MA, 1974, San Francisco State; creative writing, Chinese-American area studies.

Woodward, Kathleen * 2000; PhD, 1976, University of California (San Diego); American literature, women studies.

Associate Professors

Abrams, Robert * 1979; PhD, 1973, Indiana University; American literature.

Altieri, Joanne S. * 1977, (Emeritus); PhD, 1969, University of North Carolina; Shakespeare studies.

Bosworth, David L. * 1984; BA, 1969, Brown University; fiction writing, modern fiction and poetry, American Puritans.

Brenner, Gerald J. * 1966, (Emeritus); PhD, 1969, University of New Mexico; American literature, fiction writing.

Butwin, Joseph M. * 1978; PhD, 1971, Harvard University; Jewish studies, the literature of American immigration and Victorian studies.

Cummings, Katherine * 1985; PhD, 1985, University of Wisconsin; cultural studies, critical theory, queer studies, twentieth-century Americanist.

Dunlop, William M. * 1962, (Emeritus); MA, 1965, Cambridge University (UK); Shakespeare, nineteenth-century literature, poetry writing.

Fisher, Alan S. * 1968; PhD, 1969, University of California (Berkeley); Renaissance, seventeenth- and eighteenth-century literature, history of literary criticism.

Fuchs, Barbara * 1997; PhD, 1997, Stanford University; early modern English and Spanish literature and culture; literature and imperialism.

Griffith, John W. * 1968; PhD, 1969, University of Oregon; American literature.

Guerra, Juan C. * 1990; MA, 1983, PhD, 1992, University of Illinois; literacy, ethnography, composition, pedagogy and Chicano literature.

Hudson, Lois Phillips * 1969, (Emeritus); LittD, 1965, North Dakota State University; fiction writing.

Laguardia, Eric * 1961; PhD, 1961, University of Iowa; Renaissance literature.

Longyear, Christopher R. * 1972, (Emeritus); PhD, 1961, University of Michigan; linguistics.

Moody, Joycelyn K. * 1991; MA, 1980, University of Wisconsin, PhD, 1993, University of Kansas; 19th-century American literature; African-American autobiography; women's literature.

Mussetter, Sally Ann * 1978; PhD, 1975, Cornell University; medieval language and literature.

Palomo, Dolores J. * 1971, (Emeritus); PhD, 1972, State University of New York (Buffalo); Renaissance literature, women writers.

Patterson, Mark R. * 1981; PhD, 1981, Princeton University; American literature.

Remley, Paul G. * 1988; PhD, 1990, Columbia University; Old and Middle English, medieval languages and literatures, critical theory.

Searle, Leroy F. * 1977; MA, 1968, PhD, 1970, University of Iowa; twentieth-century literature, critical theory, American studies.

Simpson, Caroline Chung * 1994; MA, 1989, University of Houston, PhD, 1994, University of Texas (Austin); Asian American studies and postwar American culture.

Smith, Eugene H. * 1958, (Emeritus); PhD, 1963, University of Washington; rhetoric and theory of composition.

Sonenberg, Maya * 1993; MA, 1984, Brown University; fiction writing, twentieth-century fiction, postmodern fiction, women writers.

Stanton, Robert B. * 1993, (Emeritus); PhD, 1953, Indiana University; American literature.

Stygall, Gail * 1990; PhD, 1989, Indiana University; discourse analysis, rhetoric and composition, English language linguistics, forensic linguistics.

Van Den Berg, Sara J. * 1980, (Emeritus); PhD, 1969, Yale University; early modern and seventeenth-century literature, psychoanalytic theory, medicine and literature.

Vaughan, Miceal F. * 1973; PhD, 1973, MA, 1973, Cornell University; medieval European languages and literature; textual studies.

Webster, John M. * 1972; PhD, 1974, University of California (Berkeley); Renaissance literature.

Assistant Professors

Bawarshi, Anis 1999; PhD, 1999, University of Kansas; rhetoric and composition studies, with an emphasis in genre theory, invention.

Burstein, Jessica L. * 1998; PhD, 1998, University of Chicago; British and American modernist literature (1890-1930).

Curzan, Anne L. * 1998; PhD, 1998, University of Michigan; history of English, language and gender, sociolinguistics, lexicography.

Griffith, Malcolm A. * 1966, (Emeritus); PhD, 1966, Ohio State University; twentieth-century literature, modern criticism, American literature.

Halmi, Nicholas * 2001; PhD, 1995, University of Toronto (Canada); English and German literature, Enlightenment and Romantic science.

Kaup, Monika 2000; PhD, 1991, Ruhr University (Germany); U.S. Latino/a literature; comparative literature of the Americas.

Reddy, Chandan C. 2001; PhD, 2001, Columbia University; multi-ethnic literature, American studies, queer theory.

Reed, Brian 2000; PhD, 2000, Stanford University; modernist and postmodernist American poetry.

Weinbaum, Alys E. * 1998; PhD, 1998, Columbia University; feminist theory; representations of race and reproduction in modern literature.

Senior Lecturers

George, E. Laurie * 1991; PhD, 1984, University of Oregon; computer-integrated pedagogy (writing and literature) feminist pedagogies, rhetoric.

Graham, Joan Adelle 1974; MA, 1972, University of Washington; expository and interdisciplinary writing.

Harris, Jana N. 1986; MFA, 1972, San Francisco State University.

McNamara, Robert J. 1985; PhD, 1985, University of Washington; expository and interdisciplinary writing.

Simmons-O'Neill, Elizabeth 1985; PhD, 1988, University of Washington; expository and interdisciplinary writing, service learning.

Wacker, Norman J. 1989; MA, 1976, PhD, 1986, University of Washington; expository and interdisciplinary writing.

Lecturers

Gillis-Bridges, Kimberlee 1989; PhD, 1999, Claremont Graduate School; film studies, contemporary U.S. literature and cinema; interdisciplinary writing.

O'Neill, John 1985; MA, 1986, University of Washington.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsccat/.

ENGL 407 Special Topics in Cultural Studies (5) VLPA Advanced work in cultural studies.

ENGL 422 Arthurian Legends (5) VLPA Medieval romance in its cultural and historical setting, with concentration on the evolution of Arthurian romance.

ENGL 430 British Writers: Studies in Major Authors (5, max. 15) VLPA Concentration on one writer or a special group of British writers.

ENGL 431 Topics in British Literature (5, max. 15) VLPA Themes and topics of special meaning to British literature.

ENGL 440 Special Studies in Literature (3/5, max. 10) VLPA Themes and topics offering special approaches to literature.

ENGL 442 The Novel: Special Studies (5, max. 10) VLPA Readings may be English or American and drawn from different periods, or they may concentrate on different types—gothic, experimental, novel of consciousness, realistic novel. Special attention to the novel as a distinct literary form. Specific topic varies from quarter to quarter.

ENGL 443 Poetry: Special Studies (5, max. 10) VLPA A poetic tradition or group of poems connected by subject matter or poetic technique. Specific topics vary, but might include poetry as a geography of mind, the development of the love lyric, the comic poem.

ENGL 444 Dramatic Literature: Special Studies (5, max. 10) VLPA Study of a particular dramatic tradition (such as expressionism or the absurd theatre) or character (the clown) or technique (play-within-a-play, the neoclassical three unities). Topics vary.

ENGL 452 Topics in American Literature (5, max. 15) VLPA Exploration of a theme or special topic in American literary expression.

ENGL 466 Gay and Lesbian Studies (5) I&S/VLPA Examination of ways gays and lesbians are represented in literature, film, performance, and popular culture and how these representations are interpreted in mainstream, gay/lesbian, and academic writing.

ENGL 471 The Composition Process (5) VLPA Consideration of psychological and formal elements basic to writing and related forms of nonverbal expression and the critical principles that apply to evaluation.

ENGL 473 Current Developments in English Studies: Conference (5) VLPA

ENGL 474 Special Topics in English for Teachers (1-10, max. 10) VLPA

ENGL 475 Colloquium in English for Teachers (1-5, max. 10) VLPA

ENGL 476 Puget Sound Writing Program Institute (1-9, max. 9) VLPA Focus on the writing process and the teaching of writing, accomplished through research, writing, reflection, and demonstration of writing instruction. Affiliated with the National Writing Project.

ENGL 477 Children's Literature (5) VLPA An examination of books that form a part of the imaginative experience of children, as well as a part of a larger literary heritage, viewed in the light of their social, psychological, political, and moral implications.

ENGL 478 Language and Social Policy (5) I&S/VLPA Examines the relationship between language policy and social organization; the impact of language policy on immigration, education, and access to resources and political institutions; language policy and revolutionary change; language rights.

ENGL 479 Language Variation and Language Policy in North America (5) I&S/VLPA Surveys

basic issues of language variation: phonological, syntactic, semantic, and narrative/discourse differences among speech communities of North American English; examines how language policy can affect access to education, the labor force, and political institutions.

ENGL 481 Special Studies in Expository Writing (5) VLPA Individual projects in various types of non-fictional prose, such as biographical sketches, informational reports, literary reviews, and essays.

ENGL 483 Advanced Verse Writing (5, max. 15) VLPA Intensive study of ways and means of making a poem. Prerequisite: ENGL 383.

ENGL 484 Advanced Short Story Writing (5, max. 10) VLPA Experience with the theory and practice of writing the short story. Prerequisite: ENGL 384.

ENGL 485 Novel Writing (5, max. 15) VLPA Experience in planning, writing, and revising a work of long fiction, whether from the outset, in progress, or in already completed draft. Prerequisite: ENGL 384.

ENGL 490 Study Abroad Program (5, max. 15) VLPA This course, for students in the Study Abroad program, relates major works of literature to the landscape and activities of their settings.

ENGL 491 Internship (1-6, max. 12) Supervised experience in local businesses and other agencies. Open only to upper-division English majors. Credit/no credit only.

ENGL 492 Advanced Expository Writing Conference (1-5, max. 10) Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized, but new work may also be undertaken.

ENGL 493 Advanced Creative Writing Conference (1-5, max. 10) Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized, but new work may also be undertaken.

ENGL 494 Honors Seminar (5) VLPA Survey of current issues confronting literary critics today. Readings begin with work in the New Criticism that followed World War II and move forward to consider issues such as changing student population and role of the critic, revisions of the past, emergent technologies, and rise of interdisciplinary teaching and research.

ENGL 495 Major Conference for Honors in Creative Writing (5) Special projects available to honors students in creative writing. Required of, and limited to, honors students in creative writing.

ENGL 496 Major Conference for Honors (5) Individual study (reading, papers) by arrangement with the instructor. Required of, and limited to, honors seniors in English.

ENGL 497 Honors Senior Seminar (5) VLPA Seminar study of special topics in language and literary study. Limited to honors students majoring in English.

ENGL 498 Senior Seminar (5) VLPA Seminar study of special topics in language and literary study. Limited to seniors majoring in English.

ENGL 499 Independent Study (1-5, max. 10) Individual study by arrangement with instructor.

Courses for Graduates Only

ENGL 500 Reading Medieval Literature (5) Special problems involved in the study and interpretation of medieval texts, selected examples drawn from the beginnings of English literature to 1500.

ENGL 501 The Renaissance and Literary Tradition (5) Examination of selected texts from 1500 to 1660, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the Renaissance.

ENGL 502 English Literary Culture: 1660-1800 (5) Examination of selected texts of the Restoration and eighteenth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

ENGL 503 English Literary Culture: 1800-1900 (5) Examination of selected texts from the nineteenth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

ENGL 505 Theories of American Literature (5) Examination of selected texts in American Literature, concentrating on the specific problems of interpretation and scholarship characteristic of the study of works in this field.

ENGL 506 Critical Approaches to Literary Texts (5) Examination of a range of critical theories and practices appropriate to the study of literature.

ENGL 507 History of Literary Criticism and Theory I (5, max. 15) A general introduction to the major issues in the history of criticism followed by the study of the classical theorists, including Plato, Aristotle, Longinus, and the major medieval critics. Offered: jointly with C LIT 507.

ENGL 508 History of Literary Criticism and Theory II (5, max. 15) Literary criticism and theory from the Middle Ages and the Renaissance through the eighteenth century to, but not including, Kant. Offered: jointly with C LIT 508.

ENGL 509 History of Literary Criticism and Theory III (5, max. 15) Literary criticism and theory from Kant's *Critique of Judgment* to the mid-twentieth century and the work of Northrop Frye. Offered: jointly with C LIT 509.

ENGL 510 History of Literary Criticism and Theory IV (5, max. 15) A study of the major issues in literary criticism and theory since about 1965. Offered: jointly with C LIT 510.

ENGL 512 Introductory Reading in Old English (5)

ENGL 513 Old English Language and Literature (5, max. 15)

ENGL 514 Middle English (5, max. 15)

ENGL 515 Chaucer (5, max. 15)

ENGL 516 Topics in Medieval English Literature (5, max. 15)

ENGL 517 Sixteenth-Century Literature (5, max. 15)

ENGL 518 Shakespeare (5, max. 15)

ENGL 520 Seventeenth-Century Literature (5, max. 15)

ENGL 521 Milton (5, max. 15)

ENGL 522 Topics in the English Renaissance, 1485-1660 (5, max. 15)

ENGL 524 Restoration and Eighteenth-Century Literature (5, max. 15)

ENGL 525 Topics in Restoration and Eighteenth-Century Studies (5, max. 15)

ENGL 527 Romanticism (5, max. 15)

ENGL 528 Victorian Literature (5, max. 15)

ENGL 529 Topics in Nineteenth-Century Studies (5, max. 15)

ENGL 531 Early American Literature (5, max. 15)

ENGL 532 Nineteenth-Century American Literature (5, max. 15)

ENGL 533 Modern American Literature (5, max. 15)

ENGL 535 American Culture and Criticism (5, max. 15)

ENGL 537 Topics in American Studies (5, max. 15)

ENGL 540 Modern Literature (5, max. 15)

ENGL 541 Contemporary Literature (5, max. 15)

ENGL 544 World Literature in English (5, max. 15)

ENGL 546 Topics in Twentieth-Century Literature (5, max. 15)

ENGL 550 Studies in Narrative (5, max. 15)

ENGL 551 Studies in Poetry (5, max. 15)

ENGL 552 Studies in Drama (5, max. 15)

ENGL 554 Theories of Structure, Genre, Form, and Function (5, max. 15)

ENGL 555 Feminist Theories (5, max. 15)

ENGL 556 Cultural Studies (5, max. 15)

ENGL 559 Literature and Other Disciplines (5, max. 15)

ENGL 560 The Nature of Language: History and Theory (5)

ENGL 561 Stylistics (5)

ENGL 562 Discourse Analysis (5)

ENGL 564 Current Rhetorical Theory (5)
Prerequisite: teaching experience.

ENGL 567 Approaches to Teaching Composition (1-5, max. 10) Readings in composition theory and discussion of practical classroom applications. Prerequisite: previous experience or concurrent assignment in teaching writing.

ENGL 569 Topics in Language and Rhetoric (5, max. 15)

ENGL 570 Practicum in Teaching English as a Second Language (3, max. 6) Discussion and practice of second-language teaching techniques. Three hours per week teaching required in addition to regular class meetings. Credit/no credit only. Prerequisite: ENGL 571 or permission of instructor.

ENGL 571 Theory and Practice on Teaching English to Speakers of Other Languages (5) Topics include second language reading, aural/oral skills, critical pedagogy, program administration, and language policy.

ENGL 572 Methods and Materials for Teaching English as a Second Language (5) Prerequisite: LING 445 or permission of instructor.

ENGL 574 Research Methods in Second-Language Acquisition (5) Prerequisite: ENGL 572, LING 449, or permission of instructor.

ENGL 575 Pedagogy and Grammar in Teaching English as a Second Language (5)

ENGL 576 Testing and Evaluation in English as a Second Language (5) Evaluation and testing of English language proficiency, including testing theory, types of tests, and teacher-prepared classroom

tests. Prerequisite: ENGL 571 and ENGL 572 or permission of instructor.

ENGL 578 Colloquium in Teaching English to Speakers of Other Languages (5, max. 10)
Overview of major issues in second-language acquisition, teaching methodology, and classroom practice with special emphasis on links between theories of language learning and practical aspects of teaching English to speakers of other languages.

ENGL 581 The Creative Writer as Critical Reader (5)

ENGL 584 Advanced Fiction Workshop (5, max. 15)
Prerequisite: graduate standing.

ENGL 585 Advanced Poetry Workshop (5, max. 15)
Prerequisite: graduate standing.

ENGL 586 Graduate Writing Conference (5)

ENGL 590 Master of Arts Essay (5/10, max. 10)
Research and writing project under the close supervision of a faculty member expert and with the consultation of a second faculty reader. The field of study is chosen by the student. Work is independent and varies. The model is an article in a scholarly journal. Prerequisite: graduate standing in English.

ENGL 591 Master of Arts for Teachers Essay (5)
Research and writing project under the close supervision of a faculty member expert in the field of study chosen by the student within the MAT degree orientation toward the teaching of English, and with the consultation of a second faculty reader. The model is an article in a scholarly journal.

ENGL 592 Graduate English Studies (1-5, max. 10)

ENGL 593 Textual Criticism (5) Introduction to paleography, codicology, analytical and descriptive bibliography; examination of the major contributions to textual theory in the nineteenth and twentieth centuries; practice in applying textual theory in editing literary works.

ENGL 595 Topics in Teaching Literature (5, max. 15)

ENGL 597 Directed Readings (*, max. 18) Intensive reading in literature or criticism, directed by members of doctoral supervisory committee. Credit/no credit only.

ENGL 599 Special Studies in English (5, max. 15)

ENGL 600 Independent Study or Research (*)

ENGL 601 Internship (3-10, max. 10) Credit/no credit only.

ENGL 700 Master's Thesis (*)

ENGL 800 Doctoral Dissertation (*)

European Studies

See International Studies.

Genetics

See Genome Sciences.

Geography

408A Smith



General Catalog Web page:
www.washington.edu/students/genecat/academic/geography.html



Department Web page:
depts.washington.edu/geog/

Geography is a far-reaching discipline providing a distinctive spatial approach to many of today's societal problems and issues: regional inequality; growth of service activities; residential and educational segregation; health-care delivery, urban growth management; transportation efficiency; environmental and pollution problems; economic impacts of major investments or technological changes; spatial efficiency of industrial production; spatial inequality in the distribution of goods, services, and resources; and the activities of international corporations and political states. Geography is the study of how individuals, groups, and societies interact with their environments. The discipline offers sufficient skills training to enable both graduates and undergraduates to be competitive in many job markets.

The study of geography emphasizes both technical and critical thinking skills. Geographers' skill sets include the ability to use Geographic Information Systems (GIS) software to produce maps; advanced technical skills in statistical analysis; the ability to use census and other demographic data; sophistication in locating data and interpreting it to help make an argument; sophistication in visual techniques for displaying data, including maps, charts, and graphs; advanced use of such software as spreadsheets, relational data bases, and Web page design; and the ability to present multiple models of land-use patterns for analysis in environmental and economic decision making. Graduates have pursued careers as urban planners, environmental planners and land-use analysts, GIS analysts, economic analysts (marketing, location analysis, geodemographics), public health researchers, NGO specialists in developing nations, airline route analysts, import-export/international-trade specialists, real estate valuation specialists, economic development specialists, social studies teachers, and college professors.

Geography seeks to understand the complex processes that result in observed patterns of settlement, location of economic activities, patterns of development, political organization, and the linkages and direction of trade and communication. Geographers also construct analytical tools, models of information representation, and graphic portrayals (notably maps) to aid the cognitive process of understanding.

Special Research and Teaching Facilities

A map center in Suzzallo Library houses atlases, sheet maps, and aerial photographs. Departmental facilities include the Edward L. Ullman Geography Collaboratory and the John C. Sherman Laboratory, which houses a variety of computer workstations connected to the campus computer network. The Ullman Collaboratory in 415 Smith provides a unique collaborative classroom with networked computer work stations. The Geography Commons Computer Room also provides computer work stations for students. The Department of Geography is a member of the Center for Social Science Computation and Research, which maintains an extensive data archive and offers many statistical and software consulting services.

Graduate Program

Graduate Program Coordinator
415B Smith, Box 353550
206-543-3246

The Department of Geography has flexible programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The aspirant to the master's degree is expected to complete all work for the degree in four to six quarters. The aspirant to the doctoral degree is expected to undertake two years of post-master's study and must take a departmental diagnostic examination upon entry, pass the General Examination, attain an appropriate level of competence in a foreign language or cognate field, and successfully complete a dissertation. Normally, doctoral program students complete all degree requirements in three to four years.

Admission Requirements

Admission to the graduate program normally requires a minimum GPA of 3.00 (on a 4.00 scale), or "B." Students holding a master's degree must meet this minimum scholastic requirement, but also should have achieved a GPA higher than 3.00 for graduate studies completed. All applicants must take the Graduate Record Examination. Specific information regarding application procedures may be obtained by writing to the graduate program adviser.

Financial Aid

The department usually awards approximately 15 to 20 teaching assistantships for the academic year. Most of the assistantships are for teaching quiz sections for a larger lecture class. A few of the more advanced doctoral candidates may teach a class. Normally, several research assistantships are also available. In recent years, approximately 85 percent of the department's graduate students have been funded by internal or external sources.

Faculty

Chair

James W. Harrington

Professors

Beyers, William B. * 1962; PhD, 1967, University of Washington; regional science, economic geography, location theory, regional analysis.

Chan, Kam Wing * 1991; PhD, 1988, University of Toronto (Canada); economic development, urbanization, migration, labor market, China.

Chrisman, Nicholas R. * 1987; PhD, 1982, University of Bristol (UK); geographic information systems, science and technology studies, geography of geographic information.

Ellis, John Mark 1999; PhD, 1988, Indiana University; race, ethnicity, immigration and local labor markets.

Fleming, Douglas K. * 1963, (Emeritus); PhD, 1965, University of Washington; transportation geography (especially ocean and air), regional organization of western Europe.

Guest, Avery * 1972, (Adjunct); MS, 1964, Columbia University, MA, 1967, PhD, 1970, University of Wisconsin; demography, ecology, stratification.

Harrington, James W. * 1997; PhD, 1983, University of Washington; roles of industrial change and labor processes in sub-national, regional economic development.

Hart, Lawrence G. 1982, (Adjunct); MS, 1975, University of Utah, PhD, 1985, University of Washington; rural health policy, medical geography.

Hodge, David C. * 1975; MS, 1973, PhD, 1975, Pennsylvania State University; urban geography, urban transportation geography, equity, gender.

Jackson, W. A. Douglas * 1955, (Emeritus); PhD, 1953, University of Maryland; Canada.

Krumme, Gunter * 1970; PhD, 1966, University of Washington; economic geography, regional economics, location theory, organization and decision theory.

Lawson, Victoria A. * 1986; PhD, 1986, Ohio State University; Latin America, political economy of development, feminist theory in development.

Mayer, Jonathan D. * 1977; PhD, 1977, University of Michigan; medical geography, health policy, environmental health, epidemiology, international health.

Morrill, Richard L. * 1955, (Emeritus); PhD, 1959, University of Washington; social and economic geography, theory and quantitative methods, spatial organization, migration.

Nyerges, Timothy L. * 1985; PhD, 1980, Ohio State University; GIS, spatial decision support, urban, transportation, environment, groupware.

Velikonja, Joseph * 1964, (Emeritus); PhD, 1948, State University (Italy); social and political geography, international migration, immigrants in America, eastern Europe.

Zumbrunnen, Craig * 1977; PhD, 1973, University of California (Berkeley); resource analysis, Russia and NIS, environment, mathematical programming, urban ecology.

Associate Professors

Brown, Michael P. * 1997; PhD, 1994, University of British Columbia (Canada); urban politics, health, sexuality, political theory, social theory, human geography.

Chang, Kuei-Sheng * 1966, (Emeritus); PhD, 1955, University of Michigan; economic geography of China, historical geography of exploration, Third World development.

England, Kim V. L. 1999; MA, 1984, PhD, 1988, Ohio State University; employment studies (especially women), families, child care, feminist theory and methodology.

Jarosz, Lucy A. * 1990; PhD, 1990, University of California (Berkeley); critical development studies, food and agriculture, rural poverty and inequality, political ecology.

Kakiuchi, George H. * 1957, (Emeritus); PhD, 1957, University of Michigan; Japan, agriculture, internal migration, regional geography.

Mitchell, Katharyne 1993; PhD, 1993, University of California (Berkeley); urban economic and cultural geography, with focus on social theory, the Pacific Rim.

Sparke, Matthew * 1995; MA, 1991, PhD, 1996, University of British Columbia (Canada); political-geography, social theory, cultural studies, globalization.

Waddell, Paul A. * 1997, (Adjunct); PhD, 1989, University of Texas (Dallas); urban policy, regional planning, growth management, land use, transportation, GIS.

Assistant Professors

Chang, Stephanie E. * 1997, (Research); PhD, 1994, Cornell University; economic geography, urban infrastructure systems, natural disasters, United States and Japan.

Herbert, Steven K. 2000; PhD, 1995, University of California (Los Angeles); policing and social control; American criminal justice; geography and law.

Jhaveri, Nayna J. 1997; MSc, 1984, PhD, 1999, University of Edinburgh (UK); political and cultural ecology, consumption and environment, common property systems, Asia.

Withers, Suzanne D. * 1997; PhD, 1992, University of California (Los Angeles); urban housing, residential mobility and migration, longitudinal methods, life-course dynamics.

Lecturer

Purcell, Mark H. 1999; PhD, 1998, University of California (Los Angeles); urban, political, citizenship, scale.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat/.

GEOG 401 Culture, Capital, and the City (5) I&S Examines current themes in social theory as they apply to the urban landscape. Includes the interconnections of cultural and economic processes and the spatial patternings of race, class, and gender in the modern urban context. Offered: A.

GEOG 425 Qualitative Methodology in Geography (5) I&S Jarosz Historical and philosophical overview of qualitative methodology in design of geography research strategies. Techniques of interviewing, participant observation, and archival research. Forms of analyses such as textual interpretation, discourse analysis and computer-aided analyses of interview transcripts and ethnography. Questions of ethics, field notes and write-up. Offered: W.

GEOG 426 Quantitative Methods in Geography (5) I&S Withers Quantitative methods for empirical research in geography. Emphasis on statistical analysis; use of geographic data bases like the United States Census; understanding special issues and problems associated with geographically ordered data; verbal and graphic presentation in a computer environment. Recommended: GEOG 326. Offered: Sp.

GEOG 430 Contemporary Development Issues in Latin America (5) I&S Lawson Contemporary development issues in Latin America, seen from a spatial perspective. Concept of development; competing theories as related to various Latin American states. Economic structural transformation, migration, urbanization, regional inequality, and related policies. Offered: A.

GEOG 431 Geography and Gender (5) I&S Jarosz Examines theories and case studies across international, national, and regional scales in order to illustrate the impacts of social and economic processes upon the construction of gender in particular places. Offered: Sp.

GEOG 435 Industrialization and Urbanization in China (5) I&S Chan Examines the impacts of industrialization strategies adopted by the Peoples

Republic of China on urbanization and rural-urban relations. Topics include: economic development strategies, industrial geography, rural industrialization, urban development patterns, migration, and urbanization policies. Recommended: GEOG 336. Offered: Sp.

GEOG 439 Gender, Race, and the Geography of Employment (5) I&S Ellis Focuses on the geography of employment for men and women of different racial and ethnic backgrounds in American cities. Presents evidence on labor market inequality for different groups and explanations of these differences. Emphasizes the importance of a spatial perspective in understanding employment outcomes for women and minorities.

GEOG 440 Regional Analysis (5) I&S Beyers Regional industrial structures and economic change. Application of shift-share, cohort, multiplier, input/output, and programming models to the analysis and projection of regional population and employment patterns, regional growth differentials, and regional impact analysis. Recommended: GEOG 207. Offered: Sp.

GEOG 442 Social Geography (5) I&S Review of concepts and methods of postwar social geography: historical roots and present orientations. Study of social spatial systems, their structures and functioning.

GEOG 445 Population Distribution and Migration (5) I&S Withers Relation of population distribution to environment, economic development, and culture. Frontier and rural settlement, urbanization, and sub-urbanization. Regional variation in age, ethnicity, fertility, and mortality. Causes and effects of migration from the world to the local scale. Offered: A.

GEOG 447 The Geography of Air Transportation (5) I&S Geographic analysis of world air routes, passenger and cargo flows, and airport activities; consideration of physical, economic, political, and institutional determinants of routes and flows.

GEOG 448 Geography of Transportation (5) I&S Chang Circulation geography, principles of spatial interaction emphasizing commodity flow, the nature and distribution of rail and water transport, the role of transport in area development.

GEOG 449 Geography of Ocean Transportation (5) I&S Geographic analysis of ocean trade routes, cargo and passenger flows, and port activities. Evaluation of the role of the transportation carrier in international trade.

GEOG 450 Theories of Location (5) I&S Krumme Derives basic micro-economic, decision-theoretical, managerial, and organizational-theoretical principles underlying consumer, commercial, industrial, and government behavior in physical, economic, transportation, and communication (including cyber-) space. Recommended: GEOG 207. Offered: A.

GEOG 451 Cultural Geography of Latin America (5) I&S Interdisciplinary senior seminar examining how physical and social geographies are culturally constructed and interconnected with subjectivities and power in Latin America. Topics include identity formation grounded in particular territories and the social constitution of space via an interplay of material and cultural forces. Offered: jointly with SISLA 451.

GEOG 458 Map Sources and Errors (5) I&S Chrisman Analysis and appraisal of source materials for maps, production constraints of mapping agencies, coverage and quality. Focus on errors inherent in maps and geographic information; metadata resources; judgment of fitness for specific applications. Prerequisite: 2.0 in GEOG 360. Offered: odd years; W.

GEOG 460 Geographic Information Systems Analysis (5) I&S *Chrisman* Methods of Analysis provided by geographic information systems (GIS). Operations on map information including map overlay, aggregation/disaggregation, and other spatial and attribute procedures. Exposure to raster and vector software. Review of capabilities of current available GIS software. Prerequisite: 2.0 in GEOG 360. Offered: A.

GEOG 461 Urban Geographic Information Systems (5) I&S *Nyerges* Use of geographic information systems to investigate urban/regional issues; focus on transportation, land-use and environmental issues; all urban change problems considered. GIS data processing strategies. Problem definition for GIS processing. Data collection, geocoding issues. Data structuring strategies. Prerequisite: 2.0 in GEOG 360; recommended: GEOG 277. Offered: W.

GEOG 463 Geographic Information Systems Workshop (5) I&S *Chrisman, Nyerges* Practical experience applying geographic information system (GIS) tools to analyze spatial data. Workshop format requires student-motivated projects; diverse backgrounds encouraged. Prerequisite: either 2.0 in GEOG 460 or 2.0 in GEOG 461. Offered: Sp.

GEOG 465 Analytical Cartography (5) I&S *Chrisman* Algorithms and data structures for selected topics in computer-assisted cartography. Emphasis on point, line, area, and surface data representation, map design, generalization, and data transformations. Prerequisite: either 2.0 in GEOG 460 or 2.0 in GEOG 461. Offered: odd years; W.

GEOG 466 Regional Economic Development (5) I&S *Harrington* Provides a theoretical overview of sub-national, regional economic growth and structural change, including the roles of interregional interaction and international trade, technological change, social, and legal institutions. Emphasizes inter-regional disparities in the context of relatively wealthy countries. Explores the constraints and effectiveness of government (and other organizations') policy. Offered: W.

GEOG 471 Methods of Resource Analysis (5) I&S *ZumBrunnen* Economic and noneconomic criteria for resource analysis. Theory and methods of linear models of natural resource analysis. Includes materials-balance modeling, residuals management, constrained system optimization approaches to water quality analysis, land-use patterns and interregional energy use, and multiple objective planning techniques applied to natural resource problems. Recommended: GEOG 370.

GEOG 472 Ecoscapes: Nature, Culture, and Place (5) I&S *Jhaveri* Relationship between nature, culture, and place as the heart of geographic inquiry. Examines how perceptions of nature are influenced by changing political-economic, cultural, and scientific practices. Uses cultural studies of ecological science as a primary method of analysis. Offered: Sp.

GEOG 474 Geography and the Law (5) I&S *Herbert* Examines the relationship between geography, law, and socio-legal analysis; reviews significant instances where law and geography intersect, such as the regulation of public space, the regulation of borders and mobility, and disputes over property and land use. Offered: jointly with LSJ 474.

GEOG 476 Women and the City (5) I&S *England* Explores the reciprocal relations between gender relations, the layout of cities, and the activities of urban residents. Topics include: feminist theory and geography (women, gender, and the organization of space); women and urban poverty, housing and homelessness; gender roles and labor patterns; geographies of childcare; and women and urban politics. Offered: jointly with WOMEN 476.

GEOG 477 Advanced Urban Geography (5) *Brown* Geographic patterns and social processes within metropolitan areas. Canvases current research topics, methods, and theoretical debates in urban geography. Issues covered range across urban economic, political, and cultural geography. Recommended: GEOG 277. Offered: Sp.

GEOG 478 Intraurban Spatial Patterns (5) I&S *Mitchell* Geographic patterns and processes within metropolitan areas. Economic land-use patterns (commercial and industrial location), social land-use patterns (segregation, housing, and neighborhood change), urban political geography, analysis of urban infrastructure, and assessment of contemporary and future trends in urban development. Recommended: GEOG 277. Offered: Sp.

GEOG 479 Race, Ethnicity, and the American City (5) I&S *Ellis* Explores America's cities as sites where ethnic and racial interaction have generated specific patterns of opportunity and disadvantage in housing and labor markets; how ethnic identities and racial formations are changed by living and working in cities, and questions of assimilation, multiculturalism, and America's ethno-racial future.

GEOG 480 Environmental Geography, Climate, and Health (5) I&S *Mayer* Demonstrates and investigates how human-environment relations are expressed in the context of health and disease. Local and global examples emphasize the ways medical geography is situated at the intersection of the social, physical, and biological sciences. Examines interactions between individual health, public health, and social, biological, and physical phenomena. Offered: W.

GEOG 486 Problem Analysis in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local and regional issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with CFR 474; A.

GEOG 487 Applied Theory and Methods in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: CFR 474/GEOG 486. Offered: jointly with CFR 475; W.

GEOG 488 Research in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* How to analyze, present, and begin to interpret data relevant to addressing issues in urban ecology. Students write and orally present revised objectives and methods sections of their interdisciplinary project and present a draft Results section. Prerequisite: CFR 475/GEOG 487. Offered: jointly with CFR 476; Sp.

GEOG 490 Field Research: The Seattle Region (6) I&S *Moral* Field methods for contemporary urban research. Survey designs used in the analysis of transportation, land use, location of employment, shopping and housing, political fragmentation, and environmental degradation. Field report required, based on field work in the Seattle region.

GEOG 493 Assessing Geographic Learning (2) *Harrington* Enables graduating geography majors to articulate and assess their academic development and professional readiness by examining ways of representing geographic skills and capabilities. Offered: Sp.

GEOG 494 Senior Essay (3) I&S Supervised individual research and writing of major paper during senior year. Offered: AWSp.

GEOG 495 Special Topics (*, max. 15) I&S Topics vary and are announced in the preceding quarter. Offered: AWSpS.

GEOG 496 Internship in Geography (3/5, max. 12) Internship in the public or private sector, supervised by a faculty member. Credit/no credit only. Offered: AWSpS.

GEOG 497 Tutorial in Geography (1-5, max. 15) I&S *ZumBrunnen* Intensive directed study and tutoring. Literature reviews, formulations of project outlines and research designs, orientation in contemporary geographic thought and trends. Directed writing. Required for honors students. Offered: AWSp.

GEOG 498 Undergraduate Seminar in Economic Geography and Regional Science (3) I&S *Krumme* Selected advanced topics and current problems in economic geography. Emphasis on formulating research questions, developing an appropriate research process, selecting methods, searching for resources, writing up and documenting research results, and using the Internet for research purposes. Offered: Sp.

GEOG 499 Special Studies (*, max. 15) Supervised reading programs, undergraduate and graduate library and field research; special projects for undergraduate honors students. Offered: AWSpS.

Courses for Graduates Only

GEOG 500 Contemporary Geographic Thought (4, max. 8)

GEOG 502 Professional Writing in Geography (*, max. 6)

GEOG 505 Research Seminar: China (5, max. 10) *Chan* Offered: A.

GEOG 507 Research Seminar: Canadian Problems (3, max. 6) Consideration of the spatial dimensions of Canadian socioeconomic, cultural, and political development, with emphasis on resource potentials and relations with the United States, Japan, and other important trading partners. Prerequisite: GEOG 308 or permission of instructor. Offered: jointly with SISCA 507.

GEOG 512 History of Geographic Thought (5) Historical development of modern geography. Emphasis on various philosophical and methodological debates in geography and the contexts from which they emerged. Investigates geography's foundational concepts and institutions; how they have responded to—and influenced—the world around them. Offered: A.

GEOG 513 Research Grant Workshop (5, max. 10) Writing research proposals. Participants learn to identify and approach sponsors; practice the peer-review process; develop a competitive research proposal. Prerequisite: GEOG 512 or GEOG 515 or equivalent; training and experience with quantitative, qualitative, or cartographic analysis; an already-formulated research project.

GEOG 515 Evidence and Explanation in Geography (5) *Sparke* Introduces the main strands of philosophical debate shaping the discipline of human geography, including description, prediction, explanation, abstraction, structuration, representation, and institutionalization. Focuses on ways "theories" from outside the discipline have shaped the questions and concerns of geographers, and the ways geography reworks such theories. Offered: Sp.

GEOG 520 Research Seminar: Geographic Information Representation (5) *Nyerges* Current

issues in geographic information representation for geographic information systems (GIS). Includes representation for visualization, databases, and analyses. Prerequisite: one course in GIS.

GEOG 531 Latin American Development Seminar (5, max. 10) *Lawson* Evolution of development theory in Latin America from a spatial perspective. Theories and development issues, using case studies from Latin America. How geographers have conceptualized development problems and solutions. Prerequisite: GEOG 430.

GEOG 532 Rural Development Seminar (5, max. 10) *Jarosz* Contemporary issues in international development theory related to regional and agrarian change, with emphasis on Africa.

GEOG 540 Research Seminar: Industrial Geography (5, max. 10) *Beyers* Offered: W.

GEOG 541 Research Seminar: Feminist Geographies (5) *England* Explores major research themes in feminist geographies. Particular attention to the concept that gendered identities and spaces are discursively (re)produced. Emphasizes recent feminist scholarship that emphasizes difference, as well as the intersections between gender, "race," ethnicity, sexuality, age, nationality, class, and other social identities and divisions. Offered: jointly with WOMEN 541; W.

GEOG 542 Research Seminar: Social and Population Geography (5, max. 10) *Morrill* Offered: jointly with CS&SS 542; W.

GEOG 543 Research Seminar: Immigration, Ethnicity, and Employment (5) *Ellis* Employment patterns and outcomes for immigrants and ethnic minorities. Emphasis is on the U.S. experience and topics covered include labor market segmentation, theories of discrimination, job/labor queues, networks, ethnic niches and enclaves, skills and spatial mismatches. Specific focus changes annually.

GEOG 544 Event History Analysis of Social and Spatial Change (5) *Withers* Examines life course research using event-history analysis with applications to the substantive areas of household dynamics, family formation and dissolution, marriage, cohabitation, and divorce, migration histories, residential mobility, and housing careers. Examines continuous- and discrete-time longitudinal models during practical laboratory sessions. Offered: jointly with CS&SS 544.

GEOG 550 Research Seminar in Location Theory (3) *Krumme* Current research topics in economic and business geography. Focus shifts from year to year. Examples include spatial structures and economic development, economic geography of information, transaction cost perspectives of the location problem, and relationships between organization theory and theories of spatial organization.

GEOG 553 Advanced Topics in Cultural Geography (5, max. 10) *Mitchell* Focuses on important contemporary topics in cultural geography. Examines current theoretical debates in anthropology, sociology, geography, feminist criticism, and cultural studies as they relate to the landscape. Include critical questions surrounding issues of representation and ethnography. Designed to help student prepare for advanced fieldwork. Offered: Sp.

GEOG 560 Geographic Information and Analysis (5, max. 10) *Chrisman* Current research topics in geographic information systems. Particular emphasis on analytical methods, and their use in practical circumstances. Prerequisite: graduate status in GIS or related field. Offered: W.

GEOG 567 Research Seminar: Geography and Economic Development (5, max. 10) *Harrington*

Explores ways in which economic and social changes affect the well-being and development of subnational, regional economies. Explanatory roles of such factors as labor and labor institutions, governments, technical change, corporations, capital markets, information costs, and international trade in the process of global restructuring. Specific focus changes annually.

GEOG 570 Research Seminar: Natural Resources Analysis (3, max. 6) *ZumBrunnen*

GEOG 571 Research Seminar: Critical and Normative Ecologies (5) *Jhaveri* Engages in an ecocritique of mainstream managerial environmentalism by unearthing their ideological bases, and delves into the ethical underpinnings of ecological resistance struggles or green utopias such as ecofeminist, deep and social ecology, and environmental justice movements. Offered: A.

GEOG 573 Urban Political Geography: Research Seminar (5) *Brown* Covers both classic and contemporary theoretical debates and research on the relation between power, place, and the local scale. Considers both conventional sites (e.g., the local state) as well as new forms and locations of city politics (e.g., sexuality and the body).

GEOG 574 Research Seminar: Geography, Law, and Social Control (5) *Herbert* Explores relationship between the construction and enforcement of law and the landscape of lived experience; reviews major approaches in socio-legal analysis and seeks to augment these with insights from contemporary human geography research; explores various ways in which geographical variance shapes legal behavior.

GEOG 575 Advanced Political Geography (5) *Sparke* Provides resources for theorizing how politics shapes and is shaped by geographical relationships. Examines how politics are situated in complex material and discursive geographies that are partly reproduced through political negotiations. Examines interrelationships of contemporary capitalism with other complex systems of social and political power relations. Offered: jointly with SIS 575.

GEOG 578 Research Seminar: Theorizing the City (5) *Ellis* Considers classic and contemporary writings in urban theory in the twentieth century, including social ecology (Chicago School), political economy, and contemporary theoretical debates in post-structuralism, deconstructionism, and culture as they relate to cities and space. Offered: W.

GEOG 580 Medical Geography (3) *Mayer* Geography of disease, consideration in health systems planning. Analysis of distributions, diffusion models, migration studies. Application of distance, optimal location models to health systems planning; emergency medical services; distribution of health professionals; cultural variations in health behavior. Prerequisite: familiarity with social science research; health-related issues. Offered: jointly with HSERV 586; W.

GEOG 581 Seminar in Medical Geography (5, max. 10) *Mayer* Research and methodologies in medical geography; critical analysis of readings in medical geography; interrelations of medical geography with other geographical specialties and other health sciences. Prerequisite: GEOG 580. Offered: odd years; W.

GEOG 588 Advanced Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discussion of current and important theoretical and empirical papers in urban ecology. Students continue to research interdisciplinary urban ecology projects while developing publishable manuscripts and oral presentations. Offered: jointly with CFR 588; AWSp.

GEOG 597 Tutorial for Graduate Students (2) Introduces beginning geography students to the main research agendas of the faculty; identifies the range of current discourse communities formed by current faculty and graduate students; establishes a process of mentoring and long-term planning for each new graduate student. Credit/no credit only. Offered: A.

GEOG 598 Geography Colloquium (1, max. 3) Participation in, and critique of, student thesis and dissertation research, faculty research, and visitor contributions. Offered: AWSp.

GEOG 599 Effective Teaching of Geography (1) Designed for the ongoing development of effective teaching and professional skills. Topics/activities include micro-teaching, communications and presentation skills; course organization, time management, personal and small group dynamics; design of geography curricula using simulations and computer-assisted instruction in the classroom, and fostering of creative thinking. Credit/no credit only. Offered: A.

GEOG 600 Independent Study or Research (*) Offered: AWSpS.

GEOG 700 Master's Thesis (*) Offered: AWSpS.

GEOG 800 Doctoral Dissertation (*) Offered: AWSpS.

Geological Sciences

See Earth and Space Sciences.

Geophysics

See Earth and Space Sciences.

Germanics

340C Denny

 *General Catalog Web page:*
www.washington.edu/students/gencat/academic/germanics.html

 *Department Web page:*
depts.washington.edu/uwgerman/

The Department of Germanics focuses on the language, literature, and civilization of the German-speaking countries; on the role of their history, literature, and philosophy in Western civilization; and on linguistic analysis, especially historic, of the Germanic languages.

The department's mission is the dissemination of German intellectual and artistic traditions. In the service of this mission, the Department of Germanics is committed to excellence in educating undergraduates who pursue majors and minors in German language, literature, and culture. The department offers a wide spectrum of courses conducted in English on aspects of German culture and history for general humanistic education.

Graduate Program

Graduate Program Coordinator
345 Denny, Box 353130
206-543-6025
uwgerman@u.washington.edu

The Department of Germanics offers a closely integrated program leading to the Master of Arts and Doctor of Philosophy degrees. The doctoral curriculum serves the needs of the future professors at universities and colleges, stressing scholarship and research. The master's curriculum requires a minimum of 40 credits, a final comprehensive examination, and two papers. The study period of the doctoral program is two years (minimum number of post-master's credits is 60). The completion of the necessary course work is followed by general written and oral examinations. A third doctoral year is reserved for the writing of the dissertation.

The M.A. and Ph.D. programs concentrate on German literature, civilization, and philosophical traditions, with an option to include Germanic linguistics and courses outside the department. The doctoral dissertation must be an original contribution to scholarship and must demonstrate mastery of the pertinent methods of investigation.

The Department of Germanics also participates in the joint-doctoral program in literature and critical theory. Study in this program leads to a Ph.D. in Germanics and Critical Theory. For details see the program description under Comparative Literature.

Special Requirements

Aspirants for advanced degrees in German must have the equivalent of an undergraduate major in German. A reading knowledge of one foreign language (usually German) is a prerequisite for the M.A. degree. Reading knowledge of a second language is required before the student is admitted to the Ph.D. General Examination. The languages chosen are subject to approval by the department.

Financial Aid

A limited number of teaching assistantships and fellowships are available. The teaching load consists of a five-hour course on the first- or second-year level. The teaching assistants are supervised by experienced faculty members.

Faculty

Chair

Sabine Wilke

Professors

Ammerlahn, Hellmut H. * 1968; PhD, 1965, University of Texas (Austin); classicism and comparative literature.

Barrack, Charles M. * 1968; PhD, 1969, University of Washington; Germanic linguistics.

Behler, Diana I. * 1973; MA, 1966, PhD, 1970, University of Washington; romanticism, nineteenth century, comparative literature.

Brown, Jane K. * 1988; PhD, 1971, Yale University; seventeenth, eighteenth and nineteenth century, comparative literature.

Brown, Marshall J. * 1988, (Adjunct); PhD, 1972, Yale University; eighteenth- and nineteenth-century literature, literary theory, music and literature.

Gray, Richard T. * 1991; PhD, 1981, University of Virginia; eighteenth, nineteenth and early twentieth-century literature, literary sociology, critical theory.

Hertling, Gunter H. * 1961, (Emeritus); PhD, 1963, University of California (Berkeley); eighteenth- and nineteenth-century literature.

Hruby, Antonin F. * 1961, (Emeritus); PhD, 1946, Charles University (Czechoslovakia); medieval literature.

Rey, William H. 1981, (Emeritus); PhD, 1937, University of Frankfurt (Germany); nineteenth and twentieth century German literature.

Voyles, Joseph B. * 1965; PhD, 1965, Indiana University; Germanics and linguistics.

Wilke, Sabine * 1988; PhD, 1986, University of Mainz (Germany); critical theory, contemporary theater and film, literature and philosophy.

Associate Professors

Bansleben, Manfred * 1988; PhD, 1979, University of Vienna (Austria); German language and methodology, history, culture studies.

McLean, Sammy * 1967, (Emeritus); PhD, 1963, University of Michigan; Western drama, twentieth-century poetry, psychoanalysis and literature, literary translation.

Prutti, Brigitte * 1991; DPhil, 1988, University of Graz (Austria); eighteenth-century literature, twentieth-century Austrian literature, theory and history of drama.

Rabura, Horst M. * 1961, (Emeritus); MA, 1966, University of Washington; German language and methodology.

Assistant Professors

Ames, Eric C. 2000; PhD, 2000, University of California (Berkeley); nineteenth- and twentieth-century German literature; cultural studies; film.

Ostmeier, Dorothee * 1993, (Affiliate); PhD, 1993, Johns Hopkins University; German literature, philosophy, cultural history; Middle ages to present, emphasis on 20th century.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

GERMAN 401 Advanced Writing and Conversation (3-5) VLPA Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

GERMAN 403 Advanced Writing and Conversation (3-5) VLPA Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

GERMAN 406 Intensive Elementary Yiddish (5-15, max. 15) Intensive study of Yiddish grammar, with oral and written drills and reading of selected texts. Offered: S.

GERMAN 411 Studies in Medieval Literature and Culture (5) VLPA Rotating special topics in literature and culture of the Middle Ages, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 421 Studies in Eighteenth-Century Literature and Culture (5) VLPA Rotating special topics in literature and culture of the eighteenth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 422 Studies in Nineteenth-Century Literature and Culture (5) VLPA Rotating special topics in literature and culture of the nineteenth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 423 Studies in Twentieth-Century Literature and Culture: (5) VLPA Rotating special topics in literature and culture of the twentieth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 444 Undergraduate Thesis in Germanics (5) VLPA Supervised research leading to the writing of a research thesis.

GERMAN 445 Undergraduate Honors Thesis in Germanics VLPA (5) Supervised research for honors students leading to the writing of an honors thesis.

GERMAN 446 Internship in German (2-5, max. 10) Prerequisite: 6 credits of upper-level German language courses. Credit/no credit only.

GERMAN 447 Undergraduate Research (1-5, max. 15) Supervised research with faculty member. Offered: AWSpS.

GERMAN 451 Linguistic Analysis of German (5) VLPA Recommended: GERMAN 203 Offered: A.

GERMAN 452 History of the German Language (5) VLPA From early Germanic to the present. Recommended: GERMAN 203 Offered: W.

GERMAN 490 Contemporary German Literature (5) VLPA Interpretation of selected works by contemporary German authors. Recommended: GERMAN 303; either GERMAN 311 or GERMAN 312.

GERMAN 493 Special Topics in German Culture (5) I&S/VLPA Recommended: GERMAN 303; either GERMAN 322 or GERMAN 323.

GERMAN 494 Studies in German Poetry (5) VLPA Introduction to various methods of interpretation and to their practical application. Recommended: GERMAN 303; either GERMAN 311 or GERMAN 312.

GERMAN 495 Proseminar in German Literature (5, max. 15) VLPA Special topics, the subject matter and depth of which are not included in other literature courses, arranged through consultation among students and faculty members.

GERMAN 496 History of Germanic Philology (5) VLPA Introduction to the works of outstanding scholars in the field of Germanics.

GERMAN 497 Studies in German Literature (1-6, max. 15)

GERMAN 498 Studies in the German Language (1-6, max. 15)

GERMAN 499 Studies in German Culture (1-6, max. 15)

Courses for Graduates Only

GERMAN 500 Literary Theory, Methodology, and Bibliography (5) Historical survey and analysis of criticism (*Methodengeschichte*) and modern trends in contemporary theory. Methods of research and bibliography, as well as theoretical aspects of practical interpretation.

GERMAN 503 Contemporary German Literature (5, max. 15) Seminar analyzing the esthetic movements and thought of contemporary German literature, the social and political problems dealt with in the works of representative authors, and major experimental concepts. Some previous exposure to the German literature and civilization after 1945 is expected.

GERMAN 504 Special Studies in Literary Criticism and Theory (5, max. 15) Literary criticism and theory, focusing on special topics proposed by the instructor. Taught in English. Prerequisite: GERMAN 500 or equivalent.

GERMAN 510 Studies in Medieval Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the Middle Ages, such as particular movements, authors, genres, themes, or problems.

GERMAN 511 Studies in Renaissance and Baroque Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the Renaissance and Baroque, such as particular movements, authors, genres, themes, or problems.

GERMAN 514 Studies in Nineteenth-Century Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the nineteenth century, such as particular movements, authors, genres, themes, or problems.

GERMAN 516 Studies in Twentieth-Century Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the twentieth century, such as particular movements, authors, genres, themes, or problems.

GERMAN 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/NEAR E 518/SCAND 518/SLAV 518.

GERMAN 525 Seminar in Romanticism (5, max. 15)

GERMAN 526 Seminar in Nineteenth-Century Drama (5, max. 15)

GERMAN 527 Seminar in Nineteenth-Century Prose (5, max. 15)

GERMAN 528 Nineteenth-Century Poetry (5, max. 15) Representative selections from Hölderlin, the late Goethe, and from prevalent trends in nineteenth-century poetry, such as romanticism, "Young Germany," poetic realism, and the experimental poetry of naturalism.

GERMAN 529 Studies in Literature 1870-1920 (5, max. 15) Seminar on rotating special topics drawn from the period 1870-1920, such as particular movements, authors, genres, themes, or problems.

GERMAN 533 Seminar in Eighteenth-Century Literature (5, max. 15) Study of one or more of the literary movements: Enlightenment, sentimentalism,

anacreontics, storm and stress, classicism, early romanticism, and works by principal authors such as Gottsched, Bodmer, Gellert, Lessing, Wieland, Klopstock, Herder, Lenz, Goethe, Schiller, Jean Paul.

GERMAN 534 Storm and Stress (5, max. 15) Extensive investigation of poetological and esthetic concepts advanced by initiators and exponents of German storm and stress. Analyses of narrative and dramatic works of storm and stress reveal reflections and implementations of the new theoretical concepts.

GERMAN 535 Classicism: Goethe, Schiller (5, max. 15)

GERMAN 537 Studies in Literature 1770-1830 (5, max. 15) Seminar on rotating special topics drawn from the period 1770-1830, such as particular movements, authors, genres, themes, or problems.

GERMAN 540 Twentieth-Century Poetry (5, max. 15) Development of German poetry from Rilke, Hofmannsthal, and George through Trakl, Benn, the Expressionists and the Dadaists, Brecht, and Enzensberger, to such contemporaries as Eich, Heissenbüttel, the concrete poets, Celan, and Bachmann.

GERMAN 541 Twentieth-Century German Drama (5, max. 15) Selection from modern German drama representative of the concern with the human condition, of social criticism, and of experimentation with the new dramatic forms.

GERMAN 542 Twentieth-Century Prose (5, max. 15) Selected modern German novels, short novels, and short stories by representative authors dealing with the social and political problems of Germany as well as with individual problems of existence and identity.

GERMAN 550 Gothic (5)

GERMAN 551 Seminar in Germanic Philology and Linguistics (5, max. 15) Topics vary. Prerequisite: basic knowledge of German and at least one elementary linguistics course.

GERMAN 552 Old High German (5)

GERMAN 555 Old Saxon (5)

GERMAN 556 Middle High German (5)

GERMAN 560 Modern Dialects (5)

GERMAN 565 Seminar in Courtly Epic (5) Aspects and methods of literary analysis pertaining to the study of medieval courtly epics.

GERMAN 575 Teaching of German Literature and Civilization (3) Teaching of German language and literature on the advanced level in secondary schools and colleges. Credit/no credit only.

GERMAN 576 Modern Methods and Materials in Teaching German (3) Theory and practice of communicative language teaching; current developments in foreign-language teaching; evaluation of teaching materials. Credit/no credit only.

GERMAN 577 Principles of Second Language Learning (2)

GERMAN 580 Seminar in German Literature (5, max. 15) Open topics seminar with varying content.

GERMAN 581 Seminar in Poetry (5, max. 15) Open topics seminar with varying content.

GERMAN 582 Seminar in Drama (5, max. 15) Open topics seminar with varying content.

GERMAN 583 Seminar in Prose (5, max. 15) Open topics seminar with varying content.

GERMAN 590 Philosophical Issues in German Culture (5, max. 15) Seminar on rotating special topics dealing with the impact of particular thinkers, movements, or philosophical problems in German culture.

GERMAN 591 Studies in German Intellectual History (5, max. 15) Seminar on rotating special topics dealing with interactions of history, literature, and culture in the German tradition.

GERMAN 592 Cultural Studies (5, max. 15) Seminar on rotating special topics dealing with periods, themes, or particular problems in German life and culture.

GERMAN 600 Independent Study or Research (*)

GERMAN 700 Master's Thesis (*)

GERMAN 800 Doctoral Dissertation (*)

History

315 Smith



General Catalog Web page:
www.washington.edu/students/genecat/academic/history.html



Department Web page:
depts.washington.edu/clio/

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

Graduate Program

Graduate Program Coordinator
206C Smith, Box 353560
206-543-8291
histgrad@u.washington.edu

The Department of History offers graduate training leading to the Master of Arts and Doctor of Philosophy degrees in a large number of fields within the discipline. Students in the programs prepare for careers as college teachers who combine teaching with scholarship and professional writing. A few graduates enter government service, college administration, or publishing. The M.A. program is normally completed in four or five full-time academic quarters or their equivalent. The Ph.D. program requires at least three years of full-time work beyond the M.A. degree. Graduate training at both levels includes (1) course work and independent study leading to examinations in special historical fields, and (2) sustained investigation and interpretation of historical problems in seminars involving the writing of essays. A dissertation must be prepared for the Ph.D.

Special Requirements

Admission to the graduate program requires a sound undergraduate major in history or in one of the basic disciplines related to history completed within a college of liberal arts and sciences. The department also requires evidence of the applicant's ability to write cogently and lucidly and to interpret historical data.

Financial Aid

Beginning graduate students may qualify for a limited number of fellowships, readerships, and work-study assistantships. Students with, or who expect to receive, the M.A. degree by the time they begin their

studies may apply for teaching assistantships and may, with continued satisfactory scholarly progress, expect reappointment for a total of three years, provided adequate funds are available.

Faculty

Chair

Robert C. Stacey

Professors

Alden, Dauril * 1959; MA, 1952, PhD, 1959, University of California (Berkeley); Latin American history, comparative colonial history.

Bacharach, Jere L. * 1967; MA, 1962, Harvard University, PhD, 1967, University of Michigan; history of the Near East.

Barlow, Tani E. * 1994, (Adjunct); MA, 1979, PhD, 1985, University of California (Davis); modern Chinese history, feminist studies, East Asia/Asian American studies.

Behlmer, George K. * 1979; MA, 1972, PhD, 1977, Stanford University; modern English history.

Benson, Keith R. * 1981, (Adjunct); MA, 1973, PhD, 1979, Oregon State University; history of modern American biology, marine biology, and evolutionary biology.

Bergquist, Charles W. * 1989; MA, 1968, PhD, 1973, Stanford University; modern Latin American history, comparative labor history, Third World development.

Bridgman, Jon M. * 1961, (Emeritus); PhD, 1960, Stanford University; modern European history (especially military).

Butow, Robert J. C. * 1960, (Emeritus); PhD, 1953, Stanford University; East Asian diplomatic history.

Conlon, Frank F. * 1968, (Emeritus); PhD, 1969, University of Minnesota; history of India.

Ebrey, Patricia B. * 1997; PhD, 1975, Columbia University; the social and cultural history of China, especially the Song Dynasty (960-1279).

Ellison, Herbert J. * 1968; PhD, 1955, University of London (UK); modern Russian history.

Ferrill, Arthur L. * 1964, (Emeritus); PhD, 1964, University of Illinois; ancient history.

Findlay, John M. * 1987; PhD, 1982, University of California (Berkeley); history of the American West.

Fowler, Wilton B. * 1969; PhD, 1966, Yale University; American history (especially diplomatic).

Gil, Carlos * 1974; PhD, 1975, University of California (Los Angeles); Latin America and history of the Chicano people.

Glenn, Susan A. * 1993; PhD, 1983, University of California (Berkeley); twentieth-century U.S. social history including women's history, immigration, labor, popular culture.

Johnson, Richard R. * 1972; PhD, 1972, University of California (Berkeley); United States colonial history.

Jonas, Raymond A. * 1985; PhD, 1985, University of California (Berkeley); modern France.

Kirkendall, Richard S. * 1988, (Emeritus); PhD, 1958, University of Wisconsin; recent United States history.

Lebsock, Suzanne D. * 1995; MA, 1973, PhD, 1977, University of Virginia; history of women, American social history, history of the South.

Levy, Fred J. * 1960; PhD, 1960, Harvard University; history of England in the sixteenth- and seventeenth-centuries, English historiography.

McCormick, Richard L. * 1995; PhD, 1976, Yale University; United States political history.

Palais, James B. * 1968, (Emeritus); PhD, 1968, Harvard University; modern Korean history.

Pease, Otis A. * 1966, (Emeritus); PhD, 1954, Yale University; United States in the twentieth century.

Pressly, Thomas J. * 1949, (Emeritus); PhD, 1949, Harvard University; history.

Pyle, Kenneth B. * 1965; PhD, 1965, Johns Hopkins University; modern Japanese history.

Rorabaugh, William J. * 1976; PhD, 1976, University of California (Berkeley); United States social history.

Sears, Laurie J. * 1989; PhD, 1986, University of Wisconsin; Southeast Asian social and cultural history.

Stacey, Robert C. * 1988; PhD, 1983, Yale University; medieval England, medieval Judaism, political and legal history.

Sullivan, Woodruff T. II * 1973, (Adjunct); PhD, 1971, University of Maryland; radio astronomy, galactic and extragalactic structure, history of astronomy.

Taylor, Quintard * 1995; MA, 1971, PhD, 1977, University of Minnesota; African American history with a focus on blacks in the West.

Thomas, Carol G. * 1964; PhD, 1965, Northwestern University; ancient history.

Toews, John E. * 1979; PhD, 1973, Harvard University; modern European intellectual history.

Ullman, Joan Connelly * 1966, (Emeritus); PhD, 1963, Bryn Mawr College; modern Spain.

Walter, John C. * 1989, (Adjunct); PhD, 1971, University of Maine; African American history, African women's history, the New Deal.

White, Richard * 1990, (Affiliate); PhD, 1975, University of Washington; American West, American Indian, environmental history.

Williams, Michael A. * 1976, (Adjunct); PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Wineburg, Samuel S. * 1989, (Adjunct); PhD, 1990, Stanford University; educational psychology, cognitive psychology of school subjects, historical cognition.

Associate Professors

Dong, Yue 1996, (Adjunct); MA, 1991, University of Oregon, PhD, 1996, University of California (San Diego); modern Chinese history, urban history, gender studies.

Felak, James R. * 1989; PhD, 1989, Indiana University; modern East European history.

Gamboa, Erasmo * 1976, (Adjunct); MA, 1973, PhD, 1984, University of Washington; history, Chicano experience, Pacific Northwest.

Gowing, Alain M. * 1988, (Adjunct); PhD, 1988, Bryn Mawr College; Latin and Greek historiography, Latin literature of the Empire.

Gregory, James N. * 1993; PhD, 1983, University of California (Berkeley); U.S. social and political history since 1865, labor, the West.

Guy, R. Kent * 1980; PhD, 1981, Harvard University; modern Chinese history.

Harmon, Alexandra J. * 1991, (Adjunct); PhD, 1995, University of Washington; history of U.S. race and ethnic relations, especially involving American Indians.

Hevly, Bruce W. * 1989; PhD, 1987, Johns Hopkins University; history of technology and history of modern physics.

Leiren, Terje I. * 1977, (Adjunct); PhD, 1978, North Texas State University; Scandinavian history, nationalism, immigration, ethnicity.

McKenzie, Robert T. * 1988; PhD, 1988, Vanderbilt University; nineteenth-century U.S., U.S. economic.

O'Neil, Mary R. * 1983; PhD, 1982, Stanford University; Renaissance/Reformation, early modern Europe, social history, Italy before 1700.

Poiger, Uta G. * 1995; MA, 1990, PhD, 1995, Brown University; modern German history, gender history, cultural studies.

Salas, Elizabeth 1987, (Adjunct); MA, 1977, California State University, Los Angeles, PhD, 1987, University of California (Los Angeles); New Mexican history and politics, Chicana, Mexicana and Chicano history, minorities in the military.

Stacey, Robin C. * 1988; PhD, 1986, Yale University; early and high medieval history, tribal law, Celtic/Anglo-Saxon literature, heresy.

Waugh, Daniel Clarke * 1972; PhD, 1972, Harvard University; medieval Russian history.

Yee, Shirley J. * 1988, (Adjunct); PhD, 1987, Ohio State University; U.S. women's history, African-American history, nineteenth-century U.S. social history.

Young, Glennys J. * 1992; PhD, 1989, University of California (Berkeley); late Imperial and early Soviet Russia.

Assistant Professors

Camp, Stephanie M. H. 1998; PhD, 1998, University of Pennsylvania; African American history.

Giebel, Christoph * 1998; PhD, 1996, Cornell University; Viet Nam; 20th century history, communism, labor, post-independence historiography.

Nash, Linda L. 1993; MS, 1989, University of California (Berkeley); environmental, American west.

Noegel, Scott B. * 1995, (Adjunct); PhD, 1994, Cornell University; Ancient Near Eastern languages, literatures, cultures and history.

Schmidt, Benjamin * 1996; MA, 1988, PhD, 1994, Harvard University; early modern European history, especially the Netherlands; cultural history; European expansion.

Singh, Nikhil Pal * 1998; PhD, 1995, Yale University; 20th-century U.S. history and theory with a focus on ethnicity, race and nationalism.

Stein, Sarah A. * 1999; PhD, 1999, Stanford University; modern Jewish history, Russian Jewish history, Ottoman Jewish history, diaspora studies.

Thomas, Lynn M. * 1997; MA, 1989, Johns Hopkins University, MA, 1993, Northwestern University, PhD, 1997, University of Michigan; twentieth-century Kenyan history; gender, social, and cultural history.

Walker, Joel T. 1997; PhD, 1998, Princeton University; late antiquity, Byzantine, early Middle Ages.

Senior Lecturer

Wright, Mary C. 1997; PhD, 1996, Rutgers University; history of American Indians, women, American West.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

History

HIST 412 Science and the Enlightenment (5) I&S

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.

HIST 425 History of the British Empire and Commonwealth Since 1783 (5) I&S 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.

HIST 449 Issues in Comparative Labor History (5) I&S Role of labor in the modern world. Emphasis on the centrality of workers' struggles in the evolution of national societies on the conceptual, research, and expository strategies of contemporary students of the labor movement and on differences and relationships between labor in developed and underdeveloped countries.

HIST 451 Eastern and Central Africa Since 1500 (5) I&S Explores the history of Eastern and Central Africa from the period prior to the slave trade through European colonialism to the post-colonial present. Focuses on political, economic, and social change and continuity. Emphasis on understanding how various historical actors and historians have interpreted these processes.

HIST 452 Southern Africa Since 1500 (5) I&S Explores the history of Southern Africa from pre-colonial social institutions through European colonialism and industrialization to the post-apartheid present. Focuses on the interplay between race, class, ethnicity, and gender in the structuring of political relations. Emphasis on understanding how various historical actors and historians have interpreted these processes.

HIST 461 History of the Middle East: 622-1300 (5) I&S Political and economic analysis of the period circa AD 600, preliminary to rise of Islam, to arrival of the Turks. Muhammad's teaching and impact; Islamization and Arabization.

HIST 462 History of the Middle East: 1258-1798 (5) I&S Conquests by successors of Ghengis Khan; creation in Egypt, Syria, and Iran of cavalry-based states; domination of political, social, and economic history by Ottoman and Safavid empires. The Napoleonic invasion.

HIST 463 History of the Middle East Since 1789 (5) I&S Critical issues and themes in the changing Middle East, including Westernization, growth of nationalism, Arab-Israeli dispute, Iranian revolution, and the role of Islam.

HIST 481 Economic History of Europe (5) I&S Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Recommended: ECON 201. Offered: jointly with ECON 460.

HIST 491- Honors Historical Method (5-) I&S The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism. For honors students.

HIST -492 Honors Historical Method (-5) I&S The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism. For honors students.

HIST 493 Senior Thesis (5, max. 10) I&S Preparation of the senior thesis for the History and Science emphasis.

HIST 494 Colloquium in Historiography (5) I&S Advanced seminar examining central issues in historiography. Emphasizes reading, discussion, and writing.

HIST 495 History Internship (1-5, max. 10) Off-campus independent fieldwork with a community agency in an apprenticeship or internship situation. Work to be jointly supervised by a member of the History Department and an on-site field supervisor.

HIST 498 Colloquium in History (3-5, max. 15) I&S Each seminar examines a different subject or problem. A quarterly list of the seminars and their instructors is available in the Department of History undergraduate advising office.

HIST 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

HIST 501 Ancient Greece and Rome: Writings and Interpretations (3-6, max. 6) Study of historians, development of historical study as a distinct pursuit, focus of attention in historical scholarship in the ancient world and comparison with modern interpretation of antiquity.

HIST 502 Medieval Europe: Writings and Interpretations (3-6, max. 6) Study of historians, schools of history, and interpretations of medieval European history.

HIST 503 Modern Europe: Writings and Interpretations (3-6, max. 6) Study of historians, schools of history, and interpretations of modern European history.

HIST 504 Comparative Ethnicity and Nationalism (3) Theoretical approaches to, and historical case studies of, the phenomena of ethnicity, nationalism, and ethnic conflict in the modern world. Emphasis on Europe and Asia.

HIST 511 History of Science (3-6, max. 6)

HIST 512- Seminar in the History of Science ([3-6, max. 6]-)

HIST -513- Seminar in the History of Science ([3-6, max. 6]-)

HIST 515 Field Course in the History of Technology (3) Introduces students to the literature, methodology, and problems of the history of technology, and prepares them for independent study in the field.

HIST 530 Comparative Colonialisms: Methodological and Conceptual Approaches (3) Introduces students to the historiography of modern European/American colonialisms, focusing on Africa, Asia, and/or the Americas. Addresses methodological and conceptual issues by examining relationship between capitalism and colonialism; violence and routinization of colonial power; colonial categories of race, ethnicity, class, and gender; and resistance movements and nationalist politics.

HIST 552 Field Course in African History (3) Methodological and conceptual issues in African historiography, focusing on 1500 to the present.

Examines topics including pre-colonial politics and economics, slavery and the slave trades, European conquest and colonization, resistance movements and nationalist politics, and post-colonial debates and dilemmas. Special attention to issues of gender, race, ethnicity, and class.

HIST 561 Islamic History (3-6, max. 6) Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

HIST 562 Ottoman History (3-6, max. 6) 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 (French, German, Russian, or other).

HIST 563 Modern Near East (3-6, max. 6) Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the present.

HIST 570 Topics in Teaching History (3) Topics include active learning, teaching writing, assessment, and course design. Designed for history graduate students working or planning to work as TAs or instructors. Students produce a teaching portfolio and conduct peer observations. Credit/no credit only.

HIST 571 Orientation to an Academic Career in History (3) Course for prospective college and university history instructors, preparing them for the nonacademic aspects of their duties. Prerequisite: Master of Arts degree in history or permission of instructor.

HIST 580 Gender and History (5) Introduction to gender as category of historical analysis, examining the impact of feminist theory within the discipline of history. Course traces historiographical debates in women's and gender history and explores, through cross-cultural comparisons, how scholars have conceived the relationship between gender and categories such as class, race, ethnicity, and sexuality.

HIST 590 Topics in History (3, max. 9) Seminar on selected topics in general history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

HIST 595 Historical Practices (5) Emphasizes the interrelatedness of theoretical issues and historical research. Students read works that encourage the rethinking of sources and their historical meaning and experiment with sources, methods, and questions in a set of practical assignments.

HIST 598 Methods of Historical Research (5) Exploration of new historical and scholarly techniques employed in historical research. Use of social science methodology and literary theory in the evaluation and interpretation of historical sources. Use of feminist theory, deconstruction, critical theory, and orality/literacy studies. Student research paper is based upon a chosen theoretical approach.

HIST 600 Independent Study or Research (*)

HIST 700 Master's Thesis (*)

HIST 800 Doctoral Dissertation (*)

Ancient and Medieval History

HSTAM 401 Early Greece (5) I&S Bronze and Dark Age Greece: realities of the heroic age of ancient Greece.

HSTAM 402 Classical Greece (5) I&S The classical civilization of ancient Greece, with special emphasis on the legacy of Greece to Western civilization.

HSTAM 403 Alexander the Great and the Hellenistic Age (5) I&S Rise of Macedonia, conquest of Near East by Alexander, and division into lesser kingdoms after Alexander's death. Special emphasis on fusion of cultures and change from city-state to world-state.

HSTAM 411 The Roman Republic (5) I&S Political, social, economic, and cultural history, with emphasis on the development of the constitution and territorial expansions.

HSTAM 412 The Roman Empire (5) I&S Political, social, and cultural history, with special emphasis on the period of Cicero and Caesar.

HSTAM 418 The World of Late Antiquity (5) I&S Examines the transformation of the ancient world from the third-century crisis of the Roman Empire to the rise of Islamic civilization. Explores the manifold political, cultural, and social changes that transformed Europe, the Mediterranean, and the Near East between the third and the eighth centuries CE.

HSTAM 421 The Byzantine Empire (5) I&S Political, social, economic, and cultural history of the eastern Roman Empire from the fourth to fifteenth centuries.

HSTAM 443 Kievan and Muscovite Russia: 850-1700 (5) I&S Development of Russia from earliest times to the reign of Peter the Great. Offered: jointly with SISRE 443.

HSTAM 490 Topics in Ancient/Medieval History (5, max. 10) I&S Examines special topics in ancient/medieval history.

Courses for Graduates Only

HSTAM 501 Greek History Field Course (3-6, max. 6) I&S Examines various topics and themes in Greek history. Content varies.

HSTAM 511 Roman History Field Course (3-6, max. 6) I&S Examines various topics and themes in Roman history. Content varies.

HSTAM 512- Seminar in Ancient History ([3-6, max. 6]-) I&S Detailed study of special topics in ancient history.

HSTAM 518 Topics in Late Antiquity (3-6, max. 18) I&S Examines various topics in the transformation of the ancient world from the third-century crisis of the Roman Empire to the rise of Islamic civilization. Serves as the field course for masters and Ph.D. students.

HSTAM 530 Early Middle Ages (3-6, max. 6) I&S Field course. Survey of early European history through the times of tribal migrations and invasions from Asia. Problems and methods of research.

HSTAM 531 Medieval European History (3-6, max. 6) I&S

HSTAM 532 Medieval European Seminar (3-6, max. 6) I&S Prerequisite: reading knowledge of Latin.

HSTAM 533 Medieval European Seminar (3-6, max. 6) I&S Prerequisite: reading knowledge of Latin.

HSTAM 534 Medieval European Seminar (3-6, max. 6) I&S Prerequisite: reading knowledge of Latin.

HSTAM 535 Later Medieval Europe (3-6, max. 6) I&S Field course. Surveys European history from ca. 1250 to 1500, with particular attention to historiography.

HSTAM 536 Topics in Early Medieval History (3-6, max. 6) I&S Graduate level study of specific topics in

early medieval history. Topics vary from quarter to quarter; for information, please see instructor.

HSTAM 590 Topics in Ancient and Medieval History (3, max. 9) I&S Seminar on selected topics in ancient and medieval history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

History of Asia

HSTAS 401 History of Ancient India (5) I&S India in ancient times; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

HSTAS 402 History of Medieval and Mughal India (5) I&S 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) I&S Modern India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

HSTAS 404 History of Twentieth-Century India (5) I&S Analysis of the problems in the fields of social life, international and domestic politics, education, economics, and other areas that confront India today.

HSTAS 423 History of Modern Japan (5) I&S Political, social, economic, and cultural development of Japan from the late Tokugawa period to the present with special emphasis on the cultural impact of the West. Offered: jointly with SISEA 423.

HSTAS 424 The Emergence of Postwar Japan (5) I&S The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power. Recommended: HSTAS 423 or SISEA 423. Offered: jointly with SISEA 440.

HSTAS 441 Economic and Social History of Japan to 1900 (5) I&S Lecture-seminar on Japanese economic and social history from 700 to 1900. Analyses of the rise and decline of the shoen system, the rise of commerce, social change, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. Prerequisite: either SISEA 241/HSTAS 241 or SISEA 341/HSTAS 341. Offered: jointly with SISEA 441.

HSTAS 451 Chinese History: Earliest Times to 221 BC (5) I&S Preimperial China.

HSTAS 452 Chinese History from Earliest Times to 1276(5) I&S Traces the development of Chinese civilization from earliest times through the Song dynasty. Examines social, cultural, political, and economic history.

HSTAS 453 Chinese History: AD 906 to 1840 (5) I&S Political, social, economic, and intellectual history from the time of the Mongol conquest of China to the Sino-Japanese war. Focus on the evolution of the late imperial Chinese state and the "early modern" era in China.

HSTAS 454 History of Modern China (5) I&S Social, cultural, political, economic, and intellectual transformations and continuities in China from the end of the imperial period to the present. Offered: jointly with SISEA 454.

HSTAS 456 Topics in Chinese Social History (5) I&S Surveys major issues and approaches to the study of the role of the Chinese people in China's historical development. Historical focus of course varies with instructor. Recommended: HSTAS 211, HSTAS 452, HSTAS 453, or HSTAS/SISEA 454. Offered: jointly with SISEA 456.

HSTAS 457 Women in China to 1800 (5) I&S Gender in Chinese culture, women's situations in the patrilineal family system, and the ways women's situations changed as other dimensions of China's political system, economy, and culture changed from early times through the nineteenth century. Offered: jointly with WOMEN 457.

HSTAS 459 Gender Histories of Modern China, 18th to 20th Centuries (5) I&S Emergence of modernist social, political, intellectual gender formations in social activism, revolutionary writing, scientific ideologies, economic globalization. Stresses gender difference in colonial modernity, revolutionary movement, communism, post-socialist market society. Relates modern Chinese women to global flows, new division of labor, local and regional experience. Offered: jointly with WOMEN 459.

HSTAS 460 Cities in China: Past and Present (5) I&S Economic, political, social, and cultural functions of the city in modern Chinese history. Changes in China's urban system. The city as cultural center and focus of literary and cinematic representation. Attention to architecture, commerce, urbanization, the role of capital cities in the power of the state. Offered: jointly with SISEA 460.

HSTAS 462 Southeast Asian History to 1800 (5) I&S Absorption and modification of cultures (Indian and Chinese), religions (Islam, Buddhism, Catholicism), and peoples (northern European) by island- and mainland-Southeast Asians. Main themes are cultural contact and the growth of states and peoples.

HSTAS 463 Southeast Asian History from 1800 to the Present (5) I&S Post-eighteenth-century history of the present countries of Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore, Brunei, Indonesia, and the Philippines. Deals with colonial rule, emerging nationalism, and political independence. Investigates broad themes of social, economic, and cultural history.

HSTAS 465 The Viet Nam Wars (5) I&S *Giebel* Recent Vietnamese history and struggles for independence and national unification *vis-a-vis* French colonialism, Japanese occupation, American intervention, and internal divisions. Covers historical roots and contemporary contexts of revolution and war, objectives and motivations of participants, and the enormous human costs. Emphasizes socio-cultural changes and wars' legacies. Offered: jointly with SISSE 465.

HSTAS 466 Islam, Mysticism, Politics and Performance in Indonesian Culture (5) VLP/IA&S Examines how Indonesia, the world's fourth most-populous country, with the largest Islamic population, weaves together local practices and influences from India and Persia. Offers ways of understanding modern Indonesian performing arts, religion, and politics. Offered: jointly with SISSE 446.

HSTAS 481 History of Traditional Korea: Earliest Times to the Nineteenth Century (5) I&S Korean history from earliest times to the modern period.

HSTAS 482 History of Modern Korea: 1860 to the Present (5) I&S Traditional institutions and society, Japanese colonial rule, liberation and the Korean War, early Korean communist movement, and North Korea and South Korea since 1945.

HSTAS 490 Topics in Asian History (5, max. 10) I&S

Courses for Graduates Only

HSTAS 501 Indian History (3-6, max. 6) I&S Prerequisite: permission of instructor.

HSTAS 521 Modern Japanese History (3-6, max. 6) Field course. Prerequisite: HSTAS 422, HSTAS 423, or permission of instructor.

HSTAS 530 Field Course in Southeast Asian History (3) Introduction to major English-language works on Southeast Asian history and to the major historiographical issues of the era.

HSTAS 532 Seminar in Southeast Asian History (3) Selected topics in Southeast Asian history and historiography. Preparation for theses and doctoral dissertations on Southeast Asian History.

HSTAS 541 Economic and Social History of Japan to 1900 (5) Analyses of landholding systems, the rise of commerce, demographic changes, urbanization, early industrialization, and social change. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken HSTAS 441. Offered: jointly with SISEA 541.

HSTAS 546 Gender and Colonialism in Eastern Asia (5) Economic-political colonialization, post colonialism, and statist-gendered citizenship; intra-Asian subimperialism structuring domestic production, family, and gendered subjectivities; humanism and the New Woman; modern contests over new masculinity and new femininity; and the effect of war, imperialist occupation and colonial modernity on interregional flows of ideas, labor, capital, and jurisprudence. Offered: jointly with WOMEN 546; AWPoS.

HSTAS 551 Field Course in Chinese History: Pre-Sung Period (3-6, max. 6) *Ebrey* Introduction to the English-language literature on Chinese history through the Song dynasty. Recommended: HSTAS 452 or equivalent.

HSTAS 552- Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12]-) *Ebrey* Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

HSTAS 553- Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12]-) *Ebrey* Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

HSTAS 554 Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12]) *Ebrey* Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

HSTAS 560- Field Course in Chinese History: 1276-1895 ([3-6, max. 6]-) *Guy* Introduction to the English-language literature on the Yuan, Min, and Qing dynasties. Recommended: HSTAS 453 or equivalent.

HSTAS 561 Field Course in Chinese History: 1276-1895 ([3-6, max. 6]) *Guy* Introduction to the English-language literature on the Yuan, Min, and Qing dynasties. Recommended: HSTAS 453 or equivalent.

HSTAS 562- Seminar in Chinese History: 1268-1895 ([3-6, max. 6]-) *Guy* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 563- Seminar in Chinese History: 1268-1895 ([3-6, max. 6]-) *Guy* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 564 Seminar in Chinese History: 1268-1895 ([3-6, max. 6]) *Guy* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 571- Field Course in Modern Chinese History ([3-6, max. 6]-) Introduction to the major English-language literature on modern Chinese history and to the major historiographical issues of the period. Prerequisite: HSTAS 454 or equivalent, and permission of instructor.

HSTAS 572 Seminar in Twentieth Century Chinese History ([3-6, max. 6]) *Dong* Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 573- Seminar in Twentieth Century Chinese History ([3-6, max. 12]-) *Dong* Materials and methods for research in twentieth-century Chinese history. Prerequisite: knowledge of Chinese and permission of instructor.

HSTAS 574- Seminar in Twentieth Century Chinese History ([3-6, max. 12]-) *Dong* Materials and methods for research in twentieth-century Chinese history. Prerequisite: knowledge of Chinese and permission of instructor.

HSTAS 581 Modern Korean History (3-6, max. 6) Field course. Prerequisite: permission of instructor.

HSTAS 582- Seminar in Korean History ([3-6, max. 6]-) Selected topics in Korean history and historiography.

HSTAS 583- Seminar in Korean History ([3-6, max. 6]-) Selected topics in Korean history and historiography.

HSTAS 584 Seminar in Korean History ([3-6, max. 6]) Selected topics in Korean history and historiography.

HSTAS 590 Topics in Asian History (3, max. 9) Seminar on selected topics in Asian history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

History of the Americas

HSTAA 401 American Revolution and Confederation (5) I&S Causes of separation of the United States from the British empire; political theory of the Revolution; its military history; diplomacy of the Revolution; the Revolution as a social movement; intellectual aspects; readjustment after independence; the formation of the American union; the Constitution.

HSTAA 404 New England: From the Foundings to the Civil War (5) I&S New England from colonial beginnings to the region's emergence to national leadership in the mid-nineteenth century. Emphasis on Puritanism, the New England town, adjustment to empire, revolution and constitution making, the growth of party, abolitionism, the flowering of a regional culture, and the personalities who embodied these key themes and periods.

HSTAA 409 American Social History: The Early Years (5) I&S 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) I&S 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) I&S Conflicting interests, ideologies, and ways of life in the United States from the 1840s to the 1870s.

HSTAA 412 The Westward Movement, 1700-1850 (5) I&S Anglo-American advance into interior of continental United States culminating in occupation of Far West. Rivalry with New France and New Spain in colonial period; role of federal government in westward expansion; land policy and land distribution; migration, settlement, and the pioneering experience; federal Indian policies and implementation; political evolution, urbanization, and economic development of trans-Appalachian West; shaping of national character and institutions.

HSTAA 413 History of the Trans-Mississippi West (5) I&S Anglo-American exploration, conquest, occupation, and exploitation of the trans-Mississippi West, with emphasis on economic development into the twentieth century. Considers wide range of developmental themes (social, political, cultural) in historiography of American West.

HSTAA 414 The Canadian West, 1670-1990 (5) I&S Examines the history of colonization and settlement of Canada's four westernmost provinces with emphasis on their economic, social, and Native history.

HSTAA 417 Indians in Western Washington History (3) I&S *Harmon* Relations of Indians and non-Indians in the Puget Sound region, 1790s to the present, with emphasis on evolving ideas about Indian identity. Offered: jointly with AIS 425 .

HSTAA 421 American Environmental History (5) I&S American attitudes toward the natural environment. Impact of settlement on the major natural regions of the United States. Evolution of the conservation movement, including development of the national park system and national forest system and emergence of the ecological perspective.

HSTAA 431 American Politics and Society Since 1920 (5) I&S Political, social, economic, and intellectual developments in the United States from 1920 to the present.

HSTAA 432 History of Washington and the Pacific Northwest (5) I&S Exploration and settlement; economic development; growth of government and social institutions; statehood.

HSTAA 436 American Jewish History Since 1885 (5) I&S Political, social, economic, religious history of American Jewish community from great eastern European migration to present. Integration of immigrant community into general American community; rise of nativism; development of American socialism; World War I and II; and reactions of American Jews to these events. Offered: jointly with SISJE 436.

HSTAA 454 The Intellectual History of the United States (5) I&S/VLPA Lectures and discussions devoted to the development of the American mind, from historical beginnings to the present.

HSTAA 461 Diplomatic History of the United States, 1776-1901 (5) I&S Foreign policy of the United States government prior to the twentieth century. Emphasis on international wars, territorial expansion, and the peculiarities of the American position in world politics.

HSTAA 462 Diplomatic History of the United States, 1901-Present (5) I&S Foreign policy of the United States government during the twentieth century. International wars and the other major episodes in diplomacy are emphasized.

HSTAA 473 Homefront: American Cultures and Society in the 1940s (5) I&S An exploration of the impact of WWII on American culture and social thought. Topics include the effects of war on civil lib-

erties and civil rights, the uses of nationalism, patriotism, and racial ideology, the internment of Japanese-Americans, responses to the Holocaust, and the effects of war on social life.

HSTAA 480 Labor and Popular Movements in Latin America (5) I&S Interdisciplinary approach to origins and trajectory of labor movement from late nineteenth century to present. Emphasis in contemporary period on popular movements, including neighborhood associations, religious base communities, women's movement, and ethnic mobilization for democratic social and political reform. Recommended: two non-English-language Latin American studies courses. Offered: jointly with SISLA 480.

HSTAA 482 The History of Brazil: Colonial Period to the Present (5) I&S Colonial foundations; the first and second empires; the old and new republics; current problems; prospects for the future.

HSTAA 486 History of Mexico: Colonial Origins to 1822 (5) I&S Political, social, and economic history of Mexico from its discovery by the Spanish to its independence from Spain.

HSTAA 487 History of Mexico: 1822 to the Present (5) I&S Political, social, and economic history of Mexico from its independence from Spain to the present.

HSTAA 488 History of the Caribbean and Central America (5) I&S Political, social, and economic history of principal countries in the Caribbean and Central America from their discovery to the present.

HSTAA 490 Topics in American History (5, max. 10) I&S Examines special topics in American history.

Courses for Graduates Only

HSTAA 501 American History: Early (3-6, max. 6)

HSTAA 503- Seminar in American History, Early (3-) Research seminar in early American History, 1600-1875.

HSTAA -504 Seminar in American History, Early (3-6, max. 12) Research seminar in early American History, 1600-1875.

HSTAA 512 American History: Western (3-6, max. 6)

HSTAA 513- Seminar in American History: Western ([3-6, max. 12]-)

HSTAA -514 Seminar in American History: Western (-[3-6, max. 12])

HSTAA 516 Hispanics of the United States (3-6, max. 6)

HSTAA 517 Field Course in American Indian History (5) Field-reading course. Survey of major problems and literature concerning indigenous peoples of North America and their descendants.

HSTAA 521 American History: Writings and Interpretations, 1770-1870 (4-6)

HSTAA 522 American History: Writings and Interpretations Since 1870 (4-6)

HSTAA 525 American Social History After 1860 (3-6, max. 6) Field course. Survey of major problems and literature in American social history after 1860.

HSTAA 532- Seminar in American History: Recent Period ([3-6, max. 12]-)

HSTAA -533- Seminar in American History: Recent Period (-[3-6, max. 12]-)

HSTAA -534 Seminar in American History: Recent Period (-[3-6, max. 12])

HSTAA 540 African American Urban History: 1700-2000 (5) Examines the growth and evolution of African-American urban communities from the colonial era to the present, with particular emphasis on cities of the West.

HSTAA 549 Culture, Politics, and Power in Nineteenth-Century Black America (5) Camp Canonical issues, problems, and topics in nineteenth-century black social history. Traces major developments during the period; engages historiographical debates; and explores methodological questions such as the intersection of social and cultural history, and the challenges and possibilities of writing the history of a people with few written records.

HSTAA 554 American History: Intellectual (3-6, max. 6)

HSTAA -563 Seminar in American Diplomatic History (-[3-6, max. 6])

HSTAA 570 American Environmental History (5) Readings in environmental history emphasizing theory, methodology, and principal themes in the field. Readings emphasize the environmental history of North America and the United States.

HSTAA 582 Latin American History: National Period (3-6, max. 6)

HSTAA 590 Topics in American History (3, max. 9) Seminar on selected topics in American history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

Modern European History

HSTEU 401 The Italian Renaissance: (5) I&S Conditions of Renaissance culture: Italian republics and despots, humanism, the classical ideal of the arts, Machiavelli and the foundations of modern political thought; the end of an era.

HSTEU 402 The Reformation (5) I&S Origins of the disunity of Europe in the crisis of the sixteenth century with emphasis on the relations between religion and politics.

HSTEU 403 Scandinavian Immigration in History and Literature (5) VLP/IA&S History and literature of Scandinavian immigration to North America, including immigrant life and culture, community structures and traditions, and the literature about and by immigrants from Denmark, Finland, Iceland, Norway, and Sweden. Offered: jointly with SCAND 403.

HSTEU 405 European Intellectual History: Eighteenth Century (5) I&S/VLPA Development of the social sciences, moral theory, political theory, and religious thought in eighteenth-century Europe. Rationalism, empiricism, utilitarianism, and the sources of idealism.

HSTEU 406 European Intellectual History: Nineteenth Century (5) I&S/VLPA Selected topics in intellectual history up to 1890. The philosophical consequences of the French Revolution, the development of idealism, conservatism, romanticism, and early socialist theory; positivism, the problems of historicism, new forms of Christian apologetics, utilitarianism in decline, liberalism as philosophy, the early Marx.

HSTEU 407 European Intellectual History: Twentieth Century (5) I&S/VLPA 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.

HSTEU 411 Europe: 1814-70 (5) I&S 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) I&S Impact of population increase and technological change on European society; stresses and strains in European life and outlook.

HSTEU 413 Europe: 1914-45 (5) I&S Politics and society of Europe in the age of the concentration camp.

HSTEU 414 Europe Since 1945 (5) I&S Political, economic, and military developments in Europe under the impact of the Cold War.

HSTEU 415 Europe in the Six Years' War: 1939-45 (5) I&S Inquiry to discover what the war of 1939-45 was about and what it did to more than five hundred million Europeans.

HSTEU 422 The French Revolution and Napoleon: 1789-1815 (5) I&S Transformation of France under the Revolution of 1789; the Reign of Terror and Napoleon; the impact of the revolution and Napoleon upon Europe.

HSTEU 432 Germany: 1914-1945 (5) I&S Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

HSTEU 440 History of Communism (5) I&S Communism from its origins in the Bolshevik faction of Russian social democracy to the present, treating the development of the ideology, the various communist parties, and the communist states. Recommended: two history or politics of Europe courses. Offered: jointly with SIS 440.

HSTEU 444 Imperial Russia: 1700-1900 (5) I&S Development of Russia from Peter the Great to Nicholas II. Offered: jointly with SISRE 444.

HSTEU 451 East-Central Europe Since 1342 (5) I&S Focus on the lands of today's Poland, Czechoslovakia, Hungary, and Germany from the time they were great powers to the present. Traces the major changes in the fortunes of these lands in both local and international settings.

HSTEU 453 History of the Balkans, 1400 to the Present (5) I&S Centuries of Ottoman rule that produced a new basis for the reemergence of independent states in the nineteenth and twentieth centuries; history of these new states until the present.

HSTEU 454 Baltic History (5) I&S Overview of the history of the area occupied by the Baltic countries of Latvia, Lithuania, and Estonia. Emphasizes their emergence as modern European nation-states. Era from World War I to present treated in depth, including the historical role and present situation of non-Baltic peoples, particularly Russians. Offered: jointly with SCAND 454.

HSTEU 464 The Jews in Spanish History (5) I&S Sephardic Jews in Spanish politics, economy, and culture, emphasizing the medieval Golden Age and the Inquisition. Offered: jointly with SISJE 464.

HSTEU 465 The Jews of Eastern Europe (5) I&S Jewish society in Poland, Russia, the Hapsburg Lands, and Romania from the late Middle Ages to the Holocaust. Offered: jointly with SISJE 465.

HSTEU 466 The Sephardic Diaspora: 1492-Present (5) I&S *Stein* Examines the history and culture of Sephardic Jewry from the expulsion from the Iberian Peninsula in 1492 to the present. Explores the creation of Sephardic communities in the Dutch and Ottoman Empires, Western Europe, the Americas, and Africa, and the history of the conversos and "hidden Jews." Offered: jointly with SISJE 466.

HSTEU 470 The Jacobethan Age: England 1580-1630 (5) I&S Emphasis on arts and society instead of the traditional kings, battles, and politics; the way people at all levels of society lived, in towns and in the countryside, within the bounds of the royal court or outside in the political wilderness. Classes on poetry, drama, music, architecture, painting, interior decoration, and some of the minor arts, as well as on demography and some of the traditional historical subjects. Not open for credit to students who have taken 471 or 472.

HSTEU 471 England in the Sixteenth Century (5) I&S Political, administrative, and social history from Henry VII to Elizabeth I, with emphasis on the Reformation and its effects and on conditions of life in Elizabethan England. Not open to students who have taken 470.

HSTEU 472 England in the Seventeenth Century (5) I&S Political, administrative, and social history from the accession of James I to the Glorious Revolution. Not open to students who have taken 470.

HSTEU 474 England in the Nineteenth Century (5) I&S Political, social, and cultural development; the agrarian, industrial, and French revolutions; the rise of parliamentary democracy; the Victorian age; political thought from utilitarianism to Fabianism; Irish home rule.

HSTEU 475 England in the Twentieth Century (5) I&S From the Boer War to the present; conservatism, liberalism, and socialism; England in two world wars; the decline of British imperialism.

HSTEU 482 Fascism in Europe (5) I&S History of the fascist era in modern Europe from 1919 to 1945. A study of the principal examples of national fascism and fascist-like movements coupled with a general theoretical consideration of the phenomenon.

HSTEU 490 Topics in European History (5, max. 10) I&S Examines special topics in European history.

Courses for Graduates Only

HSTEU 501 Renaissance Field Course (3-6, max. 6) Topics in the cultural, political, and social history of the Renaissance era.

HSTEU 502 Reformation Field Course (3-6, max. 6) Topics in the religious, political, and social history of the Reformation era.

HSTEU 505 Early Modern European History (3-6, max. 18) Select topics in early modern European history. Topics vary from quarter to quarter. Prerequisite: permission of instructor.

HSTEU 510- Core Seminar in the History of Modern Europe (3-) An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

HSTEU -511- Core Seminar in the History of Modern Europe (-3-) An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

HSTEU -512 Core Seminar in the History of Modern Europe (-3) An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

HSTEU 515 Modern European Intellectual History (3-6, max. 6)

HSTEU 516- Seminar: European Intellectual History (3-6, max. 6)-

HSTEU -517 Seminar: European Intellectual History (-3-6, max. 6)]

HSTEU 521 Modern European History: France (3-6, max. 6)

HSTEU 531 Modern European History: Germany (3-6, max. 6)

HSTEU 544 Modern Russian History (3-6, max. 6)

HSTEU 548 Field Course in Soviet History (3-6, max. 6) Specialized course for graduate history students in the scholarly literature of Russian history since 1917. Intended for graduate students preparing for MA or Ph.D. field examination in Russian history of the Soviet period.

HSTEU 551 History of Eastern Europe: 1772-1939 (5) Study of the east-central European region: Poland, Czechoslovakia, Hungary, Romania, and the Balkan countries, from their rebirth to World War II. Prerequisite: reading knowledge of German, French, Russian, or one East European language.

HSTEU 552 History of Eastern Europe: 1939 to the Present (5) Prerequisite: reading knowledge of one major European or one East European language.

HSTEU 571 English History: Tudor and Stuart (3-6, max. 6)

HSTEU 572 English History (3-6, max. 6)

HSTEU 590 Topics in European History (3, max. 9) Seminar on selected topics in European history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

Humanities (Simpson Center for the Humanities)

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

HUM 498 Special Topics in the Humanities (1-5, max. 15) I&S/VLPA Examination of selected topics in the humanities and the study of the arts. Taught by U.W. faculty and visiting scholars and artists.

Courses for Graduates Only

HUM 520 Seminar in Textual Theory (5) Introduction to the theoretical perspectives that have shaped the emerging interdisciplinary field of Textual Studies. Included in curriculum of Textual Studies Program.

HUM 521 Seminar in Scribal Texts (5) Relationship between oral and written texts and of the social and cultural systems which enable their production, transmission, and preservation. Included in curriculum of Textual Studies Program.

HUM 522 Seminar in Printed Texts (5) Study of printing as a means of textual transmission in the ages of the hand press, machine press, and electronic press; of current theories of editing; and of preparing critical editions of printed texts.

HUM 523 Seminar in Hypertext and Textual Studies (5) Several views of hypertext conceptually explored as a basis for research and evaluation of selected hypertext works. Includes initiating the construction of a World Wide Web hypertext of resources for the study of oral, graphical, hand-written, and printed texts. Included in curriculum of Textual Studies Program.

HUM 596 Humanities Research Seminar (1-5, max. 15) Exploration of current research in the Humanities and the study of the arts. Offered by specially selected U.W. faculty and visiting scholars in the arts and humanities.

International Studies

401 Thomson

 *General Catalog Web page:*
www.washington.edu/students/genccat/academic/internat_studies.html

 *Department Web page:*
jsis.artsci.washington.edu

The Henry M. Jackson School of International Studies organizes and supports interdisciplinary teaching and research in international affairs. The school consists of a group of interdisciplinary area-studies programs on major world regions, as well as topical and comparative programs of study that transcend national and regional boundaries.

Graduate Program

Graduate Program Information
111 Thomson, Box 353650
206-543-6001
jsisinfo@u.washington.edu

The Jackson School offers six area-studies programs that lead to a Master of Arts in International Studies degree. These include China Studies; Japan Studies; Korea Studies; Middle East Studies; Russian, East European, and Central Asian Studies; and South Asian Studies. Specific requirements vary from one program to another, but all stress interdisciplinary study within the context of the historical cultures, contemporary situations, and languages of the world areas. In addition, the Jackson School offers a program in Comparative Religion for the Master of Arts in International Studies.

The Jackson School also offers a general program in International Studies that concentrates on the interaction of international economic, political, and cultural processes with states and societies around the world. This program was developed in conjunction with several professional schools and is designed as a concurrent degree program.

Admission Requirements: Applicants must meet the requirements of the Graduate School: a 3.00 GPA in the last 90 quarter (60 semester) graded credits and a baccalaureate degree from an accredited university. Submission of the scores of the general Graduate Record Examination is required. Applicants must also meet the requirements of the specific Jackson School program to which they are applying. Most of them require or strongly recommend previous study of an appropriate foreign language.

Graduation Requirements: Students must meet Graduate School requirements for the Master of Arts, as well as individual Jackson School program requirements. Programs are designed to be completed in two years.

Financial Aid: Financial support is available in the form of Title VI Foreign Language and Area Studies Fellowships. Some Jackson School programs have additional fellowships available for specific areas of study. Graduate students are also eligible for a limited number of teaching or research assistantships and readerships.

Research Facilities (East Asia): Research and training facilities include the East Asia Library, with a comprehensive collection of manuscripts, books, and serials on China, Japan, and Korea. In addition, the University is affiliated with the Inter-University Program for Chinese Language Studies in Beijing, language programs in Japan and the People's Republic of China sponsored by the Council on International Educational Exchange, the Inter-University Center for Japanese Language Studies in Yokohama, and other programs which provide intensive language training for advanced undergraduate and graduate students. The School has ongoing projects on China, Japan, and Korea in which advanced graduate students and recognized scholars from the United States and foreign institutions regularly participate.

See also descriptions of research facilities on Russia, East Europe, and Central Asia as well as South Asia under the appropriate headings below.

China Studies

David M. Bachman, Chair

The China Studies program provides a broad understanding of the Chinese people and their culture, historical development, and contemporary problems. The curriculum emphasizes the attainment of facility in Chinese language, a grounding in history, and a familiarity with the approaches of the social sciences to China studies. The cultural aspects of China are covered through offerings of several departments, with special strengths in art history and literature. The breadth of offerings allows students to select courses to meet career goals in business, government, or other professions, or to prepare for further graduate study in an academic discipline.

Admission Requirements: See above under Graduate Program. While not required for admission, some previous study of Chinese language is highly recommended.

Graduation Requirements: Chinese language training through the third year; two seminars: SISEA 521-522 (5 credits each) plus 26 credits in discipline study related to China from at least two different disciplines; two seminar papers or a thesis; comprehensive oral examination.

Comparative Religion

Brannon M. Wheeler, Chair

The Comparative Religion program leading to the Master of Arts in International Studies offers an interdisciplinary curriculum in the study of religion, with several choices for areas of concentration. The required core seminars focus on methodology and comparative perspective in the study of religion. For the remaining course requirements, primary and secondary curricular concentrations are available in Buddhism, Hinduism, Judaism, Islam, Christianity, Biblical and ancient Near Eastern religion, and religion and culture; further secondary curricular concentrations are available in Greco-Roman religions, East Asian indigenous traditions, and African religious traditions.

Admission Requirements: See above under Graduate Program. The Comparative Religion faculty reserve the right to determine in each case whether an applicant has sufficient language prepara-

tion and background in the study of religion for acceptance into the program.

Graduation Requirements: Completion of the third year in a language of the primary sources in the chosen concentration, and first-year reading proficiency in a secondary foreign language necessary for reading published research (e.g., German, French, Italian, Dutch, Spanish); certification of basic competency in the history of world religions; RELIG 501-502; one course focused on historical relations between religious traditions; at least four courses in a major concentration and two in a minor; one or two final research paper(s); and a comprehensive examination including both oral and written segments.

International Studies

Daniel Chirof, Chair

The general program in International Studies provides students with broad knowledge and skills in analyzing international affairs. Designed for students entering a variety of professional fields, the program trains them in international and comparative studies in a multidisciplinary setting. Students are prepared to undertake sophisticated analyses of international affairs and typically will hold positions after graduation with the international divisions of federal and state governments, international divisions of banks, trading companies, policy-study institutes, corporations with international operations, and international development and educational organizations. The program usually entails concurrent enrollment in a graduate professional-degree program and adds approximately one year to the student's course of study.

Admission Requirements: See above under Graduate Program. Those applying concurrently to a professional program (Business Administration, Public Affairs, Marine Affairs, Forest Resources, Law, or Public Health and Community Medicine) must first be accepted by the professional school. For non-concurrent applicants, preference is given to those who have a professional interest, or previous professional experience or education. Prior study of a foreign language and preparation in intermediate-level microeconomics and macroeconomics are highly recommended.

Graduation Requirements: Japanese or Chinese language through the third year or any other modern foreign language through the second year; SIS 500, 501, 502, 511, 512, and 522 (3 credits each); courses in two of the following three fields: a regional studies field, a professional field, or a special topics field (minimum three classes—9 credits—for each field); two seminar papers; and an oral examination. Students in concurrent graduate-degree programs also must meet Graduate School requirements for the second degree.

Japan Studies

Marie C. Anchordoguy, Chair

The graduate program in Japan Studies gives students in-depth knowledge of many facets of Japan, including its history, political economy, and language. Course work helps prepare students for careers in business, government, journalism, secondary-school teaching, and a wide variety of other professional fields. The program is specifically designed (1) for students with bachelor's degrees in a discipline who need language and interdisciplinary training on Japan to pursue their career goals, and (2) as preparation for doctoral work in an academic discipline involving Japan for students who have had little or no training on Japan or in the language.

Admission Requirements: See above under Graduate Program. At least one year of prior training in Japanese language is strongly recommended.

Graduation Requirements: Japanese language training through the third year (15 credits minimum training at the UW); SISEA 555 (5 credits) and SISEA 559 (5); 26 credits in discipline study of Japan to include at least one history course and one social science course; essay of distinction; and an oral examination.

Korea Studies

Clark W. Sorensen, Chair

The graduate program in Korea Studies offers courses in Korean language, history, and society. Regular offerings are supplemented by visiting faculty from political science, economics and economic development, folklore, and literature. The program emphasizes the study of Korea in the context of East Asian civilization and the modern world economy, not simply as a single country in isolation from its neighbors. The objective of the program is to provide students with a broad background which will be of use for further graduate study, or in a variety of professions such as teaching, business, and government.

Admission Requirements: See above under Graduate Program. Previous language training is recommended.

Graduation Requirements: Korean language through the third year of instruction (through the second year of instruction if the student is admitted with no previous language training); HSTAS 481-482, SISEA 584 (5 credits each), and SISEA 585 (6 credits); 15 credits in discipline study of East Asia or international studies; two seminar papers or an essay of distinction; comprehensive oral examination.

Middle Eastern Studies

Ellis Goldberg, Chair

The Middle East program is designed for students who wish to study the region within an interdisciplinary framework, focusing especially on the social, political, economic, and legal systems of the Middle East and/or Islamic Central Asia. To provide a thorough grounding in this region, students take courses in the social sciences, humanities, and a Middle Eastern or Central Asian language.

Admission Requirements: See above under Graduate Program. Although knowledge of a Middle Eastern or Central Asian language is not a prerequisite for admission, applicants are generally expected to have had at least the equivalent of one year's study of the language in which they plan to concentrate. Students accepted with no language training may wish to begin their language study in an intensive summer program.

Graduation Requirements: Three 3-credit or two 5-credit Middle Eastern language courses beyond the second-year (native speakers as well as non-native speakers); 20 credits on the modern Middle East from at least two social science or humanities disciplines; one approved Jackson School course; two courses in one social science discipline or in one professional school other than courses taken for preceding requirements; either a thesis and an oral examination, or two seminar papers and a four-hour written examination.

Russian, East European, and Central Asian Studies

Stephen E. Hanson, Chair

Designed primarily for students with bachelor's degrees in a discipline, the program offers a background for professional pursuits in government and nongovernmental organizations, journalism, business, or teaching, or for advanced graduate study leading to the Ph.D. degree in a discipline. The program includes language training, a concentration of study in a chosen discipline, and a combination of

courses in other disciplines that deal with aspects of the area. Students usually focus on one region (Russia, East Europe, the Baltics, or Central Asia), although the program provides flexibility to take courses on another region.

Admission Requirements: See above under Graduate Program. A prerequisite for all applicants is two years of college-level language courses or the equivalent. For those focusing on Russia the language must be Russian; for other regions of the former Soviet Union and East Europe, two years of a language of the region, or another relevant language.

Graduation Requirements: Including the two years required for entry, four years of a language of the region being studied or two years each of two relevant languages (four years of Russian required for Russian focus); SISRE 501 and 502 (3 credits each); 30 credits in disciplines other than language, with 15-20 credits in a discipline of concentration and 10-15 credits in at least two additional disciplines; a thesis (9 credits of SISRE 700); a written examination in the discipline of concentration and an oral interdisciplinary examination.

Research Facilities: The University of Washington is a major center for research on Eastern Europe, Russia, and the independent states of the former Soviet Union, notably the Baltics and the countries of Central Asia. In addition to extensive holdings in Russian, East European, and Baltic language materials, the library has one of the best Central Asian language collections in the country and the largest collection of Latvian books outside Latvia. The strengths of the program are complemented by strong programs in East Asian and Middle Eastern Studies.

South Asian Studies

Anil B. Deolalikar, Chair

The South Asian Studies program has been designed for students whose career objectives involve teaching and research in a traditional discipline with geographical interests within South Asia (i.e., India, Pakistan, Bangladesh, Sri Lanka, Afghanistan, Tibet, and Nepal); those planning to enter professional-training programs (e.g., education, business administration, journalism, law, or public affairs); or students planning a career in government service (e.g., the foreign service) who wish to acquire a special understanding of the South Asia area.

Admission Requirements: See above under Graduate Program.

Graduation Requirements: Completion of the third year of a South Asian language to include at least 7 credits at the 400 level or above; SISSA 510 and 511 (5 credits each); 26 credits in discipline course work other than language, from at least two different departments; two seminar papers; and a comprehensive oral examination.

Research Facilities: The University of Washington library holds an extensive collection of books and serials relating to South Asia. The library participates in the U.S. Library of Congress Public Law 480 program, which supplies current publications from India, Pakistan, and Sri Lanka; and is a member of the South Asian Microfilm Program of the Center for Research Libraries, providing access to a large collection of microfilm newspapers, journals, and documents on South Asia.

Faculty

Director

Arnand Yang

Professors

Bacharach, Jere L. * 1967; MA, 1962, Harvard University, PhD, 1967, University of Michigan; history of the Near East.

Bachman, David M. * 1991; PhD, 1984, Stanford University; Chinese politics and foreign policy and China's political economy (1949-present); U.S.-China relations.

Brass, Paul R. * 1965, (Emeritus); PhD, 1964, University of Chicago; comparative government, international relations.

Butow, Robert J. C. * 1960, (Emeritus); PhD, 1953, Stanford University; East Asian diplomatic history.

Chirot, Daniel * 1974; PhD, 1973, Columbia University; comparative ethnic conflict, social change, post-communist societies.

Ebrey, Patricia B. * 1997; PhD, 1975, Columbia University; the social and cultural history of China, especially the Song Dynasty (960-1279).

Ellison, Herbert J. * 1968; PhD, 1955, University of London (UK); modern Russian history.

Hamilton, Gary G. * 1993; PhD, 1975, University of Washington; economic sociology, historical comparative, organizational studies, East Asia.

Hanley, Susan B. * 1970; PhD, 1971, Yale University; premodern Japan.

Hellmann, Donald C. * 1967; PhD, 1964, University of California (Berkeley); Japanese politics and international relations.

Jaffee, Martin S. * 1987; PhD, 1980, Brown University; Rabbinic religion and literature in late antiquity.

Kasaba, Resat * 1985; PhD, 1985, State University of New York (Binghamton); historical sociology, world systems, social change in the Middle East.

Keyes, Charles F. * 1965; PhD, 1965, Cornell University; interpretive anthropology, religion and political-economic change, ethnic group relations, sociology.

Legters, Lyman H. * 1966, (Emeritus); PhD, 1958, Freie University of Berlin (Germany); Russian and East European studies.

Migdal, Joel S. * 1980; MA, 1968, PhD, 1972, Harvard University; state and society in the Third World; Middle East politics.

Palais, James B. * 1968, (Emeritus); PhD, 1968, Harvard University; modern Korean history.

Poznanski, Kazimierz * 1987; PhD, 1974, University of Warsaw (Poland); international trade; economics of technology; comparative economic systems.

Pyle, Kenneth B. * 1965; PhD, 1965, Johns Hopkins University; modern Japanese history.

Townsend, James R. * 1968, (Emeritus); PhD, 1965, University of California (Berkeley); comparative government (China), politics of development.

Webb, Eugene * 1966, (Emeritus); PhD, 1965, Columbia University; modern English, French, and German literature, comparative religion.

Williams, Michael A. * 1976; PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Wong, Christine 2000; PhD, 1979, University of California (Berkeley); economic development and reform in China, rural industrialization and fiscal management in China.

Yamamura, Kozo * 1972, (Emeritus); PhD, 1964, Northwestern University; economic development and economic history of Japan, comparative economic history.

Yang, Anand A. 2002; PhD, 1976, University of Virginia; government and reform in India, colonialism in India.

Associate Professors

Anchordoguy, Marie C. * 1989; PhD, 1986, University of California (Berkeley); Japan's political economy; East Asian economic development.

Dong, Yue 1996; MA, 1991, University of Oregon, PhD, 1996, University of California (San Diego); modern Chinese history, urban history, gender studies.

Friedman, Kathie * 1987; MA, 1979, PhD, 1991, State University of New York (Binghamton); sociology of gender, immigration, race, and ethnicity in the United States.

Guy, R. Kent * 1980; PhD, 1981, Harvard University; modern Chinese history.

Jones, Christopher D. * 1984; PhD, 1975, Harvard University; post-Cold War security issues in Europe and East Asia, political economy.

Kaczynski, Wlodzimierz M. * 1977, (Adjunct); PhD, 1973, University of Gdansk (Poland); fishery economics, international joint ventures in marine fisheries, international fisheries policy.

Lavelly, William R. * 1985; PhD, 1982, University of Michigan; social demography of China.

Noegel, Scott B. * 1995; PhD, 1994, Cornell University; Ancient Near Eastern languages, literatures, cultures and history.

Sorensen, Clark W. * 1989; PhD, 1981, University of Washington; Korea, social change in East Asia, development, ethnic identity.

Sparke, Matthew * 1995; MA, 1991, PhD, 1996, University of British Columbia (Canada); political-geography, social theory, cultural studies, globalization.

Waugh, Daniel Clarke * 1972; PhD, 1972, Harvard University; medieval Russian history.

Young, Glennys J. * 1992; PhD, 1989, University of California (Berkeley); late Imperial and early Soviet Russia.

Assistant Professors

Callahan, Mary P. 1999; PhD, 1996, Cornell University; military in S.E. Asia, government reform in S.E. Asia, women in the military, Burma.

Giebel, Christoph * 1998; PhD, 1996, Cornell University; Viet Nam; 20th century history, communism, labor, post-independence historiography.

Stein, Sarah A. * 1999; PhD, 1999, Stanford University; modern Jewish history, Russian Jewish history, Ottoman Jewish history, diaspora studies.

Warren, Jonathan W. 1996; MA, 1990, PhD, 1997, University of California (Berkeley); race and ethnicity, Latin American studies, cultural studies, Native American studies.

Senior Lecturer

Clowes, James D. 1988; PhD, 1996, University of Washington; modern European intellectual history, early German romanticism, pedagogy.

Lecturer

Wheeler, Deborah 1997; PhD, 1993, University of Chicago; contemporary Islamic societies, technology in U.S. foreign policy and contemporary Middle East.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

International Studies

SIS 401 International Political Economy (5) I&S *Ingebritsen, Poznanski* Establishment, maintenance, and decay of the post-1945 international economic order. Political economy of international trade, monetary relations, inflation, and North-South relations. Prerequisite: SIS 201 which may be taken concurrently; ECON 201 which may be taken concurrently.

SIS 406 Political Islam and Islamic Fundamentalism (5) I&S Study of resurgence, since mid-1970s, of political Islam and what has come to be called Islamic fundamentalism, especially in the Middle East. Topics include the nature and variety of political Islam today, causes and implications of the current resurgence, and comparison with previous resurgences. Offered: jointly with POL S 432.

SIS 410 Introduction to Global Internet Political Economy (5) I&S *Hellmann* Impact of the Internet revolution on structure and operating procedures of the international system. Effects of Internet-driven forces on aspects of the global political economy: cultural and political identities; interactions between states and markets; meaning of the boundaries of sovereignty and civil society.

SIS 419 Comparative Media Systems (5) I&S Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with COM 420/POL S 468.

SIS 421 National Security and International Affairs (5) I&S *Jones* Major military aspects of contemporary international politics. Uses and limitations of military capabilities for sustaining a stable international order and national security. Processes by which states detect and assess threats to their security; practice of deterrence; transfer of arms among states; pursuit of arms control. Recommended: one SIS or international relations course.

SIS 422 The United States in the Contemporary International System (5) I&S United States in the world: ways in which international circumstances shape the political-strategic, economic, and cultural dimensions of America's policy. Case studies from post-1945 period. Recommended: one international relations or foreign policy course.

SIS 423 Practicing American Foreign Policy (5) I&S Develops familiarity with tools available to promote international objectives of the United States. International case studies selected to illustrate the diverse considerations inherent in the policy process

and evaluate the strengths and weaknesses of the national institutions involved. Prerequisite: SIS 201.

SIS 425 International Law and Arms Control (5) I&S Surveys the political, legal, and technological history of 20th-century arms control agreements with emphasis on the treaties which ended the Cold War. Examines current issues of law, politics, military strategy, and technology in regard to weapons of mass destruction and related topics in international security. Offered: Sp.

SIS 426 World Politics (5) I&S *Caporaso, Modelski* Nation-state system and its alternatives; world distributions of preferences and power; structures of international authority; historical world societies and their politics. Offered: jointly with POL S 426.

SIS 430 International Population (5) I&S *Lavelly* Demographic situation of the world and of major world regions. The demographic transition. Topics include public health, policies of fertility and mortality control, international migration, relation of population growth to economic development, social change, and resource constraints. Exploration and manipulation of international demographic data.

SIS 432 Population and Modernization (3) I&S *Hirschman, Lavelly* Examines role of demographic factors in process of social modernization and economic growth. Approach is historical, focusing on populations of developed countries since 1700, and analytic, stressing attempts made by different disciplines to model demographic relationships, with attention to less developed regions. Offered: jointly with SOC 432.

SIS 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5) I&S Provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and nationalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to introductory courses in political science or to courses in ethnicity in other departments is desirable. Offered: jointly with POL S 436.

SIS 440 History of Communism (5) I&S *Ellison* Communism from its origins in Bolshevik faction of Russian social democracy to the present, treating the development of the ideology, the various communist parties, and the communist states. Recommended: two history or politics of Europe courses. Offered: jointly with HSTEU 440.

SIS 444 Peasants in Politics (5) I&S *Young* Interdisciplinary study of peasants, with special attention to questions of rural transformation. Peasant involvement in an increasingly independent world. Rebellion and revolution, impact of the international market, agricultural development. Offered: jointly with POL S 446.

SIS 449 Social Transformation of Modern East Asia (5) I&S *Sorensen* Comparative study of social change in China, Japan, Korea, and Vietnam since 1945. Concentration on small-scale social units in rural and urban areas under both communist and capitalist political systems. Recommended: two history or anthropology of East Asia courses. Offered: jointly with ANTH 449.

SIS 455 Industry and the State (5) I&S *Whiting* Builds on states and markets approach of 200 and 201 through specific examination of effects of industry and industrial structure on political outcomes and roles of state. Emphasis on late-developing and newly developing economies. Prerequisite: SIS 200; SIS 201.

SIS 456 State-Society Relations in Third World Countries (5) I&S *Bachman, Kasaba* Relationships among political, social, and economic changes in Asia, Africa, and Latin America. Problems of eco-

nomie and political development, revolution and reform, state-society relations, imperialism and dependency. Offered: jointly with POL S 450.

SIS 460 Law, State, and Society (5) I&S *Migdal* Examination of both state law and non-state law (rules and ways of ordering behavior such as customary law, religious law, and social conventions). Focuses on the ways non-state law interacts with and affects state law and is affected by state law.

SIS 465 Deeply Divided Societies (5) I&S *Migdal* Ethnic conflict seen from two perspectives: 1. the study of theoretical approaches as a means of understanding deeply divided societies; 2. a focus on one or more specific conflicts. Recommended: SIS 201 or POL S 204.

SIS 476 Comparative International Political Economy (5) I&S *Ingebritsen, Pozanski* Comparative analysis of four major approaches to international political economy: mercantilism, Marxism, liberalism, and evolutionary approach. Focus on international cooperation, social change, and economic institutions. Theoretical analysis of the four paradigms and applications to historic and current issues in international political economy: hegemonic cycle, post-communist transition, and cross-national income inequality.

SIS 490 Special Topics (1-5, max. 15) I&S Content varies from quarter to quarter.

SIS 491- Senior Honors Seminar (5-) I&S Study of issues related to students' thesis topics. Develops thesis-writing skills. Open only to Jackson School honors students.

SIS -492 Senior Honors Seminar (-5) I&S Students write a senior thesis working with their individual writing advisers.

SIS 495 Task Force (5) I&S Small-group seminars address current problems in international affairs, each focusing on one specific policy question and producing a joint task force report. Restricted to senior majors in International Studies. Prerequisite: SIS 200; SIS 201; SIS 202; SIS 401.

SIS 497 Internship (1-5, max. 15) Credit for the completion of an approved internship in international studies. Credit/no credit only.

SIS 498 Readings in International Studies (5) I&S Reading and discussion of selected works of major importance in interdisciplinary international studies. Restricted to majors in International Studies.

SIS 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

SIS 500 Seminar: Origins of the Modern Global System (3) *Kasaba, Migdal* Development of global interdependence from the fifteenth century to World War II. Interrelationship of politics and economics. International political economy from contextual, institutional, and historical perspectives.

SIS 501 Seminar: Comparative International Studies (3) *Kasaba, Poznanski* Focuses on comparison across geographical areas including comparative political economy, comparative cultures, and comparative institutions. Provides familiarity with the comparative method of inquiry, an understanding of the interplay between area studies and cross-regional theories, and skills in conducting comparative research and writing. Prerequisite: ECON 200; ECON 201.

SIS 502 Seminar: Globalization and International Relations (3) *Jones* Focuses on globalism, including international relations and transnational studies. Provides an understanding of the interplay of area studies with processes that transcend geographical

areas and intersect political boundaries, an overview of transnationalism or international relations, and skills in undertaking a major research and writing project.

SIS 511 Practicum: Methods in International Studies (3) *Chirot* Assumptions underlying leading methodologies for comparative study of societies and other large-scale social entities. Quantitative and nonquantitative methods illustrated by recent research.

SIS 512 Task Force in International Affairs (3) *Chirot* Seminar addressing a current problem in international affairs and resulting in a joint task-force report. Results presented to, and critiqued by, a distinguished outside evaluator at end of term.

SIS 522 Special Topics in Ethnicity and Nationalism (3, max. 6) Topics vary, but always focus on ethnic group relations and nationalism viewed from a broad, comparative, interdisciplinary perspective. Emphasis is heavily cross-cultural, and the geographical coverage world-wide.

SIS 534 International Affairs (3) Provides a broad understanding of international issues and United States policy. Students explore U.S. foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with PB AF 530/POL S 534.

SIS 542 Seminar: State and Society (5) *Migdal* Examines the mutually conditioning relationship between states and the societies they seek to govern. Studies states as large, complex organizations and their interactions with society on different levels. Shows that interactions on any level affect the nature of the state on other levels as well. Offered: jointly with POL S 542.

SIS 562 Law, Globalization, and Multinational Corporations (3) An interdisciplinary workshop that examines the role of multinational corporations in a global society. Topics include the legal construct of the multinational corporation, the multinational and the state, the multinational and human rights, and the multinational in the international arena. Offered: jointly with LAW E 512.

SIS 575 Advanced Political Geography (5) *Sparke* Provides resources for theorizing how politics shapes and is shaped by geographical relationships. Examines how politics are situated in complex material and discursive geographies that are partly reproduced through political negotiations. Examines interrelationships of contemporary capitalism with other complex systems of social and political power relations. Offered: jointly with GEOG 575.

SIS 580 Teaching International Studies (2, max. 4) *Migdal* For current and prospective teaching assistants. Includes teaching writing, leading effective discussions, the art of evaluation, and teaching critical reading skills; videotaping of actual teaching sessions of participants in class. Credit/no credit only.

SIS 590 Special Topics (2-5, max. 10) Seminar. Course content varies. Offered occasionally by visiting or resident faculty.

SIS 600 Independent Study or Research (*)

African Studies

SISAF 444 African Studies Seminar (5, max. 15) I&S Interdisciplinary seminar focusing upon one particular aspect of the African continent. Emphasis may be humanistic, social scientific, or historical. African Studies faculty and visiting scholars lecture on areas of their own expertise.

SISAF 490 Special Topics (1-5, max. 15) I&S

SISAF 499 Undergraduate Research (1-5, max. 15)

Asian Studies

SISA 490 Special Topics (1-5, max. 15) I&S Content varies.

SISA 499 Undergraduate Research (1-5, max. 15)

Canadian Studies

SISCA 400 Canadian Values and Symbols (5) I&S Overview of the ideas, events, and activities which help define Canadians as a people. Examines the "national" expression of these values and symbols, as evidenced in historical experience, a physical environment often harsh and unyielding, a diverse people and cultures, and a pride in achievement that is frequently slow to surface.

SISCA 424 Canadian Media Systems (5) I&S Structure and operation of Canadian mass media and telecommunications industries. Impact of United States media on Canadian culture. Role of domestic media in lives of minorities. Laws and policies governing communications. Offered: jointly with CMU 424.

SISCA 430 Canadian Documentary Film Traditions (5) I&S/VLPA History and development of non-fiction film documentary traditions, especially in Canada, the first institutionally defined area in which documentaries became prominent through the National Film Board and the Canadian Broadcasting Corporation. Discussion of Flaherty, Greirson, and independent network producers who developed present-day style of documentaries. Offered: jointly with COM 430.

SISCA 441 Québécois Literature (5) VLPA *Delcourt* Readings of novels, plays, and occasionally, poetry. Special attention paid to how Québécois authors represent in their works the complex socio-political reality of their culture. Conducted in French. French majors required to read and write in French; all others may read and write in English. Prerequisite: FRENCH 303; FRENCH 306. Offered: jointly with FRENCH 441.

SISCA 490 Special Topics (1-5, max. 15) Content varies.

SISCA 495 Multiculturalism in Canada (5) I&S History of the multi-racial and multi-ethnic character of Canadian society. Impact of federal policy of bilingualism and multiculturalism. Current issues of language rights, retention of cultural heritage, self-government for aboriginal peoples, and improving race and ethnic relations.

SISCA 498 Seminar: Canadian Problems (5) I&S Major issues pertaining to Canadian society, government, and economic development.

SISCA 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

SISCA 507 Research Seminar: Canadian Problems (3, max. 6) Consideration of the spatial dimensions of Canadian socioeconomic, cultural, and political development, with emphasis on resource potentials and relations with the United States, Japan, and other important trading partners. Prerequisite: GEOG 308 or permission of instructor. Offered: jointly with GEOG 507.

SISCA 590 Special Topics (2-5, max. 10) Offered occasionally by visitors or resident faculty. Course content varies.

SISCA 600 Independent Study (*)

Comparative Religion

RELIG 400 The Jewish Mystical Tradition (5) I&S *Jaffee* Jewish esoteric thought from antiquity to early modern times. Emergence of Spanish Kabbalah. The thought of Isaac Luria and its immense influence in Jewish history through other movements—specifically the mystical messiah, Sabbetai Sevi, and the rise of Hasidism. Recommended: RELIG 201 or RELIG 210.

RELIG 405 Scripture in Judaism (5) I&S *Jaffee* Explores the phenomenon of religious interpretation of sacred books by attending to the destiny of the Bible as read within Judaism. Begins with the canonization of the biblical text itself and continues into the rationalist and mystical interpretive innovations of the Middle Ages. Recommended: HIST/SISJE 250, RELIG 201, or RELIG 210.

RELIG 410 Law in Judaic Experience (5) I&S *Jaffee* Place and function of law in Jewish social and personal experience. Discusses the various ideological justifications of the law in biblical and rabbinic literature, examines representative texts, and explores theological reflection on law by medieval and modern thinkers. Recommended: RELIG 201; RELIG 210; RELIG 400 or RELIG 405.

RELIG 415 Modern Jewish Thought (5) I&S *Jaffee* Major trends in Jewish religious thought since the European Enlightenment, focusing on encounters between Judaism and the modern world. Includes Haskalah; varieties of religious reform and accommodation; Zionism; socialism; the philosophy of Rosenzweig, Buber, and Kaplan; and theological responses to the Holocaust. Recommended: HIST/SISJE 250, HSTEU/SISJE 469, RELIG 201, or RELIG 210.

RELIG 420 The World of the Early Church (5) I&S *Williams* Early Christian church within the context of the Greco-Roman sociopolitical, philosophical, and religious environment. Covers the period from about AD 100 to 300. Christian thinkers and documents studied include both the classical "orthodox" and the "heretical." Recommended: HIST 307, RELIG 220, or RELIG 324.

RELIG 421 The Age of St. Augustine (5) I&S Christian church in the fourth and fifth centuries as a major institution in the Roman Empire. Great figures of patristic theology, such as Athanasius, Gregory Nazianzus, Gregory of Nyssa, and Augustine. Recommended: HIST 307, RELIG 320, or RELIG 324.

RELIG 426 Gnosticism and Early Christianity (5) I&S *Williams* Impact of Gnosticism on the development of Christianity and several other religious groups of that period. Readings dating from the first through the third centuries AD.

RELIG 428 Modern Christian Theology (5) I&S Modern Protestant and Catholic thought since the nineteenth century: Kierkegaard, Barth, Bultmann, Rahner, Lonergan, and other major figures. Recommended: RELIG 301.

RELIG 430 Scripture in Islam (5) I&S/VLPA *Wheeler* Examines concept and use of scripture in Islam, with special attention to issues of canon and commentary, heavenly books, talismanic uses, and the place of scripture in ritual. In English. Offered: jointly with NEAR E 430.

RELIG 432 Ritual and Law in Islam (5) I&S/VLPA *Wheeler* Comparative study of Islamic ritual practices and related development of jurisprudence and law. Focus on sacrifice, political and social legal theory, pilgrimage, regulation of the body, and the diversity of contemporary practices. In English. Offered: jointly with NEAR E 432; W.

RELIG 433 Life of Prophet Muhammad (5) I&S/VLPA *Wheeler* Examines historical and religious traditions associated with the life of the Prophet

Muhammad with particular attention to the biography in classical Islam. Focuses on Muhammad as prophet, holy man, law-giver, mystic, and statesman. Comparison with other religious figures such as Jesus and the Buddha. In English. Offered: jointly with NEAR E 433.

RELIG 434 Human Rights and Islam (3) I&S *Souaiaia* Focuses primarily on the historical and philosophical background behind the development of the principles and norms of "human rights" in Western thought and in the Islamic legal and religious traditions, from the seventh century to modern day. Analyzes the role of religious as well as political, social, and economic institutions in formulating the notions of human rights. Offered: jointly with NEAR E 434/SISME 434.

RELIG 442 Art, Religion, and Politics in the Early Christian Period, 300-700 AD (3) I&S/VLPA *Kartsonis* Evolution of the art of the early Christian period (300-700 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with ART H 452.

RELIG 443 Art, Religion, and Politics in Byzantium, 700-1453 AD (3) I&S/VLPA *Kartsonis* Evolution of the art of Byzantium (700-1453 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with ART H 453.

RELIG 445 Greek and Roman Religion (3) I&S/VLPA *Harmon, Langdon* Religion in social life of Greeks and Romans; emphasis on their public rituals and festivals. Priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Recommended: RELIG 201. Offered: jointly with CLAS 445.

RELIG 449 Religious Movements: The Sociology of Cults and Sects (5) I&S Investigates the organizational dynamics of new religious movements. Seeks to understand why "cults" emerge and how they proliferate or decay. Examines conflicts within established churches, counter-movements, and the state. Offered: jointly with SOC 445.

RELIG 452 Topics in the Buddhism of Tibet (3) I&S Topics in the development of Buddhism of Tibet. Includes the relationship between reasoning and religious thought; the concept of a person; the formation of the different schools of Tibetan Buddhism; the notion of lineage; the master-disciple relationship in the tantric tradition. Recommended: ANTH 352, RELIG 202, RELIG 350, or RELIG 354.

RELIG 456 Women in Ancient Judaism (3) I&S/VLPA *Noegel* Explores those texts in early Jewish literature in which women play prominent roles and those in which women are surprisingly absent. Discusses the literary portrayal of women for what they tell us about the people who wrote the texts. No knowledge of Hebrew is required. Offered: jointly with NEAR E 456.

RELIG 457 The History of Biblical Interpretation (3) I&S/VLPA *Noegel* Traces biblical interpretation and translation technique from the earliest translations of the Hebrew Bible (Old Testament) to the various historical literary, deconstructionist, and holistic strategies of more recent times. Adopts a "hands-on" approach to the material and explores various hermeneutics by applying them in class. Offered: jointly with NEAR E 457.

RELIG 490 Special Topics (1-5, max. 15) I&S Topics vary with each offering.

RELIG 491 Seminar: Topics and Issues in Judaism (5) I&S *Jaffee* Topics vary. Recommended: RELIG 210; RELIG 400, RELIG 405, or RELIG 410.

RELIG 492 Seminar: Topics in Early Christianity (5) I&S *Williams* Topics vary. Recommended: one early Christian history or literature course.

RELIG 498 Honors Thesis (5) I&S Required course for Comparative Religion honors students.

RELIG 499 Undergraduate Research (1-5, max. 15) Primarily for comparative religion majors and majors in the School of International Studies.

Courses for Graduates Only

RELIG 501 Approaches to the Study of Religion (5) Major approaches employed by modern scholarship in the study of religion, including historical, phenomenological, anthropological, sociological, and psychological. Prerequisite: admission to the comparative religion MAIS program or permission of instructor.

RELIG 502 Religion in Comparative Perspective (5, max. 15) Analysis of selected theme or symbols in relation to several different religious traditions. Topics vary. Prerequisite: admission to the comparative religion MAIS program or permission of instructor.

RELIG 504 Religion and Culture (5) Study of the relations between religion and culture, with attention to the role of religion in defining conceptions of order and grounding socio-political and artistic traditions.

RELIG 520 Seminar On Early Christianity (5) *Williams* Problems in the history and literature of early Christianity.

RELIG 528 Christian Theology (5) Study of exemplary figures in the history of Christian religious thought. Prerequisite: RELIG 428.

RELIG 570 Religion and Literature (5) The relation of religious thought to the study of imaginative literature. Includes both critical theory and practical criticism of exemplary texts.

RELIG 590 Special Topics (2-5, max. 10) Offered occasionally by visitors or resident faculty. Course content varies.

RELIG 600 Independent Study or Research (*)

East Asian Studies

SISEA 423 History of Modern Japan (5) I&S *Pyle* Political, social, economic, and cultural development of Japan from the late Tokugawa period to the present with special emphasis on the cultural impact of the West. Offered: jointly with HSTAS 423.

SISEA 424 Perspectives on East Asia for Teachers (3, max. 6) I&S Substantive concepts, resources, and materials employed in teaching about East Asia. Requirements may vary in relation to the background of participants.

SISEA 434 Demographic Issues in Asia (3-5) I&S *Hirschman, Lavelly* Contemporary Asian countries face a number of issues with demographic components, including environmental and resource issues, ethnic rivalries, international migration, and public health. Addresses a set of these issues by focusing on the demography of one or more countries in Asia. Offered: jointly with SOC 434.

SISEA 435 Japanese Government and Politics (5) I&S *Hellmann* Government and politics of Japan with emphasis on the period since 1945. Offered: jointly with POL S 435.

SISEA 439 Politics of Divided Korea (5) I&S Governments, politics, and economy of South and North Korea, the inter-Korea relations, and the two Koreas' relationship with the major powers—especially the United States—with emphasis on the post-cold war period. Offered: jointly with POL S 439.

SISEA 440 The Emergence of Postwar Japan (5) I&S *Pyle* The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power. Recommended: HSTAS 423 or SISEA 423. Offered: jointly with HSTAS 424.

SISEA 441 Economic and Social History of Japan to 1900 (5) I&S *Hanley* Lecture-seminar on Japanese economic and social history from 700 to 1900. Analyses of the rise and decline of the shoen system, the rise of commerce, social change, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. Prerequisite: either SISEA 241/HSTAS 241 or SISEA 341/HSTAS 341. Offered: jointly with HSTAS 441.

SISEA 442 Political Economy of Postwar Japan (5) I&S *Anchoroguy* Political and economic problems of Japan since 1945. Utility of competing theoretical approaches to analysis of government and economy of Japan. Policy-making processes and effects of policies adopted. Some knowledge of postwar Japan desirable. Recommended: SISEA 440/HSTAS 424.

SISEA 443 Class and Culture in East Asia (5) I&S Examines the nexus between culture and systems of social stratification/class in East Asia, with an emphasis on Taiwan, Korea, Japan, and China. Topics include class formation, mechanisms of social mobility and reproduction, markers of status and hierarchy, resistance, and the formation of class identity. Offered: jointly with ANTH 446.

SISEA 444 Politics of Representation in Modern China (5) I&S Focuses on issues of representation and power in twentieth century China. Combines substantive information on modern Chinese society and culture with recent debates in social theory and the politics of representation. Major themes include Chinese nationalism, body politics, popular culture, and everyday practice. Offered: jointly with ANTH 444.

SISEA 445 Religion in China (5) I&S *Harrell* Religion in Chinese society, doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Prerequisite: either one 200-level ANTH course, ANTH 370, ANTH 403, LING 203, HSTAS 211, HSTAS 454, RELIG 202, SISEA 370, or SISEA 443. Offered: jointly with ANTH 447.

SISEA 448 Modern Korean Society (5) I&S *Sorensen* Social organization and values of twentieth-century Korea. Changes in family and kinship, gender relations, rural society, urban life, education, and industrial organization since 1900. Differences between North and South Korea since 1945. Recommended: HSTAS/SISEA 212. Offered: jointly with ANTH 448.

SISEA 449 Government and Politics of China (5) I&S *Whiting* Post-1949 government and politics, with emphasis on problems of political change in modern China. Offered: jointly with POL S 442.

SISEA 454 History of Modern China (5) I&S *Dong* Social, cultural, political, economic, and intellectual transformations and continuities in China from the end of the imperial period to the present. Offered: jointly with HSTAS 454.

SISEA 456 Topics in Chinese Social History (5) I&S *Ebrey, Guy* Surveys major issues and approaches to the study of the role of the Chinese people in China's historical development. Historical focus of course varies with instructor. Recommended: HSTAS 211, HSTAS 452, HSTAS 453, or HSTAS/SISEA 454. Offered: jointly with HSTAS 456.

SISEA 459 United States-China Relations (5) I&S *Bachman* Surveys the history of United States-China relations and examines the evolution of bilateral relations, particularly since 1949. Focus on the period since 1972 and the major issues as they have evolved since that time, including trade, human rights, security, and Taiwan. Offered: jointly with POL S 419.

SISEA 460 Cities in China: Past and Present (5) I&S Economic, political, social, and cultural functions of the city in modern Chinese history. Changes in China's urban system. The city as cultural center and focus of literary and cinematic representation. Attention to architecture, commerce, urbanization, the role of capital cities in the power of the state. Offered: jointly with HSTAS 460.

SISEA 468 China's Economic Reforms: Integration Into World Economy (5) I&S *Wong* A systematic survey of China's economic reforms since 1978, including China's increasing integration into world economy. Prerequisite: ECON 201. Offered: jointly with ECON 468.

SISEA 470 Minority Peoples of China (5) I&S *Harrell* Interaction between China and the peoples of its periphery, including Inner Asia, Tibet, Northern Mainland, Southeast Asia, and aboriginal peoples of Taiwan. Emphasis on ethnicity, ethnic group consciousness, and role of the Chinese state. Prerequisite: either ANTH/SISEA 370, HSTAS 454, LING 203, or one 200-level ANTH course. Offered: jointly with ANTH 470.

SISEA 475 Japanese Society (5) I&S Discusses rapidly changing Japanese society and history of its unique aspects. Readings and lectures in sociology, anthropology, economics, and politics; emphasis on Japanese search for cultural identity and prevalent interpretations of Japanese society and behavior. Recommended: either SISEA 241/HSTAS 241 or SISEA 341/HSTAS 341.

SISEA 478 Readings in the Social Sciences in Japanese (3-5) I&S Introduction to articles and short works in economics, history, political science, and other social sciences. Assignments chosen from major Japanese monthlies and academic works. All readings in Japanese. Prerequisite: JAPAN 313.

SISEA 480 New Orders in East Asia (5) I&S *Pyle* Rise and fall of successive international systems in East Asia over the past 150 years: Sino-centric, imperialist, Washington Treaty system, Japan's East Asian order, Yalta system, cold-war system. Post-cold-war search for a new order. Special attention to triangular relations among the United States, China, and Japan.

SISEA 482 Japanese Business and Technology (5) I&S *Anchoroguy* Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future.

SISEA 490 Special Topics (1-5, max. 15) I&S Course content varies.

SISEA 494 Economy of Japan (5) I&S *Yamamura* Analysis of the economic growth of Japan since about 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: ECON 201. Offered: jointly with ECON 494.

SISEA 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

SISEA 517- Foreign Trade and Investment Law of the People's Republic of China (1-4, max. 4)

Introduction to the regulatory regime governing foreign trade and investment in China and in-depth coverage of key aspects of the regime, with focus on issues faced by U.S. businesses. Covers specific regulations, their implementation in practice, as well as the political and economic background. Offered: jointly with LAW E 517.

SISEA 521- Seminar: Introduction to the Interdisciplinary Study of China (5-) Bachman, Dong, Guy

SISEA -522 Seminar: Introduction to the Interdisciplinary Study of China (-5) Bachman, Dong, Guy

SISEA 530 Seminar on China (3, max. 6) Problems of Chinese history. Prerequisite: permission of instructor.

SISEA 531 Chinese History: Research Methods and Bibliographic Guides (3, max. 6) *Guy* Introductory research seminar dealing with the methodological and bibliographical problems concerning all periods and aspects of Chinese history from the earliest times to the nineteenth century. Prerequisite: two years of classical or modern Chinese.

SISEA 532 The Chinese Political System (5) *Bachman, Whiting* Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor. Offered: jointly with POL S 532.

SISEA 533 Seminar on Contemporary Chinese Politics (5) Research on selected problems in contemporary Chinese politics. Prerequisite: SISEA 532 or permission of instructor. Offered: jointly with POL S 533.

SISEA 535 International Relations of Modern China (5) Foreign policy of the People's Republic of China: historical antecedents; domestic and international systemic determinants; and Chinese policies toward major states, regions, and issues. Prerequisite: a course on contemporary Chinese politics or history, or permission of instructor. Offered: jointly with POL S 535.

SISEA 538 Selected Topics on the Chinese Economy (5) Introduction to key issues of China's growth; the transition from planned economy; the changing role of the state; central-local relations; macro-management of the economy; income distribution; resources and agriculture; the external sector and the WTO.

SISEA 540 Law in East Asia: Japan (4) *Taylor* Basic institutions and processes of the Japanese legal system. Historical development and traditional role of law, reception of Western law, and cultural and structural factors that influence the function of law and legal institutions. Offered: jointly with LAW B 540.

SISEA 541 Economic and Social History of Japan to 1900 (5) *Hanley* Analyses of landholding systems, the rise of commerce, demographic changes, urbanization, early industrialization, and social change. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken 441. Offered: jointly with HSTAS 541.

SISEA 543 Law in East Asia: China (3) *Clarke* Introduction to the basic institutions and processes of the Chinese legal system. Development and role of law in both the traditional and contemporary periods. Offered: jointly with LAW B 541.

SISEA 550 Japan, the United States, and New Orders in Asia (5) *Pyle* Seeks historical understanding of establishment of new order in contemporary East Asia. Analyzes the imperialist, Washington conference, and cold war systems and explores the

present post-cold war search for a new order. Prerequisite: one course in modern Japanese history, political economy, or political science.

SISEA 551 International Relations of Northeast Asia (5) *Hellmann* Comprehensive survey of contemporary international relations of Northeast Asia with emphasis on Russia, Japan, China, and the United States. Multidisciplinary approach placing contemporary problems in historical context, drawing on modern social science theories. Connections between defense and economics are examined. Prerequisite: permission of instructor. Offered: jointly with POL S 539.

SISEA -555 Introduction to Japanese Studies (3-6, max. 6) *Anchoroguy* Interdisciplinary introduction to the study of Japan, with emphasis on historical development. Required seminar for first-year graduate students.

SISEA 558 Readings on Japan in the Social Sciences (5) Seminar discussing articles in Japanese in economics, history, political science, and other social sciences. Assignments from major Japanese monthlies and academic works. Prerequisite: JAPAN 313 or equivalent and permission of instructor.

SISEA 559 Interdisciplinary Seminar on Japan (5) Advanced readings in history and the social sciences. Prerequisite: permission of instructor.

SISEA 575 Seminar on Japanese Society (5) Interdisciplinary seminar with class-led discussions on readings from anthropology, history, sociology, and nondiscipline-specific articles on Japanese society. Prerequisite: background on Japan. Not open to students who have taken SISEA 475.

SISEA 577 Readings on Political Economy of Japan (5) *Anchoroguy* Analysis of major issues such as the Japanese state's role in industrial development, Japan's trade and investment in Asia, US-Japan trade and security relations, and Japan's model of capitalism.

SISEA 582 Japanese Business and Technology (5) *Anchoroguy* Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future.

SISEA 584 Survey of Korean Society (5) *Sorensen* Introduction to the social and political institutions of North and South Korea with an opportunity to master the most important literature on modern Korea. Focuses on the twentieth century with the major emphasis on the post-1945 period. Offered: A.

SISEA 585 Research Seminar: Modern Korea (6) *Sorensen* Advanced instruction in problems and methods of research in Korean history. Foreign language not required. Prerequisite: permission of instructor.

SISEA 590 Special Topics (2-5, max. 10) Seminar. Course content varies. Offered occasionally by visiting or resident faculty.

SISEA 600 Independent Study or Research (*)

SISEA 700 Master's Thesis (*)

European Studies

EURO 425 European Media Systems (5) I&S Examines media systems in selected countries in Europe and policy issues that link (or divide) members of the European Union and other major media producers. Media studied in context of the contem-

porary economic, social, political, and cultural milieu in which they operate. Offered: jointly with COM 425.

EURO 445 The Nordic-Baltic Region and the War: Literary Representations (5) *Stecher-Hansen* Treatment of Nazism, Stalinism, collaboration, resistance, national identities in literary texts written during/after World War II in Scandinavia and the Baltic region. Surveys different national destinies (German-occupied Denmark and Norway, neutral Sweden, Finland at war, Soviet-occupied Baltic states, Iceland) through literary texts related to period. Offered: jointly with SCAND 445.

EURO 481 August Strindberg and European Cultural History (5) I&S/VLPA Examines the work of Swedish dramatist, novelist, and painter August Strindberg, in the context of European literary movements and history of ideas from 1880 to 1912, and Strindberg's influence on 20th-century drama and film. Offered: jointly with SCAND 481.

EURO 490 Special Topics (1-5, max. 15) I&S

EURO 494 Senior Seminar I (5) I&S Introduction to research into European topics and to the analysis of problems.

EURO 495 Senior Seminar II (5) I&S Writing and discussion of senior thesis. Prerequisite: EURO 490. Offered: Sp.

EURO 499 Undergraduate Research (1-5, max. 5)

Jewish Studies

SISJE 436 American Jewish History Since 1885 (5) I&S Political, social, economic, religious history of American Jewish community from great eastern European migration to present. Integration of immigrant community into general American community; rise of nativism; development of American socialism; World War I and II; and reactions of American Jews to these events. Offered: jointly with HSTAA 436.

SISJE 438 Jewish Women in Contemporary America (5) I&S Examines how Jewish women's identities are socially constructed and transformed in contemporary America, using social histories, memoirs, and ethnographies to analyze scholars' approaches to Jewish women's lives. Topics include the role of social class, religion, migration, the Holocaust, and race relations in Jewish women's lives. Offered: jointly with WOMEN 438.

SISJE 452 The Biblical Song of Songs (3) VLPA *Noegel* Examines the erotic and beautiful Song of Songs within the context of ancient (and medieval) Near Eastern love poetry and correlates close readings of the book with various interpretations it has received from antiquity until today. No knowledge of Hebrew or the Bible is required. Offered: jointly with NEAR E 452

SISJE 453 The Biblical Prophets (3) VLPA I&S *Noegel* Explores the biblical prophets (in translation) within their Near Eastern contexts. Studies them for their historicity, literary and rhetorical sophistication, and ideological agendas. This course seeks to uncover the meaning and distinctiveness of Israelite prophecy within the context of the larger Near East. No knowledge of the Bible is required. Offered: jointly with NEAR E 453.

SISJE 454 Israel: The First Six Centuries BCE (3) VLPA I&S *Noegel* Traces the Israelites, from the Babylonian destruction of the Jerusalem Temple (586 BCE) to events following the destruction of the second Temple (1st century CE). Focuses on primary historical and literary sources as well as archaeological and artistic evidence. No knowledge of Hebrew or the Bible is required. Offered: jointly with NEAR E 454.

SISJE 455 The Kings of Monarchic Israel (3) VLPA I&S *Noegel* Examines the biblical accounts (in translation) concerning the formation and collapse of the united Israelite monarchy. Investigates the archaeological and textual evidence for their historicity, the literary sophistication of these accounts, and Israelite kingship within the wider context of the ancient Near East. No knowledge of the Bible is required. Offered: jointly with NEAR E 455.

SISJE 465 The Jews of Eastern Europe (5) I&S Jewish society in Poland, Russia, the Habsburg Lands, and Romania from the late Middle Ages to the Holocaust. Offered: jointly with HSTEU 465.

SISJE 466 The Sephardic Diaspora: 1492-Present (5) I&S *Stein* Examines the history and culture of Sephardic Jewry from the expulsion from the Iberian Peninsula in 1492 to the present. Explores the creation of Sephardic communities in the Dutch and Ottoman Empires, Western Europe, the Americas, and Africa, and the history of the conversos and "hidden Jews." Offered: jointly with HSTEU 466.

SISJE 469 Enlightenment, Emancipation, Antisemitism: History of the Jews, 1770-1914 (5) I&S *Stein* The Jewish experience in the modern world from the European Enlightenment to the First World War. Focus on the debates surrounding Jewish emancipation, the reception of Jews within European society, modern antisemitism, nationalist movements, mass migration, and war. Offered: jointly with HSTEU 469.

SISJE 490 Special Topics (1-5, max. 15) I&S Content varies.

SISJE 495 Seminar in Jewish Studies (5) I&S *Jaffee* History of Jewish Studies as an organized field of academic inquiry. Explores the implications for Jewish Studies of its present setting within the context of the humanities and the social sciences.

SISJE 499 Undergraduate Research (1-5, max. 15)

Latin American Studies

SISLA 451 Cultural Geography of Latin America (5) I&S Interdisciplinary senior seminar examining how physical and social geographies are culturally constructed and interconnected with subjectivities and power in Latin America. Topics include identity formation grounded in particular territories and the social constitution of space via an interplay of material and cultural forces. Offered: jointly with GEOG 451.

SISLA 470 Latin American Studies Internship (1-5, max. 10) Off-campus fieldwork with a community national, or international organization, in an apprenticeship or internship situation. Supervised by on-site field supervisor and Latin American Studies faculty member.

SISLA 480 Labor and Popular Movements in Latin America (5) I&S *Bergquist* Interdisciplinary approach to origins and trajectory of labor movement from late nineteenth century to present. Emphasis in contemporary period on popular movements, including neighborhood associations, religious base communities, women's movement, and ethnic mobilization for democratic social and political reform. Recommended: two non-language Latin American studies courses. Offered: jointly with HSTAA 480.

SISLA 485 Cultural Studies of Latin America (5) I&S/VLPA *Steele* Identity, representation, and transculturation in Latin American popular culture. Topics vary but may include, cinema, folk art, and historical, ethnographic, and travel writing. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 485.

SISLA 486 Photography and Cultural Studies in Latin America (5) I&S/VLPA *Steele* Interdisciplinary

exploration of the connections between visual anthropology (ethnography through photography and film), documentary and art photography, and colonial and post-colonial discourse in Latin America during the twentieth century. Offered: jointly with SPAN 486.

SISLA 489 The Mexico-U.S. Border in Literature and Film (5) I&S/VLPA *Doremus, Steele* Analysis of the Mexico-U.S. Border region in literature and film of the 1990s and early 2000s. Includes migration, tourism, NGOs, globalization, transnational commerce, multiculturalism, and politics of gender, sexuality and race. Prerequisite: SPAN 303; either SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 489.

SISLA 490 Special Topics (1-5, max. 15) I&S Content varies.

SISLA 492 Latin American Studies Seminar (5, max. 15) I&S

SISLA 499 Undergraduate Research (1-5, max. 15)

Middle Eastern Studies

SISME 400 The Middle East in the Modern World (5) I&S *Kasaba* Economic, political, and cultural ties between the Middle East and the modern world between the eighteenth century and the present. Particular attention to the transformation of societies, formation of modern states, the relationship between Islam and democracy, and gender and society in the Middle East.

SISME 434 Human Rights and Islam (3) I&S *Souaiaia* Focuses primarily on the historical and philosophical background behind the development of the principles and norms of "human rights" in Western thought and in the Islamic legal and religious traditions, from the seventh century to modern day. Analyzes the role of religious as well as political, social, and economic institutions in formulating the notions of human rights. Offered: jointly with NEAR E 434/RELIG 434.

SISME 458 Israel: Politics and Society (5) I&S *Migdal* Examines how parts of the mosaic of Israel's ethnic groups and religions have interacted over time to create today's society. Focus on politics, especially interaction of the state with the mosaic society. The religious divide; the Jewish ethnic divide; Palestinians in Israel; war and its effect on Israel; the long road to peace.

SISME 490 Special Topics (1-5, max. 15) I&S Content varies.

SISME 495 Trends in the Contemporary Middle East (3) I&S Perspectives on cultural, political, and other aspects of Middle Eastern societies. Focuses on background complexities rather than immediate political-military confrontations. Topics vary. Offered: jointly with NEAR E 495.

SISME 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

SISME 530 Reading Seminar on Middle East Studies (2) Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

SISME 531 Reading Seminar on Middle East Studies (2) Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

SISME 532 Reading Seminar on Middle East Studies (2) Middle Eastern historiography, Islamic

law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

SISME 590 Special Topics (3-5, max. 10) Content varies.

SISME 600 Independent Study or Research (*)

SISME 700 Master's Thesis (*)

Russian, East European, and Central Asian Studies

SISRE 418 Eastern Europe: the Political Economy of the Region (5) I&S *Poznanski* Focus on the classical command-type economy and the most recent economic and political transition in Eastern Europe. Analysis of current institutional reform, privatization, and trade relations.

SISRE 424 Security Affairs of Russia and Eurasia (5) I&S *Jones* Surveys history of Soviet military and Soviet empire from 1917 to 1985, breakup of the USSR during 1985 to 1991, and the emergence of new security issues among those Eurasian states that formally constituted the national components of the USSR and its communist military allies.

SISRE 425 Anthropology of the Post-Soviet States (5) I&S *Bilaniuk* Analysis of Soviet and post-Soviet culture and identity. Historical transformations in Soviet approaches to ethnicity and nationality; contemporary processes of nationbuilding and interethnic conflict. Examination of culture through the intersection of social ritual, government policies, language, economic practices, and daily life. Regional focus will vary. Offered: jointly with ANTH 425.

SISRE 443 Kievan and Muscovite Russia: 850-1700 (5) I&S *Waugh* Development of Russia from earliest times to the reign of Peter the Great. Offered: jointly with HSTAM 443.

SISRE 444 Imperial Russia: 1700-1900 (5) I&S *Young* Development of Russia from Peter the Great to Nicholas II. Offered: jointly with HSTEU 444.

SISRE 445 Politics and Society Eastern Europe (5) I&S Political and social issues in lands east of the Elbe, treating some historical problems but focusing particularly on developments since 1945. Includes all communist states of Eastern Europe and their successors. Offered: jointly with POL S 445.

SISRE 448 Twentieth-Century Russia (5) I&S *Ellison*, *Young* Russia and the USSR from Nicholas II to the present. Offered: jointly with HSTEU 445.

SISRE 455 Marine Business Environment in Russia and Eastern Europe (3) I&S *Kaczynski* International marine business environment of Russia and the maritime nations of East Europe; their transition process from communist to free market economic systems. Covers aspects of doing business in marine-related fields such as shipping, fisheries, shipbuilding, ports, and land infrastructures, marine tourism, and water sports. Offered: jointly with SMA 455.

SISRE 465 Baltic States since 1991 (5) I&S Intensive interdisciplinary survey of social, political and economic developments in Estonia, Latvia, and Lithuania since 1991. Offered: jointly with SCAND 455.

SISRE 490 Special Topics (1-5, max. 15) I&S Topics vary.

Courses for Graduates Only

SISRE 501 Bibliography and Research Methods (3) Introduction to bibliographic and other scholarly resources in field; development of research tech-

niques. Some use of relevant language required. Required of all first-year MAIS students. Credit/no credit only.

SISRE 502 Thesis Seminar (3) Required of all second-year MAIS students. Credit/no credit only.

SISRE 504 Approaches to East European Politics (3-5) Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of east-central and southeastern Europe. Prerequisite: permission of instructor. Offered: jointly with POL S 537.

SISRE 505 Seminar: Problems of Social and Political Development in Eastern Europe (3-6, max. 6) Research seminar dealing with selected problems of continuity and change in eastern Europe. Prerequisite: some previous course work on eastern Europe.

SISRE 555 Russian Ocean Policy (3) *Kaczynski* Russian ocean policy following perestroika and disintegration of Soviet empire. Discusses Russian navy, fishery industry, merchant marine, ocean research fleet, in light of international agreements, and joint ventures and new political, economic, and social environments. Prerequisite: knowledge of Soviet/Russian socio-economic problems or permission of instructor. Offered: jointly with SMA 555.

SISRE 590 Special Topics (2-5, max. 10) Course content varies. Offered occasionally by visitors or resident faculty.

SISRE 600 Independent Study or Research (*)

SISRE 700 Master's Thesis (*)

South Asian Studies

SISSA 417 Political Economy of India (5) I&S Analysis of relationships among processes of economic change, political institutions, and structures of political power in contemporary India. Includes contrasting approaches to Indian economic development, land reform, radical and agrarian political movements, and role of foreign aid. Offered: jointly with POL S 417.

SISSA 434 International Relations of South Asia (5) I&S Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia. Offered: jointly with POL S 434.

SISSA 490 Special Topics (1-5, max. 15) I&S Topics vary.

SISSA 498 Undergraduate Colloquium on South Asia (5) I&S Interrelationship of the various social science disciplines in the study of South Asian history and culture.

SISSA 499 Undergraduate Research (1-5, max. 15)

Courses for Graduates Only

SISSA 510 Introduction to Interdisciplinary Study of South Asia (5) Examines work done in the various disciplines focusing on South Asia.

SISSA 511 Seminar on South Asia (5) Interdisciplinary seminar for graduate students in which research and writing on individual research topics are critically developed. Designed to provide each student with an opportunity to synthesize his or her studies on South Asia. Prerequisite: SISSA 510 or permission of graduate program coordinator.

SISSA 590 Special Topics (2-5, max. 10) Seminar. Course content varies. Offered occasionally by visitors or resident faculty.

SISSA 600 Independent Study or Research (*)

SISSA 700 Master's Thesis (*)

Southeast Asian Studies

SISSE 445 Literature and Society in Southeast Asia (5, max. 10) I&S/VLPA *Keyes* Focus on either Vietnam or Thailand. Provides students with opportunity to explore how those living in Southeast Asia have reflected on the radical social changes their societies have undergone through novels, short stories, and poetry. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with ANTH 445.

SISSE 465 The Viet Nam Wars (5) I&S *Giebel* Recent Vietnamese history and struggles for independence and national unification *vis-a-vis* French colonialism, Japanese occupation, American intervention, and internal divisions. Covers historical roots and contemporary contexts of revolution and war, objectives and motivations of participants, and the enormous human costs. Emphasizes socio-cultural changes and wars' legacies. Offered: jointly with HSTAS 465.

SISSE 466 Islam, Mysticism, Politics and Performance in Indonesian Culture (5) I&S/VLPA Shows how Indonesia, the world's fourth most-populous country, with the largest Islamic population, weaves together local practices and influences from India and Persia. Offers ways of understanding modern Indonesian performing arts, religion, and politics. Offered: jointly with HSTAS 446.

SISSE 469 Topics in Southeast Asian History (5) I&S Introduces major issues within the history and culture of one country of Southeast Asia. Content varies. Topics may include religion, economics, colonialism, perspectives on gender, labor history, literatures, popular culture, and performing arts. Focuses on a different Southeast Asian country each time offered. Offered: jointly with HSTAS 469.

SISSE 490 Special Topics in Southeast Asian Studies (1-5, max. 15) I&S Content varies.

SISSE 499 Undergraduate Research (1-5, max. 15)

Japan Studies

See International Studies.

Jewish Studies

See International Studies.

Korea Studies

See International Studies.

Latin American Studies

See International Studies.

Law, Societies, and Justice

See Political Science.

Linguistics

A210 Padelford



General Catalog Web page:
www.washington.edu/students/genecat/academic/linguistics.html



Department Web page:
depts.washington.edu/lingweb/

Linguistics is the scientific study of language, which is one of the most characteristic human attributes. Courses provide training in the method and theory of language analysis and description, as well as studies of language change and language in society. The Romance Linguistics program allows the student to specialize in the analysis and history of one or more Romance languages.

Graduate Program

Graduate Program Coordinator
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 206-543-2046
 phoneme@u.washington.edu

The Department of Linguistics offers a program of study for graduate students leading to the degrees of Master of Arts and Doctor of Philosophy. The program is administered by the departmental faculty. The major interest of the core faculty lies in syntax, semantics, phonetics, phonology, sociolinguistics, and in theoretical aspects of second-language acquisition.

Some course work is also available in various cooperating departments. Among those fields represented outside the department are psycholinguistics, philosophy of language, speech synthesis, and the structure and history of a number of individual languages and language families.

Admission Requirements: At least one previous course in linguistics is highly recommended, as is proficiency in one language other than the student's native language. Two to three letters of recommendation (M.A.) or three letters of recommendation (Ph.D.) and Graduate Record Examination scores are required for all applicants. Doctoral degree applicants should send the department a copy of their master's thesis or a paper of high quality, or both.

Master of Arts

- Two courses each in syntax and phonetics/phonology.
- One course in semantics.
- Three courses not in categories (1) and (2) above.
- Three courses at the 400 or 500 level. At least two of these must be 500-level courses for which papers or projects are required. (LING 504, 505, 506, 507, 508, and 509 do not qualify for this requirement. Also note the University requirement for 9 credits at the 500 to 600 level.)
- No course fulfilling any of the above requirements can be taken for the 2-credit (no paper) option.
- Demonstrated ability to read the linguistic literature in a language other than English. This can be satisfied at any time during the program by arrangement with the Graduate Program Coordinator.

- An M.A. exam in any areas in which the grade point average for the required course work in that area is below 3.30.
- Formation of a supervisory committee after the second quarter.
- A short M.A. thesis (30 to 50 pages), which will typically be an expansion of a term paper. Students must register for 9 credits of LING 700.
- All requirements must be completed within the equivalent of seven full-time quarters.

Doctor of Philosophy

Direct admission to the Ph.D. program will be considered on an individual basis for applicants holding a degree from a comparable M.A. thesis program in linguistics or a closely related field. Some applicants may be granted admission directly into the Ph.D. program, with the stipulation that they make up one or more M.A.-level deficiencies.

Requirements for the Ph.D. degree are an M.A. degree plus the following:

- 35 additional credits of course work. At least 18 credits at the 500 level and above must be completed before the General Exam, 9 credits of which must follow the M.A. A minimum cumulative GPA of 3.00 is required for graduate course work. One year (three quarters) of full-time registration is required by the Graduate School.
- During the course of the entire M.A.-Ph.D. program, the student must have completed at least three courses each in syntax and phonetics/phonology and at least two courses in semantics, and have taken a total of five 500-level classes for which papers or projects are required. (LING 504, 505, 506, 507, 508, and 509 do not qualify for this requirement.) There is also a major, minor, and breadth requirement as follows: *Major*—six courses in the student's primary area of specialization; *Minor*—four courses in a second area (the major and minor together should form a coherent research area); *Breadth*—eight courses in other areas of the field. The student's supervisory committee will be the final judge of what courses might qualify to meet these requirements. However, it is worth noting that (a) courses fulfilling these requirements do not necessarily have to be offered from within the Department of Linguistics; (b) non-language instruction courses in a language area can fulfill the major or minor requirement; and (c) no course fulfilling any of the above requirements can be taken for the 2-credit (no paper) option.
- 27 credits of LING 800.
- An exotic language requirement as follows: (a) for native speakers of an Indo-European language, a year of a non-Indo-European language; (b) for native speakers of a non-Indo-European language, a year of a language that is not English or in the same sub-family as their language. The student has the right to petition the supervisory committee to allow a language excluded in (a) or (b) above.
- Two linguistic papers delivered at a colloquium or conference. Each will be evaluated by a member of the student's Ph.D. committee with expertise in the area of the paper. The evaluation may be either of the oral presentation or of the paper in written form. The student should request evaluation by a faculty member for any paper to be considered for this requirement.
- By the end of the first quarter after admission to the Ph.D. program, the student will constitute a Ph.D. committee, in accord with Graduate School requirements. As part of this process, the student

will work out with the committee members (by email or in person) a strategy for degree completion. The student's Ph.D. committee will administer a General Examination, which involves 2 parts:

- Two general papers in different areas. At least one of the papers must be in some area of grammatical theory and one must be in the projected dissertation area. (One of the two papers, of course, can fulfill both the grammatical theory and the dissertation area requirements). At least one of the student's Ph.D. committee members must have expertise in each of the chosen areas.
 - An oral examination, in which the candidate is questioned on the two papers. The oral examination may not be scheduled until the committee has read the two papers and approved them as passing.
- Within six months of the oral examination, the student will present a formal dissertation proposal to the subset of Ph.D. committee members who constitute the Reading Committee along with a proposed calendar for completion of the dissertation.
 - A Final Exam on the dissertation attended by the candidate's Supervisory Committee and open to others interested.

Faculty

Chair

Julia R. Herschensohn

Professors

Augerot, James E. * 1960, (Adjunct); MA, 1959, New Mexico Highlands University, PhD, 1968, University of Washington; Slavic linguistics, Romanian, Bulgarian.

Barrack, Charles M. * 1968, (Adjunct); PhD, 1969, University of Washington; Germanic linguistics.

Brame, Michael K. * 1970; PhD, 1970, Massachusetts Institute of Technology; syntax, phonology, structure of Arabic and English, cross-linguistic comparisons, poetics.

Contreras, Heles * 1965, (Emeritus); PhD, 1961, Indiana University; Spanish linguistics, syntax and English semantics.

Herschensohn, Julia R. 1985; PhD, 1976, University of Washington; Romance linguistics, syntactic theory, French syntax, second language acquisition.

Hunn, Eugene S. * 1972, (Adjunct); PhD, 1973, University of California (Berkeley); cognitive anthropology, ethnobiology, cultural ecology and evolution, North American Indians.

Kaisse, Ellen * 1976; PhD, 1977, Harvard University; phonology, historical linguistics, ancient and modern Greek/Spanish, syntax-phonology interface.

Klausenburger, Jurgen 1969; PhD, 1969, University of Michigan; Romance linguistics, morphology, diachronic linguistics.

Kuhl, Patricia K. * 1976, (Adjunct); MA, 1971, PhD, 1973, University of Minnesota; speech perception.

Micklesen, Lew R. * 1966, (Emeritus); PhD, 1951, Harvard University; Slavic linguistics.

Newmeyer, Frederick J. * 1969; PhD, 1969, University of Illinois; theoretical and English syntax, history of linguistics.

Ostendorf, Mari 1999, (Adjunct); MS, 1981, PhD, 1985, Stanford University; speech synthesis and understanding; spoken document retrieval; statistical pattern recognition.

Silberstein, Sandra V. * 1982, (Adjunct); PhD, 1982, University of Michigan; applied/critical linguistics. TESOL, ethnicity and gender.

Stoel-Gammon, Carol * 1983, (Adjunct); PhD, 1974, Stanford University; developmental phonology and phonetics.

Tarinskaya, Marina * 1984; PhD, 1967, DPhil, 1976, Moscow Institute of Foreign Languages; theory of translation, theory of versification, second language acquisition, semantics.

Tollefson, James W. * 1984, (Adjunct); PhD, 1978, Stanford University; English as a second language, language planning.

Voyles, Joseph B. * 1965, (Adjunct); PhD, 1965, Indiana University; Germanics and linguistics.

Yue-Hashimoto, Anne O. * 1980, (Adjunct); PhD, 1966, Ohio State University; Chinese linguistics, grammar (historical and modern), dialectology, historical reconstruction.

Associate Professors

Corina, David P. * 1993, (Adjunct); PhD, 1991, University of California (San Diego); cognitive neuropsychology, psycholinguistics, computational modeling.

Dziwirek, Katarzyna A. * 1993, (Adjunct); MA, 1984, University of Illinois, MA, 1985, University of Lodz (Poland), PhD, 1991, University of California (San Diego); linguistics, syntax and typology.

Etzioni, Oren 1991, (Adjunct); MSc, 1988, PhD, 1990, Carnegie Mellon University; artificial intelligence and information retrieval, natural language interfaces, software agents.

Hargus, Sharon Louise * 1985; PhD, 1985, University of California (Los Angeles); phonology, morphology, northwestern Native American languages, lexicography, phonetics.

Kautz, Henry 2000, (Adjunct); MS, 1982, University of Toronto (Canada), PhD, 1988, University of Rochester; artificial intelligence, knowledge representation, decision-theoretic control of reasoning.

Ogihara, Toshiyuki * 1991; PhD, 1989, University of Texas (Austin); semantic theory, mathematical linguistics, structure of Japanese.

Ohta, Amy * 1990, (Adjunct); PhD, 1993, University of California (Los Angeles); applied linguistics, especially second language acquisition, discourse analysis, and Japanese.

Osterhout, Lee E. * 1991, (Adjunct); PhD, 1990, Tufts University; psycholinguistics, cognitive psychophysiology.

Strozer, Judith R. * 1987, (Emeritus); PhD, 1976, University of California (Los Angeles); comparative Romance syntax, second language acquisition, foreign language teaching.

Zagona, Karen T. * 1987; PhD, 1982, University of Washington; syntactic theory and Spanish syntax.

Assistant Professors

Bilaniuk, Laada M. 1997, (Adjunct); PhD, 1998, University of Michigan; language politics, language ideology, ethnicity, nationalism, gender, Ukraine, former USSR.

Bilmes, Jeffrey A. * 1999, (Adjunct); PhD, 1999, University of California (Berkeley); speech and pattern recognition, learning, audio processing, high-performance computing, human-computer.

Curzan, Anne L. * 1998, (Adjunct); PhD, 1998, University of Michigan; history of English, language and gender, sociolinguistics, lexicography.

Handel, Zev * 1999, (Adjunct); MA, 1992, PhD, 1998, University of California (Berkeley); Chinese historical phonology; Sino-Tibetan linguistics.

Wassink, Alicia Beckford * 1998; PhD, 1999, University of Michigan; sociolinguistics, experimental phonetics and Creole linguistics.

Wright, Richard A. * 1998; PhD, 1996, University of California (Los Angeles); phonetics, production/perception, automatic speech recognition, phonology, African languages.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

Linguistics

LING 400 Survey of Linguistic Method and Theory (4) I&S/VLPA, QSR Major linguistic theories in phonology, syntax and semantics; linguistic analysis and argumentation. Intended for students who plan to pursue further linguistic or language-related study. Students who have taken LING 200 or 201 should not take LING 400, although credit is allowed for both if 400 is taken after 200 or 201.

LING 402 Survey of the History of Linguistics (3) I&S/VLPA Newmeyer Main trends in linguistic theory and philosophy of linguistics from ancient times through advent of transformational-generative grammar. Includes nineteenth-century comparative and historical grammar, Prague school grammar, American structuralist grammar, major concerns of linguistics today. Prerequisite: LING 450.

LING 403 Structure of American Sign Language (5) VLPA Hargus Introduction to the phonological, morphological, and syntactic structure of American Sign Language. Topics include acquisition, sociolinguistics, neurolinguistics, lexicography, history, and culture. Knowledge of American Sign Language is not required. Prerequisite: LING 200, 201, 203, or 400.

LING 404 Indo-European (3) VLPA Voyles Overview of the Indo-European languages, of comparative method, and of the phonology, morphology, and syntax of reconstructed Indo-European. Grammatical analyses and texts from various attested ancient and modern Indo-European languages, selected according to the interests of the students.

LING 411 Native Languages and Language Families of Washington State (3) VLPA Hargus Survey of linguistic structures of Washington native languages. Language families consist of Salish, Wakashan, Chemakuan, Athabaskan, Chinookan, Sahaptian, Cayuse. Structure and origin of Chinook jargon. Prerequisite: LING 450; either LING 461 or LING 481.

LING 419 The Development of the Italian Language (5) VLPA Historical survey of Italian phonology, morphology, and syntax. Evolution of the language is illustrated with study of pertinent documents from various periods. Prerequisite: ITAL 303;

either LING 400 or ROLING 401. Offered: jointly with ITAL 400.

LING 432 Sociolinguistics I (5) I&S/VLPA Wassink Social variation in the phonology, morphology, syntax, lexicon of languages and dialects. Nonstandard language, diglossia, pidgins and creoles, gender differences, bi- and multilingualism, ethnography of speaking, pragmatics, and language attitudes. Prerequisite: either LING 200 or LING 400; recommended: prior or concurrent registration in LING 450. Offered: jointly with ANTH 432.

LING 433 Language Politics and Cultural Identity (3) I&S/VLPA Bilaniuk Theories and case studies of the power of language as how it is manipulated. Multilingualism, diglossia. Role of language and linguistics in nationalism. Standardization, educational policy, language and ethnicity. World languages, language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with ANTH 464.

LING 434 Sociolinguistics II (3) I&S/VLPA Wassink Examines field methods linguists use in socially oriented studies of language variation and change. Students learn to target and design interviews appropriate for eliciting specific kinds of linguistic data. Discussion of issues related to recording, ethics, and analysis of large bodies of data. Prerequisite: LING 432. Offered: jointly with ANTH 433.

LING 441 Linguistics and Poetic Language (3) VLPA Introduction to the Relationship between linguistic structures, linguistic universals, and the poetic uses of language; linguistic description in the analysis of literature. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 442 Semantics I (4) NW/VLPA Ogihara Introduction to the study of meaning as part of linguistic theory. Relation of semantics to syntax. Emphasis on formal semantics and pragmatics. Discussion of various semantic phenomena in natural language that are theoretically relevant. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 445 Descriptive Aspects of English as a Foreign Language (3) VLPA Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behavior. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 446 Descriptive Aspects of English: Phonology and Morphology (3) VLPA Hargus, Kaisse Descriptively oriented analysis of English phonology and morphology; dialect differences. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 447 Psychology of Language II (4) I&S/VLPA Corina, Osterhout Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: jointly with PSYCH 447.

LING 449 Second-Language Learning (3) VLPA Herschensohn, Tarinskaja Issues related to the linguistic aspects of second-language learning. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 450 Introduction to Linguistic Phonetics (5) NW/VLPA Wright Introduction to the articulatory and acoustic correlates of phonological features. Issues covered include the mapping of dynamic events to static representations, phonetic evidence for phonological description, universal constraints on phonological structure, and implications of psychological speech-sound categorization for phonological theo-

ry. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 451 Phonology I (4) I&S/VLPA *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 450.

LING 452 Phonology II (4) I&S/VLPA *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 451.

LING 453 Phonology III (4) I&S/NW/VLPA *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 451.

LING 454 Methods in Comparative Linguistics (3) VLPA *Klausenburger, Shapiro, Voyles* Method and theory of historical and comparative linguistics. Problems of phonological, morphological, syntactic, and semantic change and reconstruction. Prerequisite: LING 400.

LING 455 Areal Linguistics (3, max. 6) I&S/VLPA Issues involved in classification of languages. Systems of classification based on structure, word order, areal features. Ways in which languages may be classified for different purposes. Processes such as borrowing, vocabulary specialization, lexical change, and language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with ANTH 455.

LING 457 Language Development (5) I&S/VLPA *Dale* First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Prerequisite: either PSYCH 306, LING 200, or LING 400. Offered: jointly with PSYCH 457.

LING 458 Language and Gender (5) I&S/VLPA *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis and other aspects of identity such as sexuality, class, and age. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with ANTH 450/WOMEN 450.

LING 461 Syntax I (4) I&S/VLPA *Brame, Contreras, Kim, Newmeyer, Zagona* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 462 Syntax II (4) I&S/VLPA *Brame, Contreras, Kim, Newmeyer, Zagona* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: LING 461.

LING 463 Syntax III (4) I&S/VLPA *Brame, Contreras, Kim, Newmeyer* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: LING 462.

LING 472 Introduction to Computational Linguistics (3) NW/VLPA *Hoard* Introduction to computer applications of linguistic theory, including syntactic processing, semantic and pragmatic interpretation, and natural language generation. Prerequisite: LING 461. Offered: jointly with CSE 472.

LING 476 Philosophy of Language (5) I&S/VLPA Current theories of meaning, reference, predication, and related concepts. Offered: jointly with PHIL 453.

LING 479 Semantics II (3) I&S/NW/VLPA *Ogihara* Formal characterization of linguistic meaning. Emphasis on nature and purpose of formal seman-

tics and on its relation to formal syntax. Prerequisite: LING 442. Offered: jointly with PHIL 479.

LING 480 Topics in Linguistics (3, max. 12) VLPA Introduction to an area of linguistic study not covered by the regular departmental course offerings.

LING 481 Introduction to Morphology (4) VLPA *Brame, Hargus, Kaisse, Newmeyer* Structure of words and the processes by which they are formed. Morphological processes in a wide variety of languages. Prerequisite: either LING 200, LING 201, ANTH 203, LING 203, or LING 400.

LING 484 Lexical Semantics and the Lexicon (3) VLPA *Kim* Role of the lexicon in syntax and semantics. Topics include the syntax-lexicon mapping; theories of argument structure; complex predicate formation and lexical subordination; the lexicon and language acquisition; the role of the lexicon in linguistic theory; and the lexicon and sentence processing. Prerequisite: LING 461.

LING 490 Undergraduate Fieldwork (1-3, max. 6) Individual consultation with faculty member and supervised practical experience in a broad range of industry, community, clinical settings dealing with linguistic issues. Credit/no credit only. Offered: AWSpS.

LING 499 Undergraduate Research (1-5, max. 10) Credit/no credit only.

Courses for Graduates Only

LING 501 Field Methods (3) Guided analysis of a language unfamiliar to all students of the class; construction of a grammar based on material elicited from native informant. Prerequisite: LING 452, LING 462, or LING 508.

LING 507 Syntactic Theory I (4) Introduction to the principles and parameters model of syntactic theory. The lexicon and its relation to syntactic representations. Syntactic modules and principles. Problem solving.

LING 508 Syntactic Theory II (4) Historical antecedents of the principles-and-parameters theory. Lexicalism versus transformationalism. The unification of transformational operations and conditions. Origins of subtheories. Extensive reading list of primary sources. Practical training in syntactic argumentation. Prerequisite: LING 507 or permission of instructor.

LING 509 Syntactic Theory III (4) Current issues in syntactic theory, including logical form, empty categories, the range of parametric variation, barriers, minimality, and the status of functional categories. Training in the methodology of syntactic research. Prerequisite: LING 508 or permission of instructor.

LING 514 Seminar in Comparative Linguistics (3) *Kaisse* Nineteenth- and twentieth-century theories of phonological change. Prerequisite: LING 404 or permission of instructor.

LING 519 Mathematical Models of Grammar (3) *Brame, Ogihara* Study of some mathematical models of language recognition, emphasizing context-free and context-sensitive grammars. Prerequisite: graduate standing in mathematics, linguistics, or psychology, or permission of instructor.

LING 522 Topics in the History of Linguistics (3) *Newmeyer* Intensive investigation of the main trends in the history of linguistics, concentrating on the development of nineteenth-century historical linguistics, the various schools of structural linguistics, and transformational-generative grammar. Prerequisite: LING 450, LING 461, or LING 507.

LING 531 Problems in Romance Linguistics (2-5, max. 15) Group seminar, or individual conferences are scheduled under this number to meet special

needs. Prerequisite: permission of graduate program coordinator. Offered: jointly with ROLING 531.

LING 550 Advanced Phonology (2-3) Hargus, Kaisse Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 452.

LING 551 Advanced Phonology (2-3) Hargus, Kaisse Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 452.

LING 552 Advanced Phonology (2-3) Hargus, Kaisse Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 452.

LING 553 Analysis of Linguistic Structures (3, max. 6) Syntactic, semantic, and/or phonological analysis. Languages to be analyzed vary. Prerequisite: permission of instructor. Offered: jointly with ANTH 553.

LING 554 Advanced Linguistic Phonetics (3, max. 9) *Wright, Wassink* Individual and joint projects on selected topics in theoretical and experimental phonetics. Topics may include articulatory timing, the phonetics phonology interface, and constraints and constraint interaction. Prerequisite: LING 450 or LING 452. Offered: Sp.

LING 561 Advanced Syntax (2-3, max. 9) Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

LING 562 Advanced Syntax (2-3, max. 9) Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

LING 563 Advanced Syntax (2-3, max. 9) Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

LING 580 Problems in Linguistics (2-3, max. 12) Advanced study in current theories of syntax, semantics, phonology, or morphology.

LING 590 Graduate Fieldwork (1-3, max. 6) Individual consultation with faculty member and supervised practical experience in a broad range of industry, community, clinical settings dealing with linguistic issues. Offered: AWSpS.

LING 599 Linguistics Colloquium (1, max. 6) Seminar attended by faculty and graduate students to discuss research in progress and topics of general interest. Presentation of two seminars required for doctoral students. Prerequisite: permission of instructor.

LING 600 Independent Study or Research (*)

LING 700 Master's Thesis (*)

LING 800 Doctoral Dissertation (*)

French Linguistics

FRLING 400 The Syntactic Structure of French (5) VLPA Scientific study of the syntax of French: phrase structure and movement, with emphasis on passives, relatives, and interrogatives. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 401 The Morphological Structure of French (5) VLPA *Klausenburger* Linguistic study of French morphology. Prerequisite: either FRENCH

203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 402 The Phonological Structure of French (5) VLPA Klausenburger The phonological component of the generative grammar of French: representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 403 Background of Modern French (5) VLPA Klausenburger Linguistic analysis of the important developments in the history of the French language from its Latin origin to contemporary speech. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 405 Linguistics and the Teaching of French (5) VLPA Herschensohn Areas of linguistics that can be particularly helpful to the French teacher. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 406 Advanced French Grammar (5) VLPA Herschensohn Problems of French grammar. Differences between forms and structures of French and English. Problems of effective teaching of French. Prerequisite: FRENCH 303.

FRLING 409 The Phonetics of French (5) VLPA Klausenburger Scientific study of the French sound system with special emphasis on "lower-level" phonetic rules. Focus on data from standard French as well as socioeconomic and geographic variations. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

Romance Linguistics

ROLING 402 Historical Romance Linguistics (5) VLPA Klausenburger Comparative historical survey of the development of the principal Romance tongues. Prerequisite: LING 400.

ROLING 490 Senior Essay (2) VLPA Essay on linguistic problem of student's choice written with faculty consultant.

Courses for Graduates Only

ROLING 518 Foreign Language Teaching Methodology (2) Brandl Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology.

ROLING 531 Problems in Romance Linguistics (2-5, max. 15) Group seminar, or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program coordinator. Offered: jointly with LING 531.

ROLING 551 Romance Linguistics: History, Methodology, and Bibliography (5) For new graduate students in the Romance linguistics program. History of Romance linguistics and linguistic science in the nineteenth and twentieth centuries as it relates to Romance studies. Comparative and descriptive methods used in contemporary scholarship. Prerequisite: LING 200, LING 400, or equivalent.

ROLING 600 Independent Study or Research (*)

Spanish Linguistics

SPLING 400 The Syntactic Structure of Spanish (5) VLPA Strozer, Zagona Scientific study of the syntax of Spanish: structure of phrases, transformationally derived structures, grammatical relations, principles of interpretation. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201,

LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 400.

SPLING 401 The Morphological Structure of Spanish (5) VLPA Strozer, Zagona Principles of word formation, including derivational and inflectional morphology and other components of grammar. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 401.

SPLING 402 The Phonological Structure of Spanish (5) VLPA Strozer, Zagona Phonological component of the generative grammar of Spanish; representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 402.

SPLING 403 The Evolution of the Spanish Language (5) VLPA Zagona Historical survey of Spanish phonology, morphology, and syntax, from Latin origins to the modern language. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 403.

SPLING 406 Advanced Spanish Grammar (5) VLPA Anderson, Strozer Problems of Spanish grammar. Difference from English grammar. Techniques for the effective teaching of Spanish. Prerequisite: SPAN 303; SPAN 323. Offered: jointly with SPAN 406.

SPLING 407 Dialects of World Spanish (5) Introduction to dialectal variants of Spanish. Considers standardization and the real academia; variation and change; pragmatics and politeness; Spanish in contact; sound, word formation, and grammar variation. Taught in Spanish. Prerequisite: SPAN 303; either SPAN 323, LING 200, or LING 400. Offered: jointly with SPAN 407.

SPLING 409 Spanish Phonetics (5) VLPA Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 409.

Mathematics

C138 Padelford



General Catalog Web page:
www.washington.edu/students/gencat/academic/mathematics.html



Department Web page:
www.math.washington.edu

Mathematics is both a science and an art. Like any great art, mathematics has an intrinsic beauty and coherence that has attracted practitioners for centuries. Yet, unlike other arts, mathematics is a very effective tool for describing the natural world. Indeed, mathematics has come to serve as the foundation of modern science, through its language and theorems. Some mathematical theorems were initially developed in order to solve internally generated mathematical problems and only later found application in other disciplines; other mathematical results were inspired by the needs of these other disciplines. The two facets of mathematics—tool of science and subject of inquiry for its own sake—have come to be interwoven into a complex fabric.

Graduate Program

Graduate Program Coordinator
C36 Padelford, Box 354350
206-543-6830
grads@math.washington.edu

The degrees of Master of Arts, Master of Science, and Doctor of Philosophy are offered. Opportunities are available within the department for study of pure and applied mathematics for each of these degree programs. The Master of Arts degree is appropriate for students who need a broad background in advanced mathematics and who expect to continue working with mathematics of approximately the same level in their careers. The Master of Science degree is appropriate for students who expect to be working with more specialized mathematics of increasing order of complexity in their careers. The Doctor of Philosophy degree is the highest professional degree in mathematics. It is appropriate for students who plan on a career of research and/or teaching of mathematics at the highest levels.

Of the master's degrees, the M.S. non-thesis program has the most demanding course requirements and most closely matches the early stages of the Ph.D. program. Most students who enroll in the department begin their studies with the Ph.D. or M.S. non-thesis program in mind. The M.S. programs with options in numerical analysis or optimization provide more focused training in these directions, which can be useful for students seeking employment in certain industries; however, students intending to do research in these areas would normally follow the requirements of the Ph.D. program. Note that the department does not offer a master's degree in mathematics education.

Master of Arts

Admission Requirement: Bachelor of Arts degree with major in mathematics or equivalent background (minimum of 45 quarter credits or 30 semester credits of mathematics beyond college algebra).

Graduation Requirements:

With Thesis—A minimum of nine approved one-quarter courses numbered 400 or above, at least three of which are at the 500 level, plus 9 thesis credits (700). The total must include at least two courses in each of algebra, analysis, and one other field. The thesis is defended in an oral examination.

Without Thesis—A minimum of twelve approved one-quarter courses numbered 400 or above, at least six of which are at the 500 level. The six courses at the 500 level should be distributed over no more than three sequences. The total must include at least two courses in each of algebra, analysis, and one other field. Oral examination in area of specialization agreed upon by the student and the chair of the examining committee.

Master of Science

Admission Requirement: Bachelor of Science degree with major in mathematics, Bachelor of Arts degree with strong major in mathematics or equivalent background. In particular, at least one senior-level course in abstract algebra or real analysis is expected.

Graduation Requirements:

With Thesis—A total of nine numerically graded one-quarter courses from MATH 402, 403, 404; 424, 425, 426; 427, 428, 429; 441, 442, 443; any 500-level mathematics course; AMATH 507; 584, 585, 586; plus 9 thesis credits (700). Courses to include at least two quarters from each of two designated core graduate courses and one other 500-level sequence. Transfer credits are not accepted at the 400 level;

other transfer credits and substitutions are at the discretion of the graduate program coordinator. The thesis, which is defended in an oral examination, should demonstrate the ability to do independent research.

Without Thesis—A total of twelve numerically graded one-quarter courses from MATH 402, 403, 404; 424, 425, 426; 427, 428, 429; 441, 442, 443; any 500-level mathematics course; AMATH 507; 584, 585, 586. Courses to include at least two quarters from each of three designated core graduate courses, and in addition one three-quarter sequence of 500-level mathematics courses in an area of specialization approved by the graduate program coordinator and the chair of the student's examining committee. Oral examination in the area of specialization on a topic agreed upon by the student and the chair of the examining committee, or the General Examination for the Ph.D. degree.

Numerical Analysis/Optimization Option—A total of twelve one-quarter courses, at least six of which are at the 500 level, chosen from MATH 424, 425, 426; 427, 428, 429; 438, 439; 441, 442, 443; 461, 462; 491, 492; any 500-level mathematics course; AMATH 507; 584, 585, 586. Courses to include four from AMATH 584-586 and MATH 594-596 (numerical analysis option) or four from AMATH 507 and MATH 509, 514-517 (optimization option). Oral examination in a special topic agreed upon by the student and the chair of the student's examining committee.

Doctor of Philosophy

Admission Requirement: Mathematical training equivalent to a bachelor's degree with strong major in mathematics, including rigorous course work in real analysis and abstract algebra.

Graduation Requirements: Completion of Graduate School requirements to include satisfactory performance in six three-quarter sequences numbered 500 or above, including three sequences from the department's list of core graduate courses; passing of three preliminary exams; demonstration of proficiency in two of three languages: French, German, or Russian; General Examination on a special topic; dissertation that is an original piece of work; and Final Examination.

Financial Support

Most graduate students in mathematics are supported by fellowships, research assistantships, and teaching assistantships. The workload of teaching assistants allows ample time for graduate courses and thesis work.

Faculty

Chair

Ronald S. Irving

Professors

Arsove, Maynard G. * 1951, (Emeritus); MS, 1948, PhD, 1950, Brown University; potential theory, complex function theory, theory of bases.

Blumenthal, Robert M. * 1956, (Emeritus); PhD, 1956, Cornell University; probability.

Borgs, Christian 1999, (Affiliate); PhD, 1987, University of Munich (Germany); field theory and statistical mechanics.

Brownell, Francis H, II * 1950, (Emeritus); PhD, 1949, Yale University; differential equations, applied mathematics.

Bube, Kenneth P. * 1986; PhD, 1978, Stanford University; numerical analysis, partial differential equations.

Burdzy, Krzysztof * 1988; PhD, 1984, University of California (Berkeley); probability theory.

Burke, James V. * 1985; PhD, 1983, University of Illinois; optimization, nonsmooth analysis.

Chayes, Jennifer T. 1997, (Affiliate); PhD, 1983, Princeton University; theoretical condensed-matter physics.

Collingwood, David * 1987; PhD, 1983, University of Utah; computational biology, Lie theory.

Curjel, Caspar R. * 1964, (Emeritus); DSc, 1960, Eidgenosse Technische Hochschule (Switzerland); algebraic topology, algebra.

Curtis, Edward B. * 1970; PhD, 1962, Harvard University; graph theory, networks.

Dubisch, Roy 1961, (Emeritus); PhD, 1943, University of Chicago; teacher training, elementary and secondary curriculum.

Duchamp, Thomas E. * 1979; PhD, 1976, University of Illinois; differential geometry.

Erickson, Kent B. * 1973; PhD, 1970, University of Wisconsin; probability theory.

Folland, Gerald Budge * 1973; PhD, 1971, Princeton University; harmonic analysis and differential equations.

Friedman, Michael H. 1999, (Affiliate); PhD, 1973, Princeton University; topology.

Gangolli, Ramesh A. * 1962, (Emeritus); PhD, 1961, Massachusetts Institute of Technology; probability theory, harmonic analysis on Lie groups.

Goldstein, Allen A. * 1964, (Emeritus); PhD, 1954, Georgetown University; approximation theory, nonlinear programming, control theory, calculus of variations.

Goodearl, Kenneth R. * 1998, (Affiliate); MS, 1969, PhD, 1971, University of Washington; noncommutative algebra (noetherian rings, quantum groups, regular rings, C^* -algebras).

Graham, C. Robin * 1984; PhD, 1981, Princeton University; partial differential equations, differential geometry, invariant theory.

Greenbaum, Anne * 1997; PhD, 1981, University of California (Berkeley); applied analysis and computational mathematics.

Greenberg, Ralph * 1978; PhD, 1971, Princeton University; number theory.

Grunbaum, Branko * 1966, (Emeritus); PhD, 1957, Hebrew University (Israel); geometry.

Irving, Ronald S. * 1980; PhD, 1977, Massachusetts Institute of Technology; algebra.

Jans, James P. * 1957, (Emeritus); PhD, 1955, University of Michigan; ring structure and homological algebra.

Klee, Victor * 1953, (Emeritus); PhD, 1949, University of Virginia; convex sets, functional analysis, analysis of algorithms, optimization, combinatorics.

Koblitz, Neal I. * 1979; PhD, 1974, Princeton University; number theory and cryptography.

Lee, John M. * 1986; PhD, 1982, Massachusetts Institute of Technology; differential geometry and partial differential equations.

Lind, Douglas A. * 1975; PhD, 1973, Stanford University; ergodic theory.

Lovasz, Laszlo * 1999, (Affiliate); PhD, 1977, Hungarian Academy of Sciences; discrete mathematics.

Marshall, Donald E. * 1976; PhD, 1976, University of California (Los Angeles); complex analysis.

McGovern, William M. * 1990; PhD, 1987, Massachusetts Institute of Technology; representation theory.

Michael, Ernest A. * 1953, (Emeritus); PhD, 1951, University of Chicago; topology.

Mitchell, Stephen A. * 1985; PhD, 1981, University of Washington; algebraic topology.

Morrow, James Allen * 1969; PhD, 1967, Stanford University; complex singularities, inverse problems.

Namioka, Isaac * 1963, (Emeritus); PhD, 1956, University of California (Berkeley); functional analysis.

Nijenhuis, Albert * 1988, (Affiliate); PhD, 1952, University of Amsterdam (Netherlands); geometry, combinatorics, computational complexity.

Nunke, Ronald * 1958, (Emeritus); PhD, 1955, University of Chicago; category theory, Abelian groups.

Osborne, M. Scott * 1975; PhD, 1972, Yale University; representation theory.

Phelps, Robert R. * 1962, (Emeritus); PhD, 1958, University of Washington; convexity, functional analysis, geometry of Banach spaces, optimization.

Ragozin, David * 1969; PhD, 1967, Harvard University; approximation theory.

Rockafellar, R. T. * 1966; PhD, 1963, Harvard University; variational analysis and optimization.

Schramm, Oded 1999, (Affiliate); PhD, 1990, Princeton University; complex analysis.

Segal, Jack * 1960, (Emeritus); PhD, 1960, University of Georgia; topology, shape theory.

Shorack, Galen * 1965, (Adjunct); PhD, 1965, Stanford University; empirical and quantile processes, limit theorems, L-statistics, bootstrapping, reliability.

Smith, Hart F. * 1991; PhD, 1989, Princeton University; partial differential equations, Fourier analysis.

Smith, S. Paul * 1986; PhD, 1981, University of Leeds (UK); algebra.

Solomyak, Boris * 1992; PhD, 1986, Leningrad University (Russia); ergodic theory, symbolic dynamics, spectral theory.

Stout, Edgar L. * 1969; PhD, 1964, University of Wisconsin; complex analysis.

Sullivan, John B. * 1973; PhD, 1971, Cornell University; representations of classic groups.

Sylvester, John * 1987; PhD, 1980, New York University; partial differential equations.

Tseng, Paul Yun * 1990; PhD, 1986, Massachusetts Institute of Technology; optimization.

Tuncel, Selim * 1986; PhD, 1982, University of Warwick (UK); ergodic theory, symbolic dynamics.

Uhlmann, Gunther A. * 1984; PhD, 1976, Massachusetts Institute of Technology; partial differential equations.

Warner, Garth * 1966; PhD, 1966, University of Michigan; algebraic topology.

Westwater, Michael J. * 1970; PhD, 1967, Cambridge University (UK); mathematical physics.

Zhang, Jian James * 1994; MS, 1985, Fudan University (China), PhD, 1991, Massachusetts Institute of Technology; algebra, ring theory.

Associate Professors

Arms, Judith M. * 1980; MA, 1974, PhD, 1977, University of California (Berkeley); geometric analysis of Hamiltonian systems with symmetry.

Bungart, Lutz * 1966, (Emeritus); PhD, 1962, Princeton University; several complex variables.

Chen, Zhen-Qing * 1998; PhD, 1992, Washington University; probability theory and stochastic analysis.

Dekker, David B. 1948, (Emeritus); PhD, 1948, University of California (Berkeley); numerical analysis, curve fitting, numerical solutions of differential equations.

Devinat, Ethan S. * 1991; PhD, 1985, Massachusetts Institute of Technology; algebraic topology.

Kim, Jeong Han 1999, (Affiliate); PhD, 1993, Rutgers University; mathematical physics (statistical mechanics), combinatorics.

King, James Richard * 1974; PhD, 1969, University of California (Berkeley); complex manifolds, instructional computing in geometry.

Monk, George Stephen * 1964; PhD, 1966, University of Minnesota; mathematics education.

Moore, Robert T. * 1968; PhD, 1964, Princeton University; operator theory and group representation.

Pollack, Daniel * 1996; MS, 1986, University of Pennsylvania, PhD, 1991, Stanford University; differential geometry and nonlinear partial differential equations.

Rohde, Steffen * 1998; PhD, 1989, University of Berlin (Germany); complex analysis.

Toro, Tatiana * 1996; MS, 1989, PhD, 1992, Stanford University; analysis and geometric measure theory.

Assistant Professors

Babson, Eric K. * 1998; PhD, 1993, Massachusetts Institute of Technology; algebraic and geometric combinatorics.

Cohn, Henry L. 2001, (Affiliate); PhD, 2000, Harvard University; statistical analysis of human genetic data, population genetics.

Hoffman, Christopher * 1999; PhD, 1996, Stanford University; ergodic theory of p-adic endomorphisms, percolation theory.

Iovita, Adrian * 1998; PhD, 1996, Boston University; algebraic varieties.

Kovacs, Sandor J. 2000; PhD, 1995, University of Utah; algebraic geometry, complex geometry, commutative algebra.

Ozols, Vilnis * 1968; PhD, 1967, University of California (Berkeley); lie groups, Riemannian geometry.

Palmieri, John * 1999; PhD, 1991, Massachusetts Institute of Technology; algebraic topology, representation theory.

Thomas, Rekha R. 2000; PhD, 1994, Cornell University; computational algebra, combinatorics, discrete optimization.

Yuan, Yu * 2001; PhD, 1998, University of Minnesota; partial differential equations and differential geometry.

Senior Lecturers

Perkins, Patrick 2001; PhD, 1988, University of Washington.

Vesztegombi, Katalin 2000; PhD, 1987, Hungarian Academy of Science (Hungary); discrete mathematics, combinatorics, graph theory.

Warfield, Virginia 1973; MA, 1965, PhD, 1971, Brown University; probability and the teaching of mathematics.

Wilson, David B. 2000, (Affiliate); PhD, 1996, Massachusetts Institute of Technology; stochastic processes, computer algorithms, probability and combinatorics.

Lecturers

Averbeck, Patrick J. 1998; MS, 1993, PhD, 2000, Oregon State University; mathematics education.

Taggart, Jennifer 2001; PhD, 1997, University of Boulder.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsat/.

MATH 400 Mathematical Communication for Undergraduates (2) NW Techniques of effective writing and oral presentations in the mathematical sciences. Offered: jointly with AMATH 400/STAT 400. Prerequisite: at least 15 credits in MATH, STAT, AMATH, or CSE at the 300 or 400 level, including MATH 307 or AMATH 351 and MATH 308 or AMATH 352.

MATH 402 Introduction to Modern Algebra (3) NW Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 327, 2.0 in MATH 336, or 2.0 in MATH 340. Offered: AS.

MATH 403 Introduction to Modern Algebra (3) NW Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisite: 2.0 in MATH 402. Offered: WS.

MATH 404 Introduction to Modern Algebra (3) NW Algebraic systems; elementary theory of groups, rings, and fields; polynomials; topics in linear algebra; reductions of forms. Prerequisite: 2.0 in MATH 403. Offered: Sp.

MATH 407 Linear Optimization (3) NW Maximization and minimization of linear functions subject to constraints consisting of linear equations and inequalities; linear programming and mathematical modeling. Simplex method, elementary games and duality. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308, or 2.0 in AMATH 352. Offered: AWS.

MATH 408 Nonlinear Optimization (3) NW Maximization and minimization of nonlinear functions, constrained and unconstrained; nonlinear pro-

gramming problems and methods. Lagrange multipliers; Kuhn-Tucker conditions, convexity. Quadratic programming. Prerequisite: 2.0 in MATH 308; 2.0 in MATH 327. Offered: W.

MATH 409 Discrete Optimization (3) NW Maximization and minimization problems in graphs and networks (shortest paths, minimum spanning trees, maximum flows, minimum cost flows); transportation and trans-shipment problems, NP-completeness. Prerequisite: 2.0 in MATH 407. Offered: Sp.

MATH 411 Introduction to Modern Algebra for Teachers (3) NW Basic concepts of abstract algebra with an emphasis on problem solving, constructing proofs, and communication of mathematical ideas. Designed for teaching majors; not open for credit to students who have taken 402, 403. Prerequisite: either 2.0 in MATH 205, 2.0 in MATH 308, or 2.0 in MATH 136. Offered: AS.

MATH 412 Introduction to Modern Algebra for Teachers (3) NW Basic concepts of abstract algebra with an emphasis on problem solving, constructing proofs, and communication of mathematical ideas. Designed for teaching majors; not open for credit to students who have taken 402, 403. Prerequisite: 2.0 in MATH 411. Offered: WS.

MATH 414 Number Theory (3) NW Congruences, arithmetic of quadratic fields, binary quadratic forms, Dirichlet's theorem on primes in an arithmetic progression, Chebyshev's theorem on distribution of primes, the partition function, equations over finite fields. Prerequisite: either 2.0 in MATH 301 or 2.0 in MATH 402.

MATH 415 Number Theory (3) NW Congruences, arithmetic of quadratic fields, binary quadratic forms, Dirichlet's theorem on primes in an arithmetic progression, Chebyshev's theorem on distribution of primes, the partition function, equations over finite fields. Prerequisite: 2.0 in MATH 414.

MATH 420 History of Mathematics (3) NW Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisite: either 2.0 in MATH 402 or 2.0 in MATH 411, either of which may be taken concurrently. Offered: S.

MATH 421 Conceptual Calculus for Teachers (3) NW In-depth conceptual study of calculus, approached from many points of view, including the study of patterns of physical change, discrete approximation to continuous phenomena, and the historical development of calculus. Intended for future teachers.

MATH 422 Conceptual Calculus for Teachers (3) NW In-depth conceptual study of calculus, approached from many points of view, including the study of patterns of physical change, discrete approximation to continuous phenomena, and the historical development of calculus. Intended for future teachers.

MATH 424 Fundamental Concepts of Analysis (3) NW Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisite: either 2.0 in MATH 328 or 2.0 in MATH 335. Offered: A.

MATH 425 Fundamental Concepts of Analysis (3) NW Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisite: either 2.0 in MATH 326 or 2.0 in MATH 335; 2.0 in MATH 424. Offered: W.

MATH 426 Fundamental Concepts of Analysis (3) NW Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Prerequisite: 2.0 in MATH 425. Offered: Sp.

MATH 427 Topics in Applied Analysis (3) NW Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 327 or 2.0 in MATH 335; recommended: MATH 328. Offered: AS.

MATH 428 Topics in Applied Analysis (3) NW Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 335 or 2.0 in MATH 309 and 2.0 in MATH 327. Offered: W.

MATH 429 Topics in Applied Analysis (3) NW Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 427 or 2.0 in MATH 336; 2.0 in MATH 428. Offered: Sp.

MATH 435 Introduction to Dynamical Systems (3) NW Examples of dynamical systems in mathematics and in natural phenomena. Iterated functions, phase portraits, fixed and periodic points. Hyperbolicity, bifurcations. *Chaos*. Interval maps; quadratic families. Fractals; iterated function systems. Elements of higher dimensional dynamics. Julia sets, the Mandelbrot set. Prerequisite: 2.0 in MATH 335 or 2.0 in MATH 327; either 2.0 in MATH 309 or 2.0 in AMATH 352 and 2.0 in AMATH 353.

MATH 436 Introduction to Dynamical Systems (3) NW Examples of dynamical systems in mathematics and in natural phenomena. Iterated functions, phase portraits, fixed and periodic points. Hyperbolicity, bifurcations. *Chaos*. Interval maps; quadratic families. Fractals; iterated function systems. Elements of higher dimensional dynamics. Julia sets, the Mandelbrot set. Prerequisite: 2.0 in MATH 435.

MATH 438 Introduction to Partial Differential Equations (3) NW Integral curves and surfaces of vector fields, initial value problems for first-order linear and quasi-linear equations, Cauchy-Kovalevsky theorem, general Cauchy problem characteristics, special equations. Prerequisite: either 2.0 in both MATH 309 and MATH 326 or 2.0 in MATH 336.

MATH 441 Topology (3) NW Metric and topological spaces, convergence, continuity, finite products, connectedness, and compactness. Prerequisite: either 2.0 in MATH 328 or 2.0 in MATH 335. Offered: A.

MATH 442 Differential Geometry (3) NW Curves in 3-space, continuity and differentiability in 3-space, surfaces, tangent planes, first fundamental form, area, orientation, the Gauss Map. Prerequisite: either 2.0 in MATH 335, or 2.0 in MATH 326 and 2.0 in MATH 328 and 2.0 in either MATH 308 or 2.0 in MATH 318. Offered: W.

MATH 443 Topics in Topology and Geometry (3) NW Content selected from such topics as homotopy theory, topological surfaces, advanced differential geometry, projective geometry, hyperbolic geometry, spherical geometry, and combinatorial geometry. Offered: Sp.

MATH 444 Geometry for Teachers (3) NW Concepts of geometry from multiple approaches; discovery, formal and informal reasoning, transformations, coordinates, exploration using computers and models.

Topics selected from Euclidean plane and space geometry, spherical geometry, non-Euclidean geometries, fractal geometry. Designed for teaching majors. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 129; either 2.0 in MATH 136, 2.0 in MATH 205, or 2.0 in MATH 308. Offered: AS.

MATH 445 Geometry for Teachers (3) NW Concepts of geometry from multiple approaches; discovery, formal and informal reasoning, transformations, coordinates, exploration using computers and models. Topics selected from Euclidean plane and space geometry, spherical geometry, non-Euclidean geometries, fractal geometry. Designed for teaching majors. Prerequisite: 2.0 in MATH 444. Offered: WS.

MATH 461 Combinatorial Theory (3) NW Selected topics from among: block designs and finite geometries, coding theory, generating functions and other enumeration methods, graph theory, matroid theory, combinatorial algorithms, applications of combinatorics. Prerequisite: either 2.0 in MATH 308 or 2.0 in MATH 318.

MATH 462 Combinatorial Theory (3) NW Selected topics from among: block designs and finite geometries, coding theory, generating functions and other enumeration methods, graph theory, matroid theory, combinatorial algorithms, applications of combinatorics. Prerequisite: 2.0 in MATH 461.

MATH 464 Numerical Analysis I (3) NW Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308 and 2.0 in MATH 327, or 2.0 in MATH 335. Offered: A.

MATH 465 Numerical Analysis II (3) NW Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: 2.0 in MATH 464. Offered: W.

MATH 466 Numerical Analysis III (3) NW Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: either 2.0 in MATH 307 or 2.0 in MATH 136; 2.0 in MATH 465. Offered: Sp.

MATH 487 Advanced Mathematics Computer Laboratory (1-2, max. 6) NW Laboratory activities in the use of computing as a tool for doing mathematics, to be taken jointly with a designated section of a 400-level mathematics course. Credit/no credit only.

MATH 491 Introduction to Stochastic Processes (3) NW Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 396. Offered: jointly with STAT 491; A.

MATH 492 Introduction to Stochastic Processes (3) NW Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 491. Offered: jointly with STAT 492; W.

MATH 496 Honors Senior Thesis (1-5) NW Problem seminar for honors students. Cannot be repeated for credit. Offered: AWSp.

MATH 497 Special Topics in Mathematics for Teachers (2-9, max. 9) NW Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered: jointly with EDC&I 478.

MATH 498 Special Topics in Mathematics (1-5, max. 15) Reading and lecture course intended for special needs of advanced students. Offered: AWSpS.

MATH 499 Undergraduate Research (8) Summer research opportunity for undergraduates. Credit/no credit only. Offered: S.

Courses for Graduates Only

MATH 500 Mathematical Communication for Graduates (2) Analysis and practice of mathematical writing. Oral and poster conference presentations. Academic job interview skills. Mathematics on the web. Offered: jointly with AMATH 580/STAT 500.

MATH 501 Special Topics in Teaching and Learning Mathematics (2-3, max. 15) Selected Topics dealing with issues in the teaching and learning of mathematics.

MATH 502 Special Topics in Teaching and Learning Mathematics (2-3, max. 15) Selected Topics dealing with issues in the teaching and learning of mathematics.

MATH 503 Special Topics in Teaching and Learning Mathematics (2-3, max. 15) Selected Topics dealing with issues in the teaching and learning of mathematics.

MATH 504 Modern Algebra (5) First quarter of a three-quarter sequence covering group theory; field theory and Galois theory; commutative rings and modules, linear algebra, theory of forms; representation theory, associative rings and modules; commutative algebra and elementary algebraic geometry. Prerequisite: MATH 404 or equivalent.

MATH 505 Modern Algebra (5) Continuation of MATH 504. Prerequisite: MATH 504.

MATH 506 Modern Algebra (5) Continuation of MATH 505. Prerequisite: MATH 505.

MATH 507 Algebraic Geometry (3) First quarter of a two-quarter sequence covering the basic theory of affine and projective varieties, rings of functions, the Hilbert Nullstellensatz, localization, and dimension; the theory of algebraic curves, divisors, cohomology, genus, and the Riemann-Roch theorem; and related topics. Prerequisite: MATH 506.

MATH 508 Algebraic Geometry (3) Continuation of MATH 507. Prerequisite: MATH 507.

MATH 509 Theory of Optimal Control (3) Trajectories from ordinary differential equations with control variables. Controllability, optimality, maximum principle. Relaxation and existence of solutions. Techniques of nonsmooth analysis. Prerequisite: real analysis on the level of MATH 426; background in optimization corresponding to MATH 515. Offered: jointly with AMATH 509; even years.

MATH 510 Seminar in Algebra (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 514 Networks and Combinatorial Optimization (3) Networks and directed graphs. Paths and trees. Feasible and optimal flows and potentials. Transportation problems, matching and assignment problems. Algorithms and applications.

Prerequisite: MATH 308 or AMATH 352 and MATH 324. Offered: jointly with AMATH 514.

MATH 515 Fundamentals of Optimization (5) Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with IND E 515/AMATH 515.

MATH 516 Numerical Optimization (3) Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent, quasi-Newton methods. Quadratic programming and complementarity. Exact penalty methods, multiplier methods. Sequential quadratic programming. Cutting planes and nonsmooth optimization. Prerequisite: MATH 515. Offered: jointly with AMATH 516.

MATH 517 Optimization Under Uncertainty (3) Sequential optimization problems involving random variables. Dynamic programming, stochastic programming. Control of uncertain dynamic systems in finite, discrete time. Risk, feedback, adaptivity. Problems with imperfect state information. Applications such as to optimal stopping, inventory control, resource management. Prerequisite: MATH 308, MATH 324 and an introduction to basic concepts of probability, such as MATH 390 or MATH 394, MATH 395. Offered: jointly with AMATH 517.

MATH 521 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with STAT 521.

MATH 522 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with STAT 522.

MATH 523 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with STAT 523.

MATH 524 Real Analysis (5) First quarter of a three-quarter sequence covering the theory of measure and integration, point set topology, Banach spaces, L_p spaces, applications to the theory of functions of one and several real variables. Additional topics to be chosen by instructor. Prerequisite: MATH 426 or equivalent.

MATH 525 Real Analysis (5) Continuation of MATH 524. Prerequisite: MATH 524.

MATH 526 Real Analysis (5) Continuation of MATH 525. Prerequisite: MATH 525.

MATH 527 Functional Analysis (3) First quarter of a three-quarter sequence. Review of Banach, Hilbert, and L_p spaces; locally convex spaces (duality and separation theory, distributions, and function spaces); operators on locally convex spaces (adjoints, closed graph/open mapping and Banach-Steinhaus theorems); Banach algebras (spectral theory, elementary applications); spectral theorem for Hilbert space operators. Additional topics chosen by instructor. A working knowledge of real variables, general topology, and complex variables is assumed.

MATH 528 Functional Analysis (3) Continuation of MATH 527. Prerequisite: MATH 527.

MATH 529 Functional Analysis (3) Continuation of MATH 528. Prerequisite: MATH 528.

MATH 530 Seminar in Analysis (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 534 Complex Analysis (5) First quarter of a three-quarter sequence covering complex numbers, analytic functions, contour integration, power series, analytic continuation, sequences of analytic functions, conformal mapping of simply connected regions, and related topics. Prerequisite: MATH 426.

MATH 535 Complex Analysis (5) Continuation of MATH 534. Prerequisite: MATH 534.

MATH 536 Complex Analysis (5) Continuation of MATH 535. Prerequisite: MATH 535.

MATH 537 Several Complex Variables (3) First quarter of a three-quarter sequence covering Weierstrass preparation theorem and its immediate consequences, analytic continuation, domains of holomorphy, pseudoconvexity, Cartan-Oka theory of coherence, embedding theorems; the CR equations, CR manifolds, connections with algebraic geometry. Prerequisite: MATH 536.

MATH 538 Several Complex Variables (3) Continuation of MATH 537. Prerequisite: MATH 537.

MATH 539 Several Complex Variables (3) Continuation of MATH 538. Prerequisite: MATH 538.

MATH 541 Special Topics in Applied Mathematics (2-3, max. 15) Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

MATH 542 Special Topics in Applied Mathematics (2-3, max. 15) Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

MATH 543 Special Topics in Applied Mathematics (2-3, max. 15) Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

MATH 544 Topology and Geometry of Manifolds (5) First quarter of a three-quarter sequence covering general topology, the fundamental group, covering spaces, topological and differentiable manifolds, vector fields, flows, the Frobenius theorem, Lie groups, homogeneous spaces, tensor fields, differential forms, Stokes's theorem, deRham cohomology. Prerequisite: MATH 404 and MATH 426 or equivalent.

MATH 545 Topology and Geometry of Manifolds (5) Continuation of MATH 544. Prerequisite: MATH 544.

MATH 546 Topology and Geometry of Manifolds (5) Continuation of MATH 545. Prerequisite: MATH 545.

MATH 547 Geometric Structures (3, max. 9) First quarter of a three-quarter sequence covering differential-geometric structures on manifolds, Riemannian metrics, geodesics, covariant differentiation, curvature, Jacobi fields, Gauss-Bonnet theorem. Additional topics to be chosen by the instructor, such as connections in vector bundles and principal bundles, symplectic geometry, Riemannian comparison theorems, symmetric spaces, symplectic geometry, complex manifolds, Hodge theory. Prerequisite: MATH 546.

MATH 548 Geometric Structures (3, max. 9) Continuation of MATH 547. Prerequisite: MATH 547.

MATH 549 Geometric Structures (3, max. 9) Continuation of MATH 548. Prerequisite: MATH 548.

MATH 550 Seminar in Geometry (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 554 Linear Analysis (5) First quarter of a three-quarter sequence covering advanced linear algebra and matrix analysis, ordinary differential equations (existence and uniqueness theory, linear systems, numerical approximations), Fourier analysis, introductions to functional analysis and partial differential equations, distribution theory. Prerequisite: MATH 426 and familiarity with complex analysis at the level of 427 (the latter may be obtained concurrently).

MATH 555 Linear Analysis (5) Continuation of MATH 554. Prerequisite: MATH 554.

MATH 556 Linear Analysis (5) Continuation of MATH 555. Prerequisite: MATH 555.

MATH 557 Introduction to Partial Differential Equations (3) First quarter of a three-quarter sequence. Review of the theory of distributions and the Fourier transform. Detailed study of main linear equations: wave equation, Laplace's equation, and the heat equation. Sobolev spaces and regularity of solutions of elliptic equations. Theory of pseudodifferential operators. Initial value problem for hyperbolic equations and methods of geometrical optics. Fourier integral operators. The Dirichlet problem and eigenfunction expansions for elliptic equations. Prerequisite: MATH 556.

MATH 558 Introduction to Partial Differential Equations (3) Continuation of MATH 557. Prerequisite: MATH 557.

MATH 559 Introduction to Partial Differential Equations (3) Continuation of MATH 558. Prerequisite: MATH 558.

MATH 564 Algebraic Topology (3) First quarter of a three-quarter sequence covering classical and modern approaches; complexes and their homology theory; applications; fixed points, products and Poincaré duality; axiomatic approach. Prerequisite: MATH 506 and MATH 544, or equivalent.

MATH 565 Algebraic Topology (3) Continuation of MATH 564. Prerequisite: MATH 564.

MATH 566 Algebraic Topology (3) Continuation of MATH 565. Prerequisite: MATH 565.

MATH 570 Seminar in Topology (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 574 Fundamental Concepts of Analysis (3) *Hoffman, Toro* Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Intended for students in Biostatistics and related fields; does not fulfill requirements for degrees in mathematics.

MATH 575 Fundamental Concepts of Analysis (3) *Hoffman, Toro* Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Intended for students in Biostatistics and related fields; does not fulfill requirements for degrees in mathematics.

MATH 576 Fundamental Concepts of Analysis (3) *Hoffman, Toro* Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Intended for students in Biostatistics and related fields; does not fulfill requirements for degrees in mathematics.

MATH 577 Lie Groups and Lie Algebras (3, max. 9) Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

MATH 578 Lie Groups and Lie Algebras (3, max. 9) Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

MATH 579 Lie Groups and Lie Algebras (3, max. 9) Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

MATH 581 Special Topics in Mathematics (*, max. 36) Advanced topics in various areas of mathematics. Offered: AWWSpS.

MATH 582 Special Topics in Mathematics (*, max. 36) Advanced topics in various areas of mathematics. Offered: AWWSpS.

MATH 583 Special Topics in Mathematics (*, max. 36) Advanced topics in various areas of mathematics. Offered: AWWSpS.

MATH 584 Applied Linear Algebra and Introductory Numerical Analysis (5) Numerical methods for solving linear systems of equations, linear least squares problems, matrix eigen value problems, nonlinear systems of equations, interpolation, quadrature, and initial value ordinary differential equations. Offered: jointly with AMATH 584. A.

MATH 585 Numerical Analysis of Boundary Value Problems (5) Numerical methods for steady-state differential equations. Two-point boundary value problems and elliptic equations. Iterative methods for sparse symmetric and non-symmetric linear systems: conjugate-gradients, preconditioners. Prerequisite: AMATH 584/MATH 584 which may be taken concurrently. Offered: jointly with AMATH 585; W.

MATH 586 Numerical Analysis of Time Dependent Problems (5) Numerical methods for time-dependent differential equations, including explicit and implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory. Spectral and pseudospectral methods. Prerequisite: AMATH 581 or AMATH 584. Offered: jointly with AMATH 586/ATM S 581; Sp.

MATH 590 Seminar in Probability (2-5, max. 5) Credit/no credit only. Prerequisite: permission of instructor.

MATH 594 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing, such as iterative methods, eigenvalue computations, approximation theory, finite element methods, inverse problems, nonlinear conservation laws, computational fluid dynamics. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or equivalent. Offered: jointly with AMATH 594.

MATH 595 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or equivalent. Offered: jointly with AMATH 595.

MATH 596 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with AMATH 596.

MATH 597 Seminar on Teaching Math (1, max. 3) Issues in the teaching and learning of college mathematics, such as discovering and working with student background and expectations, increasing student engagement with course material, and evaluating student achievement. For graduate students who are, or soon will be, teaching mathematics courses on their own. Credit/no credit only.

MATH 598 Seminar on Technology (1, max. 3) Explores the use of computer technology in teaching and research in mathematics. Develops the basic skills required for using computer mathematics software.

MATH 600 Independent Study or Research (*)

MATH 700 Master's Thesis (*)

MATH 800 Doctoral Dissertation (*)

Middle Eastern Studies

See International Studies.

Music

102 Music



General Catalog Web page:
www.washington.edu/students/genecat/academic/music.html



Department Web page:
www.music.washington.edu

The foremost goal of the School of Music is the discovery, preservation, and transmission of the practice and knowledge of music, as well as the role of music in culture and history. The School expands the frontiers of artistic enterprise and cultural knowledge through research, scholarship, and creative production in its publications, performances, and teaching. Through its instructional offerings, the School provides opportunities for all students at the University of Washington to explore the role of music in the cultural nature of the world, past, present, and future. The School of Music teaches students to think creatively and critically, and to engage in discussions and debates with understanding and respect. The School's intention is to instill the standards and ideals of excellence in both the artistic and scholarly endeavors of its students. The opportunities offered and skills developed within the School of Music form the foundation of a lifetime of cultural expression and understanding.

Graduate Program

Graduate Program Coordinator
116 Music, Box 353450
206-543-2726
musicadv@u.washington.edu

Graduate programs in the School of Music take into consideration the dual nature of music's subject matter. First, it is one of the creative arts, requiring constant renewal through the efforts of composers, performers, and teachers. Second, it is a branch of the humanities, subject to scholarly study and interpretation of its theoretical concepts and historical development.

Special Requirements

Performance degrees require an audition (see below)

Financial Aid

A limited number of teaching and staff assistantships (including accompanying) are available. Competitive auditions for performance scholarships for new and returning students are held each year. See the School's Web site (above) for more information about applications and audition dates.

Research Facilities

The Music Building contains the music library, an electronic composition laboratory, a listening center, and the ethnomusicology archives, as well as the studio, practice, and classroom facilities of a modern music department.

Ensembles available for student participation include University Symphony Orchestra, University Chorale, Opera Chorus, Contemporary Group, and Baroque Ensemble, as well as non-Western ensembles with visiting artists from around the globe.

Master of Music, Doctor of Musical Arts

The programs with more creative emphasis lead to the degrees of Master of Music and Doctor of Musical Arts. Areas of specialization: performance (brass, harp, harpsichord, piano, organ, percussion, string, voice, woodwinds), instrumental conducting, choral conducting, composition, and opera production. The Graduate Record Examination is not required for application to these graduate programs. All graduate students must maintain a GPA of at least 3.00, and a minimum grade of 2.7 in courses used to fulfill School of Music graduation requirements.

Master of Music

Admission Requirements: Audition required for entrance to performance except for composition. Details of requirements for each of the areas of specialization are available from the School of Music Office of Graduate and Undergraduate Advising and on the School's Web site (above).

Graduation Requirements: Please see the School's Web site for individual degree program plans.

Doctor of Musical Arts

Admission Requirements: Audition required for performance. (See the School's Web site for suggested audition repertoire and audition dates.) See the School's Web site or visit the advising office for specific application and admission requirements.

Graduation Requirements: 90 credits of graduate coursework (60 must be taken at the UW), and demonstration of proficiency in one or two languages must be completed before taking the General Examination. Please see individual program plans on

the School's Web site for complete graduation requirements.

Master of Arts, Doctor of Philosophy

The research-oriented programs lead to the degrees of Master of Arts and Doctor of Philosophy. Areas of specialization are music theory, music history, ethnomusicology, and music education. The Graduate Record Examination is required for application to these graduate programs with the exception of ethnomusicology. Check individual program requirements on the School's Web site. All graduate students must maintain a GPA of at least 3.00, and a minimum grade of 2.7 in courses used to fulfill School of Music graduation requirements.

Master of Arts

Admission Requirements: Requirements vary for the different areas of specialization. Details of requirements for each of the areas of specialization are available from the School of Music Advising Office and on its Web site.

Graduation Requirements: Degree requirements vary by program. Please see individual program plans on the School's Web site.

Doctor of Philosophy

Admission Requirements: Requirements vary for the different areas of specialization. Details of requirements for each of the areas of specialization are available from the School of Music Advising Office and on the School's Web site.

Graduation Requirements: 90 credits of approved academic coursework, completion of the foreign language requirement as specified for the degree, General Examination and defense of the dissertation. Please refer to the program plans on the School's Web site for specific degree requirements.

Faculty

Chair

Robin L. McCabe

Professors

Beale, James M. * 1948, (Emeritus); MMus, 1947, Yale University; theory/composition.

Bernard, Jonathan W. * 1987; MA, 1973, MPhil, 1975, PhD, 1977, Yale University; theory and analysis of twentieth-century music.

Bozarth, George S, Jr. * 1982; MFA, 1973, PhD, 1978, Princeton University; music history and literature.

Campbell, Patricia S. * 1989; MM, 1975, University of Akron, PhD, 1981, Kent State University; music and child development, multicultural music education, comparative music education.

Carlsen, James C. * 1967, (Emeritus); MA, 1958, Washington University, PhD, 1962, Northwestern University; systematic musicology, psychomusicology, research methodology, theories of music instruction.

Chaloupka, Vladimir * 1981, (Adjunct); PhD, 1975, University of Geneva (Switzerland); experimental elementary-particle physics.

Curtis-Verna, Mary * 1969, (Emeritus); BA, 1943, Hollins College (Virginia); voice.

Dahlstrom, Robert A. * 1971, (Adjunct); MA, 1967, University of Illinois; design.

Dempster, Stuart R. * 1968, (Emeritus); MA, 1967, San Francisco State; trombone, contemporary music.

Eros, Peter S. * 1989; Diploma, 1956, Franz Liszt Academy; orchestra and opera.

Grossman, Arthur * 1968, (Emeritus); Diploma, 1955, Curtis Institute of Music; bassoon.

Hokanson, Randolph H. * 1949, (Emeritus); studied with Dame Myra Hess, Howard Ferguson (London); piano.

Jacobs, Sue-Ellen * 1974, (Adjunct); PhD, 1970, University of Colorado (Boulder); women studies, socio-cultural and applied anthropology, anthropological studies of women.

Kaplan, Abraham * 1977; Diploma, 1957, Juilliard School; choral conducting, composition.

Kappy, David L. * 1979; MM, 1971, University of Wisconsin; French horn performance, chamber music, and theory.

Karpen, Richard S. * 1989; MA, 1986, DMA, 1989, Stanford University; music composition, computer music, digital arts.

Kechley, Gerald * 1955, (Emeritus); MA, 1950, University of Washington; theory/composition.

Kind, Silvia E. 1969, (Emeritus); Konzert-Reife-Prufung, 1934, Hochschule für Musik (Germany); harpsichord.

Lundquist, Barbara R. * 1973, (Emeritus); MS, 1959, Montana State University, DMA, 1973, University of Washington; music education, sociomusicology, ethnomusicology in schools.

McCabe, Robin L. 1987; MMus, 1973, DMA, 1976, Juilliard School; piano performance, communication skills, and pedagogy.

McCull, William D. * 1968; Diploma, 1955, State Academy of Music (Austria); clarinet.

Moore, John T. 1948, (Emeritus); MM, 1941, University of Illinois; piano.

Patrick, Julian * 1990; BA, 1950, Cincinnati Conservatory; music, opera, song literature, musical theater, legitimate theater, teaching voice.

Patterson, Ronald G. 1999; developing classical music interactive DVDs for education and entertainment purposes.

Rahn, John * 1975; MFA, 1972, PhD, 1974, Princeton University; theory/composition.

Saks, Toby * 1976; MS, 1966, Juilliard School; performance and teaching of violoncello and chamber music.

Salzman, Timothy O. * 1987; MM, 1979, Northern Illinois University; wind ensemble conducting, pedagogy and repertoire.

Skowronek, Felix E. * 1968; BMus, 1956, Curtis Institute of Music; flute.

Smith, William O. * 1966, (Emeritus); MA, 1952, University of California (Berkeley); theory/composition.

Sokol, Vilem 1961, (Emeritus); BMus, 1938, MMus, 1946, Oberlin College; violin, viola, conducting.

Starr, Lawrence * 1977; PhD, 1973, University of California (Berkeley); music history and literature.

Staryk, Steven S. * 1987, (Emeritus); studied at the Royal Conservatory of Music (Toronto); violin.

Storch, Laila * 1968, (Emeritus); BA, 1964, Wilkes College; oboe.

Terry, Carole R. * 1979; MM, 1973, University of Rochester, DMA, 1977, Stanford University; organ, harpsichord.

Thome, Diane * 1977; MA, 1966, University of Pennsylvania, PhD, 1973, Princeton University; theory/composition.

Tufts, Paul Dewitt 1961, (Emeritus); MA, 1951, University of Washington; theory/composition.

Winn, William David * 1985, (Adjunct); PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

Zsigmondy-Liedmann, Denes 1973, (Emeritus); BA, 1940, Gymnasium, Budapest (Hungary); violin.

Associate Professors

Benshoof, Kenneth 1963, (Emeritus); MA, 1963, San Francisco State; theory/composition.

Boers, Geoffrey Paul * 1996; MA, 1985, Portland State University, DMA, 1987, University of Arizona; choral music: literature, history, conducting, and rehearsal techniques; vocal pedagogy.

Demorest, Steven M. * 1993; MM, 1983, Westminster Choir College, PhD, 1989, University of Wisconsin; music education, choral ensembles.

Durand, Joel-Francois * 1991; MM, 1984, Musikhochschule, Freiburg (Germany), PhD, 1988, State University of New York (Stony Brook); music composition.

Ellingson, Terry J. * 1983; PhD, 1979, University of Wisconsin, MA, 1979, University of Chicago; ethnomusicology, anthropology, religion, Tibet, Nepal, Buddhism.

Geissmar, Else J. 1977, (Emeritus); MM, 1944, University of Michigan; piano.

Jussila, Clyde F. 1971, (Emeritus); MS, 1951, Kansas State University; music education.

Michaelian, Patricia * 1984; Diploma, 1970, Curtis Institute of Music; piano teaching and performance.

Rosinbum, Ralph 1983, (Emeritus); MA, 1948, University of Washington; opera production.

Schuyler, Philip D. 1999; MA, 1974, PhD, 1979, University of Washington; Near Eastern musics and cultures; contemporary music and art in the United States.

Seales, Marc A. 1987; BA, 1978, Western Washington University; jazz studies, keyboard.

Sheppard, Craig * 1993; Diploma, 1968, The Curtis Institute, Philadelphia, MSc, 1971, Juilliard School; piano and piano literature.

Taricani, Jo Ann * 1980; PhD, 1986, University of Pennsylvania; music history and literature.

Assistant Professors

Callus, Helen Sarah 1996; MA, 1994, Johns Hopkins University; viola performance, chamber music performance, viola pedagogy.

Collier, Thomas W. 1980; BA, 1971, BMus, 1971, University of Washington; percussion performance and mallet jazz improvisational techniques.

Dudley, Shannon K. * 1996; MA, 1988, PhD, 1996, University of California (Berkeley); steelband music in Trinidad; Caribbean music; colonialism, nationalism, ethnicity.

Henderson, Rebecca A. * 1996, (Affiliate); MM, 1985, Eastman School of Music; oboe performance and literature.

Immel, Don T. * 1999; MM, 1996, Rice University; artistic advancement of trombone performance, teaching and literature.

Kopp, David 1997; MA, 1980, State University of New York (Stony Brook), PhD, 1995, Brandeis University; systems of harmony in tonal and post-tonal music.

McDavid, Brad 1994; MM, 1990, Arizona State University, PhD, 1999, Ohio State University; conducting athletic band and concert band, music education.

Morrison, Steven J. * 1997; MM, 1988, University of Wisconsin, PhD, 1995, Louisiana State University; factors in the development of music listening and performance behaviors.

Sielert, Vern 2001; MM, 1993, University of North Texas; jazz studies, jazz ensembles, trumpet (jazz and orchestral).

Zahn, Claudia 1998; BFA, 1976, Carnegie Mellon University; teaching acting and directing to singers and young directors.

Lecturer

Novacek, Steven A. 1984; BMus, 1975, California State University, Northridge; guitar.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Music

MUSIC 400 Computer Applications to Music (3, max. 9) VLPA Music workstation applications using microcomputers, music synthesizers, and analog-to-digital converters: music editing and score production, transcription, waveform and spectral analysis, and introduction to programming.

MUSIC 401 Computer Music Seminar 1 (3) VLPA *Karpen* Use of computers in musical composition, software digital sound synthesis, score generation, theoretical investigations. Prerequisite: either MUSIC 212, MUSIC 302, MUSIC 456, or PHYS 207.

MUSIC 402 Computer Music Seminar 2 (3) VLPA *Karpen* Use of computers in musical composition, digital sound synthesis, digital signal processing. Hardware used includes NeXT computers, digital recorders. Software used includes CSound, Common LISP, UNIX. Prerequisite: MUSIC 401.

MUSIC 403 Computer Music Seminar 3 (3) VLPA *Karpen* Advanced use of computers for musical composition, digital sound synthesis, digital signal processing. Advanced synthesis techniques such as LPC for speech and vocal synthesis, phase vocoders, reverb, and spatial location. Hardware used includes NeXT computers and peripherals. Software includes CSound, Common Lisp, C, and UNIX. Prerequisite: MUSIC 402.

MUSIC 405 Liturgics and Hymnology: Practical Applications I (2) VLPA *Butler* Prepares organ majors and other advanced organ students to play hymns in a manner that inspires congregational singing. Includes a study of hymnology as well as instruction on the realization of anthem accompani-

ments and piano scores at the organ. Prerequisite: MUSIC 302; MUSIC 305; MUHST 212. Offered: A.

MUSIC 406 Liturgics and Hymnology: Practical Applications II (2) VLPA *Butler* Survey of church choir repertoire with emphasis on the smaller choir, choir organization and rehearsal techniques, choral conductor's preparation, a brief study of choral styles and editions, and choral arranging for the church choir. Prerequisite: either MUSIC 303, MUSIC 306, and MUHST 210, or MUSIC 405. Offered: W.

MUSIC 407 Liturgics and Hymnology: Practical Applications III (2) VLPA *Butler* History of Psalm singing, traditional and contemporary liturgics, plainchant, liturgical use of handbells, "contemporary" repertoire for the church, orchestral instruments and their use in worship (arranging for amateur players, basics of string bowing and editing, organizing instrumental ensembles), youth choir organization. Prerequisite: either MUSIC 303, MUSIC 306, and MUHST 210, or MUSIC 406. Offered: Sp.

MUSIC 410 ElectroAcoustic Music: History and Analysis (3) VLPA *Thome* Examines the music of major electro-acoustic composers. Emphasis on the relationship between technological resources and compositional advances. Addresses issues raised by the diversity of approaches to musical composition; relates particular creative contributions to the historical, cultural, and technological contexts in which they originated. Prerequisite: MUSIC 303; MUSIC 306; MUHST 210. Offered: Sp.

MUSIC 418 Baroque Ornamentation and Improvisation (3) VLPA *Terry* The study of ornamentation and improvisation for keyboard, woodwinds, voice, and strings of selected German, Italian, French, and English repertoire from 1600 to 1800.

MUSIC 420 Organ Improvisation and Service Playing I (2) VLPA Prepares students to improvise, especially for the church/synagogue service. Includes a brief study of hymnology, hymn elaboration, altered harmonizations, improvisation based on existing hymn tunes, interludes, chorale preludes, ornamented chorales. Prerequisite: MUSIC 303; MUSIC 306. Offered: A.

MUSIC 421 Organ Improvisation and Service Playing II (2) VLPA Continuation of MUSIC 420. Includes brief review of figured bass and functional harmony, free improvisation in simple antecedent/consequent ABA forms and more complex forms (rondo, theme, and variation), improvising partitas, interludes, improvisations based on plainchant. A survey of important improvisation texts. Prerequisite: MUSIC 420. Offered: W.

MUSIC 422 Organ Improvisation and Service Playing III (2) VLPA Continuation of MUSIC 421. Advanced improvisation: baroque improvisation techniques, fughettas, baroque preludias and fantasias, canons, toccatas, duos, trios, and simple fugues. Prerequisite: MUSIC 421. Offered: Sp.

MUSIC 426 Advanced Jazz Arranging (2) VLPA *Brockman* Advanced arranging techniques for jazz ensembles of various sizes, exploring methods employed by Duke Ellington, Gil Evans, and others. Assignments include one original arrangement each for small-combo and full-jazz ensemble. Prerequisite: MUSIC 336. Offered: Sp.

MUSIC 427 Music of Africa (3) I&S/VLPA Music cultures of Africa. Traditional styles and more recent developments. Open to all students with an interest in the area. Prerequisite: MUSIC 317.

MUSIC 428 Music of North India (3) I&S/VLPA Classical music of North India, the Hindustani tradition with emphasis on the Dhrupad and Khyal styles. Recommended: ethnomusicology or South Asian studies background.

MUSIC 430 Organology (3) VLPA Systematic study of musical instruments, involving the history, acoustical phenomena, and physical topologies of instruments from around the world, with emphasis on non-Western music.

MUSIC 433 Music of Latin America (3) I&S/VLPA The music of the Spanish-, French-, and Portuguese-speaking New World countries.

MUSIC 434 Pedagogy (2) VLPA Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 435 Pedagogy (2) VLPA Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 436 Pedagogy (2) VLPA Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 445 Selected Topics in Ethnomusicology (3, max. 9) I&S/VLPA Deals with areas not covered by other courses in ethnomusicology. Content varies with different instructors.

MUSIC 449 Advanced Piano Repertoire (2, max. 6) VLPA *McCabe, Michaelian, Sheppard* For piano majors who wish an in-depth survey of major areas of the piano repertoire. Prerequisite: MUSIC 328. Offered: AWSp.

MUSIC 451 Summer Jazz Institute (1) VLPA *Brockman, Collier, Seales* Intensive one-week institute designed for the serious jazz student as well as for music educators. Six hours of daily instruction in jazz theory, ear-training, improvisation, arranging, as well as emphasis on rehearsal and performance techniques through sectional workshops and small group "jam sessions."

MUSIC 454 Organ Pedagogy (3) VLPA *Terry* Pedagogical approaches to organ techniques and performance practice, provides opportunity for practical application by means of student teaching.

MUSIC 458 Organ Repertoire: Middle Ages through Baroque (3) VLPA *Terry* Analysis and performance practices of organ literature, Middle Ages through baroque period. Development of the organ as musical instrument. Prerequisite: either MUHST 400, MUHST 401, MUHST 402, MUHST 403, MUHST 406, or MUHST 407.

MUSIC 459 Organ Repertoire: Bach to Present (3) VLPA *Terry* Analysis and performance practices of organ literature, classical period through the twentieth century. Development of the organ as a musical instrument. Prerequisite: either MUHST 408, MUHST 409, MUHST 410, MUHST 411, MUHST 412, MUHST 413, MUHST 414, MUHST 415, MUHST 417, MUHST 418, MUHST 419, MUHST 423, MUHST 424, or MUHST 426.

MUSIC 460 Advanced Vocal Repertoire: Pre-Nineteenth-Century Art Songs (2, max. 6) VLPA Professional preparation of pre-nineteenth-century songs with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 328.

MUSIC 461 Advanced Vocal Repertoire: Nineteenth-Century Art Songs (2, max. 6) VLPA Professional preparation of works from the literature of nineteenth-century German lieder, with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 460.

MUSIC 462 Advanced Vocal Repertoire: Twentieth-Century Art Songs (2, max. 6) VLPA Preparation of works from the twentieth-century repertoire of

French, German, Italian, Spanish, and English songs, with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 461.

MUSIC 464 Jazz Laboratory (1, max. 9) VLPA *Seales* Forum for testing new technical skills, improvisational techniques, and jazz compositions and/or arrangements in a formal laboratory setting.

MUSIC 465 Acting for Singers (2, max. 6) VLPA Workshop designed specifically for the singing actor, focusing on character analysis, movement, and audition department skills.

MUSIC 467 Advanced Jazz Improvisation I (1) VLPA *Collier, Seales* Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 369.

MUSIC 468 Advanced Jazz Improvisation II (1) VLPA *Collier, Seales* Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 467.

MUSIC 469 Advanced Jazz Improvisation III (1) VLPA *Collier, Seales* Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 468.

MUSIC 470 Analysis of Tonal Music: Introduction to Schenker (3) VLPA *Bernard, Kopp, Rahn* Introduction to the theories of Heinrich Schenker and their subsequent development; analysis of music from the common-practice period (1700-1900), with possible excursions into the twentieth century. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

MUSIC 471 Introduction to Atonal Theory and Analysis (3) VLPA *Bernard, Rahn* Theory of atonal music, including the "classical" twelve-tone repertoire. Analysis of works by Schoenberg, Berg, Webern, and others. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

MUSIC 472 Analysis of Twentieth Century Music, 1900-1950 (3, max. 6) VLPA *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of musical works of the first half of the twentieth century in Europe and the United States, with emphasis on music other than that of the second Viennese school. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

MUSIC 473 Keyboard Harmony and Transposition (3) VLPA *Terry* Keyboard harmonization from the baroque period to present; transposition of vocal and instrumental pieces to different pitch levels. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215. Offered: alternate years.

MUSIC 474 Keyboard Harmony and Transposition (3) VLPA *Terry* Keyboard harmonization from the baroque period to present; transposition of vocal and instrumental pieces to different pitch levels. Prerequisite: MUSIC 473. Offered: alternate years.

MUSIC 475 Figured Bass Realization (3) VLPA *Terry* Various styles of continuo realization for keyboardists, emphasizing Bach cantatas, Haydn symphonies, and Mozart operas. Prerequisite: MUSIC 474. Offered: alternate years.

MUSIC 476 Advanced Vocal Repertoire: Seventeenth and Eighteenth Centuries (2) VLPA Opera repertoire, 1600 to the Bel Canto era (Bellini, Rossini, Donizetti); style, traditions, embellishments in Italian, French, and German arias. Prerequisite: MUSIC 328.

MUSIC 477 Advanced Vocal Repertoire: Nineteenth Century (2) VLPA Opera repertoire, the

post Bel Canto era through Verdi, Puccini and verismo, and significant German, French, and Slavic repertoire. Prerequisite: MUSIC 476.

MUSIC 478 Advanced Vocal Repertoire: Twentieth Century (2) VLPA Opera repertoire, twentieth-century opera literature (Barber, Menotti, Bartok, Dvorak); understanding of style, character and overall artistic and musical needs of the present. Prerequisite: MUSIC 477.

MUSIC 479 Senior Recital (1) VLPA

MUSIC 480 The Anthropology of Music (3) I&S/VLPA Analysis of aspects of anthropological thought influential in ethnomusicology. Critical evaluation of dominant theoretical schools and modes of explanation. e.g., evolutionist, diffusionist, historical particularist, structuralist, functionalist, symbolist, and semiotic, through detailed examination of seminal texts. Offered: jointly with ANTH 430.

MUSIC 481 Choral Repertoire: Sixteenth and Seventeenth Centuries (3) VLPA Sacred and secular choral literature from the Renaissance through the early baroque, covering Europe and England. Various genres and styles of major composers, including performance practice, rehearsals, and conducting.

MUSIC 482 Choral Repertoire: Eighteenth Century (3) VLPA Sacred and secular choral literature of the baroque, covering mainland Europe and England. Choral works of Bach, his predecessors, and contemporaries. Stylistic analysis and study of performance practice.

MUSIC 483 Choral Repertoire: Nineteenth Century (3) VLPA Sacred and secular choral literature of the nineteenth century, covering mainland Europe and England. Analysis of accompanied and a cappella choral works by major composers with implications for conducting and programming of literature.

MUSIC 484 Choral Repertoire: Twentieth Century (3) VLPA Choral literature of the twentieth century, covering America, England, and mainland Europe. Various genres and styles, including score study and teaching strategies.

MUSIC 487 Tonal Counterpoint (3) VLPA *Bernard, Durand, Kopp, Rahn* Introduction to tonal counterpoint through exercises in analysis and composition, focusing on 18th-century styles. Study of melody principles of counterpoint in two and three voices, dance forms, inventions, fugue. Prerequisite: either MUSIC 311 or MUSIC 202.

MUSIC 490 Orchestration (3) VLPA Study of the instruments of the orchestra and practical experience in combining them; to enable the student to score for various instrumental combinations. Ideally to be taken before band arranging or jazz arranging, but is not a prerequisite.

MUSIC 491 Composition (3, max. 18) VLPA One-hour private instruction and one-hour laboratory session each week. Prerequisite: MUSIC 391.

MUSIC 492 Opera Direction and Production (4) VLPA Practical experience with problems of the theater.

MUSIC 493 Opera Direction and Production (4) VLPA Practical experience with problems of the theater. Prerequisite: MUSIC 492.

MUSIC 498- Senior Thesis (3-, max. 9) VLPA Design and completion of an individual research project and writing of a thesis under supervision of a faculty member.

MUSIC 499 Undergraduate Research (*, max. 6)

Courses for Graduates Only

MUSIC 511 Seminar in Field and Laboratory Methods (3) Methodology of field research in ethnomusicology along with practical experience. Prerequisite: graduate student standing in ethnomusicology or permission of instructor.

MUSIC 512 Seminar in Ethnomusicology (3, max. 18) Deals with advanced theoretical and methodological problems in ethnomusicology, and with the relationship of ethnomusicology to allied disciplines. Prerequisite: graduate student standing in ethnomusicology or permission of instructor.

MUSIC 520 Music in Higher Education (3) *Morrison* Philosophical and practical issues surrounding music within the context of higher education. Topics include mission and structure of music programs, development of teaching expertise, teacher/student evaluation, academic freedom, and job opportunities. Appropriate for all graduate music students and does not require background in teaching or education.

MUSIC 526 History of Theory (3) Ancient, medieval, early Renaissance.

MUSIC 527 History of Theory (3) Renaissance, baroque, early classic.

MUSIC 528 History of Theory (3) Classic, romantic, twentieth century.

MUSIC 530 Seminar in Music Cognition (3, max. 9) Study of research literature in cognition and music cognition, particularly as it relates to nonverbal musical experience. Prerequisite: MUSIC 344 or MUSIC 544 or permission of instructor.

MUSIC 531 Proseminar in Ethnomusicology (3) Theoretical and methodological issues in ethnomusicology based on historical and contemporary major writings. Critical evaluations of works with a broad view toward developing ethnomusicological research. Prerequisite: permission of instructor.

MUSIC 532 Opera Direction and Production (4/6, max. 12) Practical experience with problems of the opera theatre.

MUSIC 533 Preceptorial Readings in Ethnomusicology (5) Significant ethnomusicological literature on the music cultures of Asia. Meets with MUSIC 316. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 534 Preceptorial Readings in Ethnomusicology (5) Significant ethnomusicological literature on the music cultures of Africa, the Americas, and Oceania. Meets with MUSIC 317. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 536 Transcription and Analysis (3) Study of the methodological principles of transcription and analysis, together with practical exercises in developing transcription skills. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 544 Music Perception and Cognition (3, max. 9) Examines the systematic research literature on the cognitive operations involved in musical performance, composition, and listening. Topics include: the mental representation of musical concepts, communication of expressiveness in music, memory for music, processing of tonal and nontonal music; computer models of music cognition; melodic and rhythmic development; composition and improvisation.

MUSIC 551 Practicum in Music Instruction (3, max. 9) Practical application and validation of results of investigation in curriculum, music teaching and

learning, performance and theoretical studies. Prerequisite: teaching experience or permission of instructor.

MUSIC 559 Master's Recital (3, max. 6) Public performance for students in the Master of Music degree program. Prerequisite: permission of instructor and Master of Music program standing.

MUSIC 570 Seminar in Schenkerian Analysis (3, max. 9) *Bernard, Kopp, Rahn* Advanced work in Schenkerian analysis. Prerequisite: MUSIC 470.

MUSIC 571 Seminar in Serialism (3, max. 9) *Bernard, Kopp, Rahn* Advanced theoretical and analytical work in serialism and other nontonal systems. Prerequisite: MUSIC 471 or equivalent.

MUSIC 572 Advanced Topics in Computer Music (3) *Karpen, Rahn* Topics vary. Offered: AWSpS.

MUSIC 573 Seminar in Tonal Analysis (3, max. 9) Modern theoretical and analytical methods appropriate to study of western music of the eighteenth and nineteenth centuries, conceived independently of or in response to the work of Heinrich Schenker. Prerequisite: MUSIC 470 or permission of instructor.

MUSIC 574 Analysis of Twentieth-Century Music: 1950—Present (3) *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of major works of second half of twentieth century. Prerequisite: MUSIC 471 and MUSIC 472 or permission of instructor.

MUSIC 575 Seminar in Theory (3, max. 18) *Bernard, Kopp, Rahn* Development and discussion of current student and faculty research in compositional/analytical theory and metatheory.

MUSIC 576 Critical Theory of Music (3, max. 18) Philosophical foundations of the criticism of music, including relevant contemporary thought in the criticism of literature and the other arts.

MUSIC 577 Composers of the Twentieth Century (3, max. 9) *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of the work of a major composer of the twentieth century. Prerequisite: MUSIC 574 or permission of instructor.

MUSIC 580 Advanced Conducting (3, max. 9) *Eros, Salzman*

MUSIC 581 Advanced Conducting (3, max. 9) *Eros, Salzman*

MUSIC 582 Advanced Conducting (3, max. 9) *Eros, Salzman*

MUSIC 583 Advanced Choral Conducting (3, max. 27) *Kaplan*

MUSIC 590 Doctoral Recital (2-6, max. 18) Public performance for students in the Doctor of Musical Arts degree program. Prerequisite: permission of instructor.

MUSIC 591 Graduate Composition (*, max. 30) *Bernard, Durand, Karpen, Rahn, Thome*

MUSIC 599 Advanced Selected Topics (1-3, max. 27) Selected readings on current issues and problems in music. Prerequisite: permission of a supervising music faculty member.

MUSIC 600 Independent Study or Research (*)

MUSIC 700 Master's Thesis (*)

MUSIC 800 Doctoral Dissertation (*)

Music Applied

MUSAP 420 Private Instruction: Voice (2-3, max. 27) VLPA *Harper, Patrick* Intended for undergraduate majors.

MUSAP 421 Private Instruction: Piano (2-3, max. 27) VLPA *McCabe, Michaelian, Seales, Sheppard* Intended for undergraduate majors.

MUSAP 422 Private Instruction: Organ (2-3, max. 27) VLPA *Terry* Intended for undergraduate majors.

MUSAP 423 Private Instruction: Harpsichord (2-3, max. 27) VLPA *Terry* Intended for undergraduate majors.

MUSAP 424 Private Instruction: Violin-Viola (2-3; max. 27) VLPA *Callus, Patterson* Intended for undergraduate majors.

MUSAP 425 Private Instruction: Violoncello (2-3; max. 27) VLPA *Saks* Intended for undergraduate majors.

MUSAP 426 Private Instruction: Double Bass (2-3, max. 27) VLPA *Lieberman* Intended for undergraduate majors.

MUSAP 427 Private Instruction: Flute (2-3, max. 27) VLPA *Skowronek* Intended for undergraduate majors.

MUSAP 428 Private Instruction: Oboe (2-3, max. 27) VLPA Intended for undergraduate majors.

MUSAP 429 Private Instruction: Clarinet (2-3, max. 27) VLPA *McColl* Intended for undergraduate majors.

MUSAP 430 Private Instruction: Bassoon (2-3, max. 27) VLPA *Grossman* Intended for undergraduate majors.

MUSAP 431 Private Instruction: Saxophone (2-3, max. 27) VLPA *Brockman* Intended for undergraduate majors.

MUSAP 432 Private Instruction: Horn (2-3, max. 27) VLPA *Kappy* Intended for undergraduate majors.

MUSAP 433 Private Instruction: Trumpet (2-3, max. 27) VLPA Intended for undergraduate majors.

MUSAP 434 Private Instruction: Trombone (2-3, max. 27) VLPA *Immel* Intended for undergraduate majors.

MUSAP 435 Private Instruction: Tuba (2-3, max. 27) VLPA *Phillips* Intended for undergraduate majors.

MUSAP 436 Private Instruction: Harp (2-3, max. 27) VLPA *Vokolek* Intended for undergraduate majors.

MUSAP 437 Private Instruction: Percussion (2-3, max. 27) VLPA *Collier, Crusoe* Intended for undergraduate majors.

MUSAP 438 Private Instruction: Guitar (2-3, max. 27) VLPA *Novacek* Intended for undergraduate majors.

MUSAP 439 Private Instruction: Viola da Gamba (2-3, max. 27) VLPA *Tindemans* Intended for undergraduate majors.

MUSAP 440 Timpani (2-3, max. 27) VLPA *Crusoe* Intended for undergraduate majors.

MUSAP 441 Mallet Percussion (2-3, max. 27) VLPA *Collier* Intended for undergraduate majors.

MUSAP 442 Jazz and Non-Western Drumming Techniques (2/3, max. 18) VLPA *Collier* Focused study of American jazz drumming and/or hand drumming techniques of various world music cultures to broaden the skills of percussion students, preparing them for new demands of contemporary musical styles. Designed primarily for music undergraduates enrolled in the percussion program.

Courses for Graduates Only

MUSAP 500 Private instruction: Voice (2-3, max. 45) *Harper, Patrick* Intended for graduate non-majors.

MUSAP 501 Private Instruction: Piano (2-3, max. 45) *McCabe, Michaelian, Seales, Sheppard* Intended for graduate non-majors.

MUSAP 502 Private Instruction: Organ (2-3, max. 45) *Terry* Intended for graduate non-majors.

MUSAP 503 Private Instruction: Harpsichord (2-3, max. 45) *Terry* Intended for graduate non-majors.

MUSAP 504 Private Instruction: Violin-Viola (2-3, max. 45) Intended for graduate non-majors.

MUSAP 505 Private Instruction: Violoncello (2-3, max. 45) *Saks* Intended for graduate non-majors.

MUSAP 506 Private Instruction: Double Bass (2-3, max. 45) *Lieberman* Intended for graduate non-majors.

MUSAP 507 Private Instruction: Flute (2-3, max. 45) *Skowronek* Intended for graduate non-majors.

MUSAP 508 Private Instruction: Oboe (2-3, max. 45) Intended for graduate non-majors.

MUSAP 509 Private Instruction: Clarinet (2-3, max. 45) *McColl* Intended for graduate non-majors.

MUSAP 510 Private Instruction: Bassoon (2-3, max. 45) *Grossman* Intended for graduate non-majors.

MUSAP 511 Private Instruction: Saxophone (2-3, max. 45) *Brockman* Intended for graduate non-majors.

MUSAP 512 Private Instruction: Horn (2-3, max. 45) *Kappy* Intended for graduate non-majors.

MUSAP 513 Private Instruction: Trumpet (2-3, max. 45) Intended for graduate non-majors.

MUSAP 514 Private Instruction: Trombone (2-3, max. 45) *Immel* Intended for graduate non-majors.

MUSAP 515 Private Instruction: Tuba (2-3, max. 45) *Phillips* Intended for graduate non-majors.

MUSAP 516 Private Instruction: Harp (2-3, max. 45) *Vokolek* Intended for graduate non-majors.

MUSAP 517 Private Instruction: Percussion (2-3, max. 45) *Collier, Crusoe* Intended for graduate non-majors.

MUSAP 518 Private Instruction: Guitar (2-3, max. 45) *Novacek* Intended for graduate non-majors.

MUSAP 519 Private Instruction: Viola da Gamba (2-3, max. 45) *Tindemans*

MUSAP 520 Private Instruction: Voice (3, max. 18) *Harper, Patrick* Intended for graduate majors.

MUSAP 521 Private Instruction: Piano (3, max. 18) *McCabe, Michaelian, Sheppard* Intended for graduate majors.

MUSAP 522 Private Instruction: Organ (3, max. 18) *Terry* Intended for graduate majors.

MUSAP 523 Private Instruction: Harpsichord (3, max. 18) *Terry* Intended for graduate majors.

MUSAP 524 Private Instruction: Violin-Viola (3, max. 18) *Callus, Patterson* Intended for graduate majors.

MUSAP 525 Private Instruction: Violoncello (3, max. 18) *Saks* Intended for graduate majors.

MUSAP 526 Private Instruction: Double Bass (3, max. 18) *Lieberman* Intended for graduate majors.

MUSAP 527 Private Instruction: Flute (3, max. 18) *Skowronek* Intended for graduate majors.

MUSAP 528 Private Instruction: Oboe (3, max. 18) Intended for graduate majors.

MUSAP 529 Private Instruction: Clarinet (3, max. 18) *McCull* Intended for graduate majors.

MUSAP 530 Private Instruction: Bassoon (3, max. 18) *Grossman* Intended for graduate majors.

MUSAP 531 Private Instruction: Saxophone (3, max. 18) *Brockman* Intended for graduate majors.

MUSAP 532 Private Instruction: Horn (3, max. 18) *Kappy* Intended for graduate majors.

MUSAP 533 Private Instruction: Trumpet (3, max. 18) Intended for graduate majors.

MUSAP 534 Private Instruction: Trombone (3, max. 18) *Immel* Intended for graduate majors.

MUSAP 535 Private Instruction: Tuba (3, max. 18) *Phillips* Intended for graduate majors.

MUSAP 536 Private Instruction: Harp (3, max. 18) *Vokolek* Intended for graduate majors.

MUSAP 537 Private Instruction: Percussion (3, max. 18) *Collier, Crusoe* Intended for graduate majors.

MUSAP 540 Timpani (3, max. 18) *Crusoe* Intended for graduate majors.

MUSAP 541 Mallet Percussion (3, max. 18) *Collier* Intended for graduate majors.

MUSAP 542 Private Instruction: Viola da Gamba (3, max. 18) *Tindemans* Intended for graduate majors.

MUSAP 570 Private Instruction: Voice (3, max. 27) *Harper, Patrick* Intended for graduate majors.

MUSAP 571 Private Instruction: Piano (3, max. 27) *McCabe, Michaelian, Sheppard* Intended for graduate majors.

MUSAP 572 Private Instruction: Organ (3, max. 27) *Terry* Intended for graduate majors.

MUSAP 573 Private Instruction: Harpsichord (3, max. 27) *Terry* Intended for graduate majors.

MUSAP 574 Private Instruction: Violin-Viola (3, max. 27) *Callus, Patterson* Intended for graduate majors.

MUSAP 575 Private Instruction: Violoncello (3, max. 27) *Saks* Intended for graduate majors.

MUSAP 576 Private Instruction: Double Bass (3, max. 27) *Lieberman* Intended for graduate majors.

MUSAP 577 Private Instruction: Flute (3, max. 27) *Skowronek* Intended for graduate majors.

MUSAP 578 Private Instruction: Oboe (3, max. 27) Intended for graduate majors.

MUSAP 579 Private Instruction: Clarinet (3, max. 27) *McCull* Intended for graduate majors.

MUSAP 580 Private Instruction: Bassoon (3, max. 27) *Grossman* Intended for graduate majors.

MUSAP 581 Private Instruction: Saxophone (3, max. 27) *Brockman* Intended for graduate majors.

MUSAP 582 Private Instruction: Horn (3, max. 27) *Kappy* Intended for graduate majors.

MUSAP 583 Private Instruction: Trumpet (3, max. 27) Intended for graduate majors.

MUSAP 584 Private Instruction: Trombone (3, max. 27) *Immel* Intended for graduate majors.

MUSAP 585 Private Instruction: Tuba (3, max. 27) *Phillips* Intended for graduate majors.

MUSAP 586 Private Instruction: Harp (3, max. 27) *Vokolek* Intended for graduate majors.

MUSAP 587 Private Instruction: Percussion (3, max. 27) *Collier, Crusoe* Intended for graduate majors.

MUSAP 589 World Music Laboratory (2-3, max. 18) World music traditions taught by visiting artists with emphasis on cultural pedagogy and traditional theory. The particular culture studied changes from year to year. Required of all graduate students in ethnomusicology. Credit/no credit only.

MUSAP 590 Timpani (3, max. 27) *Crusoe* Intended for graduate majors.

MUSAP 591 Mallet Percussion (3, max. 27) *Collier* Intended for graduate majors.

MUSAP 592 Private Instruction: Viola da Gamba (3, max. 27) *Tindemans* Intended for graduate majors.

Music Education

MUSED 403 Part-Time Student Teaching in Music (6) VLPA *Campbell, Demorest, Morrison* Supervised teaching internship. Directed observations of distinguished teachers in an elementary or secondary music setting. Weekly seminars. Credit/no credit only. Offered: AWP.

MUSED 404 Full-Time Student Teaching in Music (15) VLPA *Campbell, Demorest, Morrison* Supervised teaching internship. Directed observations of distinguished teachers in an elementary or secondary music setting. Weekly seminars. Credit/no credit only. Prerequisite: MUSED 403. Offered: AWP.

MUSED 405 Marching Band Technique (2) VLPA *McDavid, Morrison, Salzman* Basics of marching and maneuvering discussed and used to write drill. Covers selection of music, use of marching procession, and show design. Students complete a drill for their own band or for an instrumentation determined by the instructor.

MUSED 410 Instrumental Rehearsal Techniques (3) VLPA *Salzman* Includes score preparation, rehearsal formats, and error detection.

MUSED 432 Comprehensive Music in the Secondary School (3) VLPA *Demorest* The teaching of music and its literature in music classes other than traditional ensembles from grade six through adults. Prerequisite: MUSED 340.

MUSED 440 Music for Children (3) VLPA *Campbell* Identification and selection of appropriate objectives, materials, teaching strategies and evaluation techniques used in teaching music from birth through grade five, with consideration of various approaches (e.g., Delcroze, Kodaly, Orff) for the musical development of children. Prerequisite: MUSED 302; MUSED 340

MUSED 442 Instrumental Curriculum: Methods and Materials (3) VLPA *Morrison* 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. Prerequisite: MUSED 340.

MUSED 443 Choral Curriculum: Methods and Materials (3) VLPA *Demorest* Study of the organiza-

tion and administration of school choral music; the selection and use of materials and teaching strategies from beginning to advanced levels of choral instruction. Prerequisite: MUSED 340.

MUSED 452 Ethnomusicology in the Schools (3) VLPA *Campbell* Issues, teaching materials, and techniques involved in incorporating music cultures of United States and related world music repertoires in K-12 classroom instruction. Prerequisite: MUSED 340.

MUSED 465 Classroom Management and Evaluation in Music Education (3) VLPA *Morrison* Provides future teachers with strategies and techniques for classroom management, motivation, assessment, and evaluation for applications to K-12 school music programs. Prerequisite: MUSED 340.

MUSED 475 Teaching the Music of Selected Cultures (1, max. 6) VLPA *Campbell* Music and culture of a specific world region with particular attention to songs, stories, and instrumental pieces applicable to the teaching of music and the arts in elementary and secondary schools.

MUSED 480 Music Methods for Classroom Teachers (3) VLPA *Campbell* Addresses the basic fundamentals of music and methods for teaching K-6 school children. Topics include repertoire appropriate for different age levels, methods and materials for integrating music into the K-6 curriculum.

MUSED 496 Special Topics in Music Education (1-3, max. 10) VLPA Special studies designed to reflect contemporary emphases and concerns in the music education profession.

Courses for Graduates Only

MUSED 501 Introduction to Research in Music Education (3) Campbell, Demorest, Morrison Seminar in research design and method with emphasis on identification of problems in music instruction, interpretation of data, and application of findings to classroom settings.

MUSED 502 Quantitative Research in Music Education (3) Campbell, Demorest, Morrison Seminar in quantitative research utilizing experimental, quasi-experimental, and descriptive design, with emphasis on the pursuit of solutions to pedagogical problems through appropriate research procedures, analysis, and interpretation of findings. Prerequisite: MUSED 501.

MUSED 503 Qualitative Research in Music Education (3) Campbell, Demorest, Morrison Examination of qualitative modes of inquiry (including ethnographic, case study, phenomenological, and historical) to music instruction in classroom, studio, and community settings. Prerequisite: MUSED 502.

MUSED 522 Psychology of Music Learning and Teaching (3) Campbell, Demorest, Morrison Examines previous research in areas related to music cognition, including music perception, music performance, musical creativity, musical affect, musical preference, and social psychology. Explores how this research relates to curriculum and practice in music education. Role of theory, method, and procedure for psychological research in music education.

MUSED 524 Seminar in Music Education (3) Campbell, Demorest, Morrison Special problems in the teaching and supervision of music in the elementary grades. Prerequisite: one year of teaching experience.

MUSED 525 Seminar in Music Education (3) Campbell, Demorest, Morrison Special problems in the teaching and administration of music in the secondary school and community college. Prerequisite: one year of teaching experience.

MUSED 535 Seminar in Musical Development (3) *Campbell, Demorest, Morrison* Critical review of theories, methods of inquiry, designs, and conclusions of research in musical development from early childhood through adolescence. Emphasis on evaluating theories and methods of studying musical development and exploring their relationship to theories of general intellectual development; adult music cognition research; and curriculum and practice in music education.

MUSED 542 Comparative Music Education (3) *Campbell, Demorest, Morrison* A transcultural examination of philosophy and practice of music instruction.

MUSED 550 Proseminar in Music Education (3) *Campbell, Demorest, Morrison* Examination of the major literature in the philosophy, history, psychology, and sociology of formal school music instruction.

MUSED 552 World Music Education (3) *Campbell* Seminar on issues of multiculturalism and the world music "movement" as they affect school music curriculum and instruction. Curricular content and cultural context examined in relation to teaching K-12 students, teachers, and undergraduate students in music education programs. Offered: AWPSP.

MUSED 560 Contemporary Issues in Music Education (1-3, max. 6) *Campbell, Demorest, Morrison* Seminar focusing on review of literature on psychological and sociological aspects of music education, including historical and philosophical foundations of music education in the United States. Appropriate for MA students seeking guidance in preparation of topic for examinations. Prerequisite: MUSED 501.

MUSED 575 Seminar in Music Education Research (1-3, max. 6) *Campbell, Demorest, Morrison* Examines research and research-based issues relevant to music instruction and learning. Doctoral students should register each quarter until successful completion of general examination. Offered: A.

Music Ensemble

MUSEN 446 Advanced Studio Jazz Ensemble (1, max. 9) VLPA Preparation and performance of material appropriate to large jazz ensemble concerts, clinics, and radio and television broadcasts. Recommended: three quarters of MUSEN 346.

Courses for Graduates Only

MUSEN 500 University Symphony Orchestra (1, max. 9)

MUSEN 501 Wind Ensemble (1, max. 9) *Salzman*

MUSEN 502 Symphonic Band (1, max. 6) *Salzman*

MUSEN 503 Marching Band (2, max. 6) *McDavid*

MUSEN 504 Percussion Ensemble (1, max. 9) *Collier*

MUSEN 505 Brass Ensemble (1, max. 9) *Kappy*

MUSEN 506 Woodwind Ensemble (1, max. 9) *Skowronek*

MUSEN 507 University Oratorio Chorus (1, max. 9) *Kaplan* Credit/no credit only.

MUSEN 525 Accompanying (2, max. 18)

MUSEN 540 Vocal Jazz Ensemble (1, max. 9) Credit/no credit only.

MUSEN 545 Jazz Workshop (1, max. 9) *Collier, Seales*

MUSEN 546 Studio Jazz Ensemble (1, max. 9)

MUSEN 547 Opera Chorus (1, max. 9) *Kaplan*

MUSEN 550 University Chorale (1, max. 9) Credit/no credit only.

MUSEN 551 Chamber Singers (1, max. 9) *Boers*

MUSEN 561 Piano Ensemble (1, max. 9) Study and performance of works for four hands at one or two pianos. Designed for upper-level piano majors or students with equivalent ability.

MUSEN 568 Harp Ensemble (1, max. 9) *Vokolek*

MUSEN 569 Baroque Chamber Ensemble (1) *Terry, Tindemans*

MUSEN 575 Opera Workshop (1, max. 9) *Zahn* Preparation of music theatre repertoire. Intended for the mature voice student.

MUSEN 581 Chamber Music (1, max. 9)

MUSEN 582 Opera Theatre (2, max. 18) Public performance of roles in opera.

MUSEN 583 Collegium Musicum (1, max. 9) *Tindemans*

MUSEN 584 Contemporary Group (1, max. 9) *Durand* Exploration of notation and performance problems in today's music; preparation for public performance. Credit/no credit only.

Music History

MUHST 400 Medieval Music: To 1400 (3) VLPA *Taricani* Critical readings on issues in medieval music. Works to be studied include repertory from chant, motets, and sacred and secular music of the Middle Ages. Prerequisite: one 300-level MUHST course.

MUHST 401 Early British Music: 1300-1700 (3) VLPA *Taricani* Examines the history of British music from its earliest polyphony through the music of Purcell. Stylistic features of English music studied, including medieval polyphony, Tudor music, Elizabethan music, and seventeenth-century music through Purcell. Prerequisite: one 300-level MUHST course.

MUHST 404 Baroque Keyboard Music (3) VLPA Forms and styles: Frescobaldi through J.S. Bach and C.P.E. Bach. Prerequisite: one 300-level MUHST course.

MUHST 405 Orchestral Music: 1620-1760 (3) VLPA Corelli through the Mannheim School. Prerequisite: one 300-level MUHST course.

MUHST 406 Baroque Choral Music (3) VLPA *Bozarth* Monteverdi through Handel. Prerequisite: one 300-level MUHST course.

MUHST 407 Baroque Opera (3) VLPA Monteverdi through Handel. Prerequisite: one 300-level MUHST course.

MUHST 408 Keyboard Music: 1760-1830 (3) VLPA *Bozarth* Haydn through Schubert. Prerequisite: one 300-level MUHST course.

MUHST 409 Chamber Music: 1760-1830 (3) VLPA Haydn through Schubert. Prerequisite: one 300-level MUHST course.

MUHST 410 Orchestral Music: 1760-1830 (3) VLPA Haydn through early Berlioz. Prerequisite: one 300-level MUHST course.

MUHST 411 Art Song, 1760-1830 (3) VLPA The art song in European culture during the Classical and early Romantic periods. Prerequisite: one 300-level MUHST course.

MUHST 412 Choral Music: 1750-1830 (3) VLPA Large works for chorus and orchestra, Haydn through Beethoven. Prerequisite: one 300-level MUHST course.

MUHST 413 Opera: 1750-1830 (3) VLPA Gluck through Bellini. Prerequisite: one 300-level MUHST course.

MUHST 414 Keyboard Music: 1830-1915 (3) VLPA *Bozarth* Schumann through Debussy. Prerequisite: one 300-level MUHST course.

MUHST 415 Chamber Music: 1830-1915 (3) VLPA Schumann through Ravel. Prerequisite: one 300-level MUHST course.

MUHST 416 Orchestral Music: 1830-1915 (3) VLPA Schumann and Mendelssohn through early Schoenberg and Stravinsky. Prerequisite: one 300-level MUHST course.

MUHST 417 Art Song: 1830-1915 (3) VLPA *Bozarth* The Lieder of Schumann, Brahms, Wolf, Strauss, Mahler, and Schoenberg. Prerequisite: one 300-level MUHST course.

MUHST 418 Choral Music: 1830-1915 (3) VLPA *Bozarth* Selected choral masterpieces. Mendelssohn through Schoenberg. Prerequisite: one 300-level MUHST course.

MUHST 419 Opera: 1830-1915 (3) VLPA German, French, and Italian operatic traditions. Prerequisite: one 300-level MUHST course.

MUHST 421 Music Criticism (3) VLPA *Starr* Study of the various forms of music criticism, with an emphasis on the writing of valid examples and evaluation of one's own work along with that of others—classmates, journalists, and academic critics. Prerequisite: one 300-level MUHST course.

MUHST 423 Twentieth-Century Music to 1945 (3) VLPA *Starr* Intensive study of selected composers and works exemplifying the new vocabularies, grammars, and styles of the early part of the twentieth century. Prerequisite: one 300-level MUHST course.

MUHST 424 Music Since 1945 (3) VLPA *Starr* Diversity of the contemporary musical scene. Vocabularies appropriate for the description and understanding of the new music, developed through study of representative composers and works, and appropriate readings. Prerequisite: one 300-level MUHST course.

MUHST 425 Jazz History and Analysis (3) VLPA *Collier* Major eras and styles of jazz with emphasis on technical aspects of jazz music: composition, arranging, improvisation practices. Prerequisite: one 300-level MUHST course.

MUHST 426 American Popular Music (3) VLPA *Starr* An in-depth consideration of American popular music styles and repertory from about 1920 to the present day. Analysis of representative pieces; consideration of critical and aesthetic issues relating to popular music; relationship of popular music to "art" music and to American culture and society. Prerequisite: one 300-level MUHST course.

MUHST 429 Music, Literature, and the Arts (3) VLPA Literary and visual art works that include musical subject matter and forms; musical genres that incorporate other arts such as opera and ballet. Related philosophical writings. Includes works of a particular time period or investigation of a specific problem in comparative arts. Prerequisite: one 300-level MUHST course.

MUHST 497 Special Topics in Music History (1-3, max. 6) VLPA Topics vary each quarter. Prerequisite: one 300-level MUHST course.

Courses for Graduates Only

MUHST 500 Seminar in Methods of Music Research (3) *Taricani* Explores various critical approaches to research in music at the graduate level, examining specialized bibliographical resources, controversial arguments about musical issues, and other matters of musical criticism required to begin advanced study of music. Prerequisite for all graduate music history courses except MUHST 515.

MUHST 503 Readings in Medieval and Renaissance Music (5) *Taricani* Musical styles, genres, and forms of the Middle Ages and Renaissance. Focuses upon musicological problems and controversy related to music composed between ca. 1000 and 1600. Prerequisite: permission of instructor.

MUHST 504 Seminar in Medieval Music (3, max. 6) *Taricani* Prerequisite: MUHST 500.

MUHST 505 Seminar in Renaissance Music (3, max. 6) *Taricani* Prerequisite: MUHST 500.

MUHST 508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6) *Bozarth* Prerequisite: MUHST 500.

MUHST 509 Seminar in Nineteenth-Century Music: 1830-1890 (3, max. 6) *Bozarth* Prerequisite: MUHST 500.

MUHST 510 Seminar in Music Since 1890 (3, max. 6) *Starr* Prerequisite: MUHST 500.

MUHST 515 Seminar in Medieval and Renaissance Notation (5) *Taricani* Gregorian chant through sixteenth-century prints.

MUHST 519 Seminar in Modern Editorial Procedures (5) *Bozarth* Study of modern procedures for preparing critical editions. Related areas of study may include analysis of musical style and historical and performance problems inherent in works being edited.

MUHST 520 Seminar in American Music (3, max. 6) *Starr* Research in the life, works, and times of composers in the United States from colonial days to the present. Prerequisite: MUHST 500.

MUHST 537 Seminar on Opera (3, max. 6) Prerequisite: MUHST 500.

Near Eastern Languages and Civilization

229B Denny



General Catalog Web page:
www.washington.edu/students/genocat/academic/near_eastern.html



Department Web page:
depts.washington.edu/nelc/

The Department of Near Eastern Languages and Civilization focuses on the languages and civilizations of the Near with an emphasis on the ancient and medieval roots of these civilizations as well as more-recent cultural developments. Each of the languages offered by the department represents a major literary tradition. Arabic, Persian, Turkish, and Central Asian Turkic are the languages of the most significant literary manifestations of Islamic civilization. Hebrew and Aramaic are the languages of the Bible and are central to Judaism and Jewish culture. Egyptian languages (Coptic, Hieroglyphic) and other Mesopotamian and Mediterranean languages

(Akkadian, Ugaritic, Phoenician) are important to the ancient and Christian cultures of the Near East. These languages are taught in conjunction with courses on the social, cultural, and religious history of the Near East, providing students with a broad understanding and solid foundation for more advanced studies or professional career development.

Graduate Program

Graduate Program Coordinator
M29A Denny, Box 353120
206-685-3800
neareast@u.washington.edu

Master of Arts

The Department of Near Eastern Languages and Civilization offers a graduate program of studies leading to the Master of Arts degree. The program is designed to provide students with advanced training in at least one Near Eastern language and in a specific field of specialization. Students may concentrate in Arabic, Hebrew, Persian, Turkish, or Central Asian Turkic and may choose as their field of specialization a civilization or literature related to their language of concentration. The program is intended not only for those students who wish to continue their studies at the doctoral level but also for students who wish to pursue careers in government or business.

Admission Requirements: Statement of purpose; a sample of written work; three letters of recommendation, of which at least two must attest to scholarly ability; GRE scores. Although knowledge of a Near Eastern language is not a prerequisite for admission, applicants are generally expected to have had the equivalent of two years' study of the language in which they plan to concentrate.

Graduation Requirements: Departmental requirements, in addition to those required by the Graduate School for the Master of Arts degree, include a reading knowledge of French or German, or, with the prior approval of the student's M.A. committee, any other language pertinent to the research in the student's field of study; a seminar paper representing the student's best work; a written examination consisting of four parts: (1) on the general culture of the Near East, (2) on the student's field of specialization, (3) on the student's language of concentration, (4) on a second Near Eastern language related to the language concentration. Fulfillment of these requirements normally entails the completion of at least two years of study.

Doctor of Philosophy

Some of the department faculty are part of an interdisciplinary faculty group which offers doctoral study in Near and Middle Eastern Studies. The program is located administratively within the Graduate School. For a description of the program, see the Interdisciplinary Graduate Degree Programs section of this catalog.

Summer Programs

The department offers Summer Intensive Language programs in Arabic, Hebrew, and Central Asian languages (Uzbek, Kazakh, Tajik, and others).

Research Facilities

The University of Washington Libraries holds an extensive collection of books and materials in the languages of the Near East, the Turkic regions of Central Asia, and in European languages on Near Eastern and Central Asian Turkic subjects. Candidates for the master's degree as well as doctoral students will find in the collection adequate resources for their research. The library participated in the Library of Congress Middle East Cooperative

program for the acquisition of Arabic serials, and the Library of Congress Cooperative program for Pakistan for the purchase of Persian books and serials. The library staff includes Near East and Central Asia specialists responsible for acquiring and cataloging the collection. The library maintains book exchanges with the Central Asian republics, some of these beginning as early as 1961. They are handled through the Near East and Slavic Sections of the University's Suzzallo Library. Among its staff are an exchange librarian and a specialist trained in Central Asian Turkic languages. A book exchange with Xinjiang is administered through the East Asia Library.

Financial Aid

A limited number of teaching assistantships are available for graduate students in the department who are fluent in speaking and writing a Near Eastern language. A limited number of graduate fellowships are also available.

Exchange Agreements

The University of Washington and the Department of Near Eastern Languages and Civilization maintain exchange agreements for graduate students and faculty with the following universities and institutions: American University in Cairo, Egypt; Hebrew University of Jerusalem-Israel; Tashkent University-Uzbekistan. In addition the department has direct exchange agreements with Xinjiang University, Urumchi, People's Republic of China, and several universities in Kyrgyzstan and Kazakhstan. It also maintains exchanges and cooperation with the Oriental Institute at the Tajik Academy of Sciences, Dushanbe; and participates in an agreement of scholarly exchanges and cooperation with the Uzbek Writers' Union, the Uzbek Academy of Sciences, and the Kazakh Academy of Sciences.

Faculty

Chair

Michael A. Williams

Professors

Andrews, Walter G. 2001, (Research); PhD, 1970, University of Michigan.

Bacharach, Jere L. * 1967, (Adjunct); MA, 1962, Harvard University, PhD, 1967, University of Michigan; history of the Near East.

Cirtautas, Ilse D. * 1968; PhD, 1958, University of Hamburg (Germany); Turkic languages and literatures.

Heer, Nicholas L. * 1965, (Emeritus); PhD, 1955, Princeton University; Arabic language and literature, Islamic theology and philosophy.

Jaffee, Martin S. * 1987, (Adjunct); PhD, 1980, Brown University; Rabbinic religion and literature in late antiquity.

Karimi-Hakkak, Ahmad * 1985; PhD, 1979, Rutgers University; Persian language and literature, Iranian culture and civilization.

Mackay, Pierre A. * 1966, (Emeritus); PhD, 1964, University of California (Berkeley); Greek literature, post classical and Byzantine Greek literature, numismatics.

Sokoloff, Naomi B. * 1985; PhD, 1980, Princeton University; Hebrew language and literature.

Williams, Michael A. * 1976; PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Ziadeh, Farhat J. * 1966, (Emeritus); LLB, 1940, University of London (UK); Arabic language and literature, Islamic law, Islamic institutions.

Associate Professors

Deyoung, Terri L. * 1991; PhD, 1988, University of California (Berkeley); Arabic language and literature.

Noegel, Scott B. * 1995; PhD, 1994, Cornell University; Ancient Near Eastern languages, literatures, cultures and history.

Wheeler, Brannon M. * 1996; PhD, 1993, University of Chicago; Islamic studies, comparative religion, late antique, Jewish studies and legal studies.

Assistant Professors

Kuru, Selim Sirri 1999; PhD, 2000, Harvard University; Ottoman, Turkish, language, literature.

Walker, Joel T. 1997, (Adjunct); PhD, 1998, Princeton University; late antiquity, Byzantine, early Middle Ages.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Near Eastern Languages and Civilization

NEAR E 402 Classical Arabic Literature in Translation (3) VLPA *DeYoung* Examines development of Arabic literature from its beginnings through the fall of the Abbasid dynasty to the Mongols. Coincides with period when Arabic language and literature were dominant forces in Islamic civilization. Topics include: impact of Islam on the literature, courtly love, mystical poetry, the Thousand-and-One Nights, and Hispano-Arabic literature.

NEAR E 403 Colonialism, Nationalism, and the Modern Arabic Novel (3) I&S/VLPA *DeYoung* Examines how representative novels from the modern canon in Arabic have both endorsed and critiqued aspects of nationalism and colonialist ideology. Recommended: NEAR E 210.

NEAR E 421 Islamic Mystical Literature in English (3) VLPA Readings from the works of principal Sufi writers and poets.

NEAR E 423 Persian Literature in Translation (3) VLPA *Karimi-Hakkak* Designed to familiarize students with an expanding collection of works translated from Persian literature, both classical and modern, into English. Focuses on a few representative texts and offers interpretations of the culture through close readings. Prior acquaintance with Iranian culture not required.

NEAR E 425 Current Trends in Modern Near Eastern Literature and Criticism (3) VLPA Modern literary tradition of the Near East with emphasis on major literary movements and/or genres and literary criticism in the modern period. The literatures of the Arab world, Persia, Turkey, and Israel are considered in alternate quarters.

NEAR E 430 Scripture in Islam (5) I&S/VLPA *B. Wheeler* Examines concept and use of scripture in Islam, with special attention to issues of canon and commentary, heavenly books, talismanic uses, and the place of scripture in ritual. In English. Offered: jointly with RELIG 430.

NEAR E 432 Ritual and Law in Islam (5) I&S/VLPA *B. Wheeler* Comparative study of Islamic ritual practices and related development of jurisprudence and law. Focus on sacrifice, political and social legal theory, pilgrimage, regulation of the body, and the diversity of contemporary practices. In English. Offered: jointly with RELIG 432; W.

NEAR E 433 Life of Prophet Muhammad (5) I&S/VLPA *B. Wheeler* Examines historical and religious traditions associated with the life of the Prophet Muhammad with particular attention to the biography in classical Islam. Focuses on Muhammad as prophet, holy man, law-giver, mystic, and statesman. Comparison with other religious figures such as Jesus and the Buddha. In English. Offered: jointly with RELIG 433.

NEAR E 434 Human Rights and Islam (3) I&S *Souaiaia* Focuses primarily on the historical and philosophical background behind the development of the principles and norms of "human rights" in Western thought and in the Islamic legal and religious traditions, from the seventh century to modern day. Analyzes the role of religious as well as political, social, and economic institutions in formulating the notions of human rights. Offered: jointly with RELIG 434/SISME 434.

NEAR E 435 Major Trends in Modern Arabic Fiction (3) VLPA *DeYoung* Development of Arabic prose fiction from the end of the nineteenth century to the present.

NEAR E 443 The Word and the Empire: Reading Ottoman Literature (3-5) I&S/VLPA *Kuru* Approaches Ottoman literature through translations and scholarly articles in English. Evaluates this particular literary tradition as an imperial production, through an analysis and critical reading of course materials.

NEAR E 451 Pharaonic Egypt in the Context of the Ancient Near East (3) I&S/VLPA *Noegel* Surveys the history, literature, and archaeology of ancient Egypt from the first pharaohs to the conquest of Alexander the Great. Introduces the field of Egyptology, and focuses on the continuity of Egyptian history and culture in context. Slide presentations supplement the readings and in-class lectures.

NEAR E 452 The Biblical Song of Songs (3) VLPA *Noegel* Examines the erotic and beautiful Song of Songs within the context of ancient (and medieval) Near Eastern love poetry and correlates close readings of the book with various interpretations it has received from antiquity until today. No knowledge of Hebrew or the Bible is required. Offered: jointly with SISJE 452.

NEAR E 453 The Biblical Prophets (3) I&S/VLPA *Noegel* Explores the biblical prophets (in translation) within their Near Eastern contexts. Studies them for their historicity, literary and rhetorical sophistication, and ideological agendas. This course seeks to uncover the meaning and distinctiveness of Israelite prophecy within the context of the larger Near East. No knowledge of the Bible is required. Offered: jointly with SISJE 453.

NEAR E 454 Israel: The First Six Centuries BCE (3) I&S/VLPA *Noegel* Traces the Israelites, from the Babylonian destruction of the Jerusalem Temple (586 BCE) to events following the destruction of the second Temple (1st century CE). Focuses on primary historical and literary sources as well as archaeological and artistic evidence. No knowledge of Hebrew or the Bible is required. Offered: jointly with SISJE 454.

NEAR E 455 The Kings of Monarchic Israel (3) I&S/VLPA *Noegel* Examines the biblical accounts (in translation) concerning the formation and collapse of the united Israelite monarchy. Investigates the

archaeological and textual evidence for their historicity, the literary sophistication of these accounts, and Israelite kingship within the wider context of the ancient Near East. No knowledge of the Bible is required. Offered: jointly with SISJE 455.

NEAR E 456 Women in Ancient Judaism (3) I&S/VLPA *Noegel* Explores those texts in early Jewish literature in which women play prominent roles and those in which women are surprisingly absent. Discusses the literary portrayal of women for what they tell us about the people who wrote the texts. No knowledge of Hebrew is required. Offered: jointly with RELIG 456.

NEAR E 457 The History of Biblical Interpretation (3) I&S/VLPA *Noegel* Traces biblical interpretation and translation technique from the earliest translations of the Hebrew Bible (Old Testament) to the various historical literary, deconstructionist, and holistic strategies of more recent times. Adopts a "hands-on" approach to the material and explores various hermeneutics by applying them in class. Offered: jointly with RELIG 457.

NEAR E 490 Supervised Study (1-6, max. 18) Special work in Near Eastern studies for graduates and undergraduates.

NEAR E 495 Trends in the Contemporary Middle East (3) I&S *Bacharach, De Young, D. Wheeler* Perspectives on cultural, political, and other aspects of Middle Eastern societies. Focuses on background complexities rather than immediate political-military confrontations. Topics vary. Offered: jointly with SISME 495.

NEAR E 496 Special Studies in Near Eastern Languages and Civilization (3-5, max. 15) VLPA Offered occasionally by visitors or resident faculty. Content varies.

NEAR E 499 Undergraduate Research (1-6, max. 18)

Courses for Graduates Only

NEAR E 518 Foreign Language Teaching Methodology (2) Brandl Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/SCAND 518/SLAV 518.

NEAR E 524 Islamic Law (3) Selected topics in Islamic law that highlight major aspects of Islamic civilization. Offered: jointly with LAW B 556.

NEAR E 525 Islamic Institutions (3) Islamic institutions of the caliphate, the sultanate, the bureaucracy, taxation, mosques, and madrasahs, as well as theories of government.

NEAR E 596 Special Studies in Near Eastern Languages and Civilization (3-5, max. 15) Offered occasionally by visitors or resident faculty. Content varies.

NEAR E 600 Independent Study or Research (*)

Akkadian

AKKAD 401 Elementary Akkadian (3) Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

AKKAD 402 Elementary Akkadian (3) Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

AKKAD 403 Elementary Akkadian (3) Introduction to the Akkadian language (Assyrian and Babylonian).

Readings in original Akkadian cuneiform from historical, legal, and literary texts.

AKKAD 421 Intermediate Akkadian (3) VLPA Readings in Akkadian texts.

AKKAD 422 Intermediate Akkadian (3) VLPA Readings in Akkadian texts.

AKKAD 423 Intermediate Akkadian (3) VLPA Readings in Akkadian texts.

Arabic

ARAB 401 Intensive Elementary Arabic (15) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 411, 412, 413 taken.) Offered: S.

ARAB 411 Elementary Arabic (5) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.)

ARAB 412 Elementary Arabic (5) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.) Prerequisite: ARAB 411.

ARAB 413 Elementary Arabic (5) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.) Prerequisite: ARAB 412.

ARAB 414 Spoken Arabic (3) Study of grammar with emphasis on oral drill in modern spoken Arabic (Western or Eastern).

ARAB 415 Spoken Arabic (3) Study of grammar with emphasis on oral drill in modern spoken Arabic (Western or Eastern).

ARAB 416 Spoken Arabic (3) Study of grammar with emphasis on oral drill in modern spoken Arabic (Western or Eastern).

ARAB 421 Intermediate Arabic (5) VLPA Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: either ARAB 401 or ARAB 413.

ARAB 422 Intermediate Arabic (5) VLPA Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: ARAB 421.

ARAB 423 Intermediate Arabic (5) VLPA Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: ARAB 422.

ARAB 431 Advanced Arabic (3) VLPA Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 423.

ARAB 432 Advanced Arabic (3) VLPA Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 431.

ARAB 433 Advanced Arabic (3) VLPA Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 432.

ARAB 451 Adab Prose: Jahiz (3) VLPA Readings in early Arabic prose. Prerequisite: ARAB 432.

ARAB 452 Maqamat: Hamadhani, Hariri (3) VLPA *MacKay* Reading of several maqamat (essays in rhymed prose) of al-Hamadhani and al-Hariri. Examination of the maqamat genre as a whole. Prerequisite: ARAB 432.

ARAB 453 Historical Texts (3) I&S/VLPA *B. Wheeler* Readings in Arab historians with particular reference to scholars such as Tabari, Ibn al-Jawzi, and Ibn al-Athir. Prerequisite: ARAB 432.

ARAB 454 Quran and Its Interpretation (3) VLPA *B. Wheeler* Reading of selected passages from the Quran in relation to their interpretation in classical commentaries (tafsir) and in legal texts (ahkam al-Quran). Focus on the various types of classical scholarship applied to the text of the Quran (ulum al-Quran). Prerequisite: ARAB 432.

ARAB 455 Ritual and Legal Texts (3) VLPA *B. Wheeler* Selected readings from well-known Islamic legal texts (furu al-fiqh) with attention to the sources of the law and methods of exegesis (usul al-fiqh). Prerequisite: ARAB 432.

ARAB 456 Islamic Political Theorists (3) I&S/VLPA Readings from the main political theorists: al-Baghdadi, al-Mawardi, and Ibn Khaldun. Prerequisite: ARAB 432.

ARAB 457 Grammatical and Lexical Texts (3) VLPA *B. Wheeler* Introduction to concepts and terminology of Arabic grammar and lexicography through readings from scholars such as Sibawayh, Ibn Aqil, and Ibn Manzur. Prerequisite: ARAB 432.

ARAB 458 Modern Poetry (3) VLPA *DeYoung* Neoclassical poetry of the nineteenth and twentieth centuries, and the development of modern verse. Prerequisite: ARAB 432.

ARAB 459 Islamic Philosophical Literature (3) I&S/VLPA Reading of selected texts by representative Islamic philosophers. Prerequisite: ARAB 432.

ARAB 461 Modern Prose (3) VLPA *DeYoung* Modern essays, fiction, and ideological writings. Prerequisite: ARAB 432.

ARAB 462 Sirah and Maghazi Texts (3) I&S/VLPA *B. Wheeler* Reading and discussion of selected historical texts devoted to the life of the Prophet Muhammad, such as Ibn Ishaq, Ibn Hisham, al-Waqidi, Ibn Sa'd, and al-Bayhaqi. Some attention to related genres and contemporary scholarship. Prerequisite: ARAB 432.

ARAB 470 Stories of the Prophets (3) I&S/VLPA *B. Wheeler* Reading and discussion of Jewish and Islamic exegesis of selected Biblical and Quranic narratives dealing with such figures as Moses, Abraham, Jacob, or Adam and Eve. Prerequisite: either ARAB 432 or HEBR 423. Offered: jointly with HEBR 470.

ARAB 472 Quran and Bible Masorah (3) VLPA *B. Wheeler* Introduces and discusses selected readings in textual apparatuses for the Quran and Bible. Attention to marginalia in Rabbinic texts, and Islamic scholars such as al-Zarkashi and as-Suyuti. Prerequisite: either ARAB 432, HEBR 427, or HEBR 432. Offered: jointly with HEBR 472.

ARAB 481 South Arabian Epigraphic (3) VLPA Introduction to epigraphic languages used in Southern Arabia from first half of first millennium BCE to mid-fifth century CE. Overview of script, basic grammar, and vocabulary with readings from selected Minaic, Sabaic, Qatabanic, and Hadramitic inscriptions. No previous study of Arabic required.

ARAB 482 North Arabic Inscriptions (3) VLPA Introduction to Arabic Languages of pre-Islamic Northern Arabia from 6th century B.C.E. to 5th century C.E. Overview of scripts, grammar and vocabulary with readings from Thaudic, Taymanite, Dedanite, Lihyanite, Safaitic, and Hassean. No previous Arabic study required. Prerequisite: either ARAB 423, HEBR 423, or HEBR 426.

ARAB 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: ARAB 423.

ARAB 496 Special Studies in Arabic (3-5, max. 15) VLPA Topics vary. Offered occasionally by visiting or resident faculty.

ARAB 499 Undergraduate Research (1-6, max. 18)

Courses for Graduates Only

ARAB 596 Special Studies in Arabic (3-5, max. 15) Topics vary. Offered occasionally by visiting or resident faculty.

ARAB 600 Independent Study or Research (*)

Aramaic

ARAMIC 411 Syriac (3) VLPA *Walker, Wheeler* Beginning Syriac including basic grammar and vocabulary with selected readings from simple prose passages and poetry selected from early Christian and other late antique writings. No previous study of Aramaic required Offered: A.

ARAMIC 412 Syriac (3) VLPA *Walker, Wheeler* Beginning Syriac including basic grammar and vocabulary with selected readings from simple prose passages and poetry selected from early Christian and other late antique writings. No previous study of Aramaic required. Offered: W.

ARAMIC 421 Biblical Aramaic (5) VLPA *Noegel* Fundamentals of Aramaic grammar and the differences that distinguish Aramaic from Hebrew, includes select Aramaic portions of the Bible. Emphasis on grammar and comprehension. Designed for students with some knowledge of Hebrew. Prerequisite: HEBR 333 or HEBR 426.

ARAMIC 422 Targumic Aramaic (5) VLPA *Noegel* The Targum (ancient Aramaic translation) of the Hebrew Bible forms an important basis for biblical interpretation. Emphasis on comprehension and interpretive strategies. Recommended: knowledge of Hebrew and/or Aramaic. Prerequisite: HEBR 333 or HEBR 426.

ARAMIC 423 Readings in Syriac (3) VLPA *Walker, Wheeler* Readings from selected passages in Biblical and Christian literature with emphasis on writings of late antique and medieval Christian communities of Syria, Iraq, and Iran until the Mongol invasions. Prerequisite: ARAM 412. Offered: Sp.

ARAMIC 451 Aramaic Epigraphy (3, max. 6) VLPA *Noegel, Walker, B. Wheeler* Examination of selected Aramaic inscriptions with particular focus on different languages and periods including ancient and imperial Aramaic, and late antique Aramaic epigraphy, such as Nabataean, Palmyrene, and Hatran.

Egyptian

EGYPT 410 Hieroglyphic Egyptian (5) VLPA *Noegel* Provides an introduction to hieroglyphic Egyptian as written during the Middle Kingdom (c. 2040-1782 BCE). Focuses on reading and writing hieroglyphics, including reading a complete Egyptian text. No knowledge of Egyptian or any other Near Eastern language is required.

EGYPT 411 Introduction to Coptic (3) Williams Elements of grammar of the Sahidic dialect of the Coptic language.

EGYPT 422 Readings in Coptic (3) VLPA *Williams* Readings from ancient Coptic Christian literature, with emphasis on the *Nag Hammadi* texts. Prerequisite: COPTC 411 or EGYPT 411.

EGYPT 423 Readings in Coptic (3) VLPA *Williams* Readings from ancient Coptic Christian literature,

with emphasis on the *Nag Hammadi* texts. Prerequisite: COPTC 411 or EGYPT 411.

Hebrew

HEBR 401 Intensive Elementary Modern Hebrew (15) Intensive study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 411, 412, 413 taken.) Offered: S.

HEBR 411 Elementary Modern Hebrew (5) *Sokoloff* Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.)

HEBR 412 Elementary Modern Hebrew (5) *Sokoloff* Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.) Prerequisite: HEBR 411.

HEBR 413 Elementary Modern Hebrew (5) *Sokoloff* Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.) Prerequisite: HEBR 412.

HEBR 414 Elementary Biblical Hebrew (5) *Noegel* Offers an inductive introduction to the biblical Hebrew language. Covers the basics of Hebrew grammar while reading the stories of Joseph in the book of Genesis. No prior knowledge of Hebrew necessary.

HEBR 415 Elementary Biblical Hebrew (5) *Noegel* Continues the inductive introduction to the biblical Hebrew language begun in HEBR 414. Moves beyond the textbook and into select portions of the Hebrew Bible. Prerequisite: HEBR 331 or HEBR 414.

HEBR 421 Intermediate Modern Hebrew (5) VLPA *Sokoloff* Readings of selected texts in modern Hebrew with continuing emphasis on grammar, syntax, composition, and conversation. Prerequisite: either HEBR 401 or HEBR 413.

HEBR 422 Intermediate Modern Hebrew (5) VLPA *Sokoloff* Readings of selected texts in modern Hebrew with continuing emphasis on grammar, syntax, composition, and conversation. Prerequisite: HEBR 421.

HEBR 423 Intermediate Modern Hebrew (5) VLPA *Sokoloff* Readings of selected texts in modern Hebrew with continuing emphasis on grammar, syntax, composition, and conversation. Prerequisite: HEBR 422.

HEBR 426 Biblical Hebrew Prose (5) VLPA *Noegel* Explores select prose sections of the Hebrew Bible (Old Testament) in conjunction with English translations and commentaries. Emphasis on close readings, the grammatical insights of textual criticism, and the interpretive strategies and agendas of the English translations. Prerequisite: HEBR 332 or HEBR 415.

HEBR 427 Biblical Hebrew Poetry (5) VLPA *Noegel* Explores select poetic sections of the Hebrew Bible (Old Testament) in conjunction with English translations and commentaries. Emphasis on close readings, the grammatical insights of textual criticism, and the interpretive strategies and agendas of the English translations. Prerequisite: HEBR 333 or HEBR 426.

HEBR 428 Inscriptions from Biblical Times (5) VLPA *Noegel* Surveys Northwest Semitic inscriptions that bear significantly on our understanding of Biblical history and ancient Hebrew including the Moabite stone, Israelite ostraca, Siloam engraving, Gezer calendar, Deir Alla (Gilead) inscriptions, the

Asherah texts, Ammonite fragments, and Phoenician monuments. Prerequisite: HEBR 333 or HEBR 426.

HEBR 451 Introduction to Hebrew Literature (3) VLPA *Sokoloff* Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts—short poetry, fiction, and essays—with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

HEBR 452 Introduction to Hebrew Literature (3) VLPA *Sokoloff* Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts—short poetry, fiction, and essays—with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

HEBR 453 Introduction to Hebrew Literature (3) VLPA *Sokoloff* Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts—short poetry, fiction, and essays—with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

HEBR 454 Hebrew Poetry (3) VLPA *Sokoloff* Selections of poetry by prominent twentieth-century Hebrew poets whose texts comment or elaborate on biblical texts. Original source considered side-by-side with modern poetry, to examine ways recent literature models itself on, draws upon, and revises traditional sources. Prerequisite: HEBR 423.

HEBR 455 Hebrew Fiction (3) VLPA *Sokoloff* Selections of fiction by prominent modern Hebrew writers, including S.Y. Agnon, Aharon Appelfeld, David Shahar, Aharon Megged, and others. Prerequisite: HEBR 423.

HEBR 470 Stories of the Prophets (3) I&S/VLPA B. *Wheeler* Reading and discussion of Jewish and Islamic exegesis of selected Biblical and Quranic narratives dealing with such figures as Moses, Abraham, Jacob, or Adam and Eve. Prerequisite: either ARAB 432 or HEBR 423. Offered: jointly with ARAB 470.

HEBR 472 Quran and Bible Masorah (3) VLPA *Wheeler* Introduces and discusses selected readings in textual apparatuses for the Quran and Bible. Attention to marginalia in Rabbinic texts, and Islamic scholars such as al-Zarkashi and as-Suyuti. Prerequisite: either ARAB 437, HEBR 427, or HEBR 432. Offered: jointly with ARAB 472.

HEBR 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: HEBR 423.

HEBR 499 Undergraduate Research (1-6, max. 18)

Courses for Graduates Only

HEBR 600 Independent Study or Research (*)

Persian

PRSAN 401 Intensive Elementary Tajik (15) Intensive study of grammar with oral and written drill and reading of selected texts in Tajik, the literary language spoken and written in the Central Asian Republic of Tajikistan. Offered: S.

PRSAN 404 Intensive Persian for Native Speakers (15) VLPA *Karimi-Hakkak* Enables students with a degree of proficiency in spoken Persian to read and write, to translate rudimentary texts, and to conceptualize the use of the formal style of composition. Reading, writing, and comprehension, particularly of handwritten manuscripts of the scribal tradition. Also covers calligraphy, translation, journalistic prose, and other facets of the language and the script. Offered: S.

PRSAN 411 Elementary Persian (5) Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words.

PRSAN 412 Elementary Persian (5) Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words. Prerequisite: PRSAN 411.

PRSAN 413 Elementary Persian (5) Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words. Prerequisite: PRSAN 412.

PRSAN 421 Intermediate Persian (5) VLPA Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 413.

PRSAN 422 Intermediate Persian (5) VLPA Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 421.

PRSAN 423 Intermediate Persian (5) VLPA Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 422.

PRSAN 431 Advanced Persian (3) VLPA Designed to improve reading and writing skills. Graded reading and writing and exposure to the writing system, textual history, newspaper reading, and translation. Cultural materials presented as appropriate. The art of calligraphy introduced. For students with a degree of proficiency in spoken Persian. Prerequisite: PRSAN 423.

PRSAN 451 Introduction to Persian Literature (3) VLPA *Karimi-Hakkak* Selected texts from modern and classical Persian poetry and prose. Provides insights into Iranian culture and its past and present achievements in literature. Prepares the student for a more comprehensive and critical study of Persian literature. Prerequisite: PRSAN 423.

PRSAN 452 Modern Persian Literature: A Survey (3) VLPA *Karimi-Hakkak* Development of poetry and prose after Iran felt and absorbed the impact of Western cultures. Periods and genres. Works of such authors as Jamalzadeh, Hedayat, Dehkoda, Al-e Ahmad, Nima, Sepehri, and Forugh. Prerequisite: PRSAN 423.

PRSAN 453 Classical Persian Literature: A Survey (3) VLPA *Karimi-Hakkak* History of Persian literature from Rudaki to Hafiz. Studies epic, lyric, and mystic traditions placed in historical settings. Covers the most important genres such as the Qasida, the Ghazal, the *Ruba'i* and the *Masnavi*. Prerequisite: PRSAN 423.

PRSAN 454 The Epic Tradition in Iran (3) VLPA *Karimi-Hakkak* Focuses on the Shahnameh of Firdaws: explores the ancient legends that gave rise to it and follows the fortunes of epic poetry after Firdaws, touching on the rise, development, and decline of romance in classical Persian literature. Prerequisite: PRSAN 433.

PRSAN 455 The Persian Ghazal (3) VLPA *Karimi-Hakkak* The Ghazal as the leading medium for lyrical

expression in classical Persian tradition. Follows this genre from conception to culmination in the poetry of Hafiz. Conventions and devices of the *Ghazal*. Development placed in historical and social context. Prerequisite: PRSAN 433.

PRSAN 456 Sufism: Thought and Expression (3) I&S/VLPA *Karimi-Hakkak* Dynamics of mystical thought and expression as evolved in the writings of the great Sufi masters and reflected in the poetry of Sana'i, Attar, Rumi, and others. The fundamental unity of the mystical vision, with special attention to the peculiarities of individual style and expression. Prerequisite: PRSAN 433.

PRSAN 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: PRSAN 423.

PRSAN 499 Undergraduate Research (1-6, max. 18)

Courses for Graduates Only

PRSAN 600 Independent Study or Research (*)

Turkic

TKIC 401 Intensive Elementary Uzbek (15) Intensive study of grammar, with oral and written drill and reading of simple texts in Uzbek. Covers first-year Uzbek. Cannot be taken for credit if 411, 412, 413 taken. Offered: S.

TKIC 403 Intensive Elementary Kirghiz (15) Intensive study of grammar with oral and written drill of selected texts. Offered: S.

TKIC 404 Intensive Intermediate Uzbek (15) VLPA Allows students to complete second-year Uzbek in one quarter. Reading of selected texts in Uzbek, with continuing emphasis on oral and written practice, grammar, and advanced readings. Cannot be taken for credit if 421, 422, 423 taken. Prerequisite: either TKIC 401 or TKIC 413. Offered: S.

TKIC 406 Intensive Advanced Uzbek (15) VLPA Advanced-level instruction in speaking, writing, reading, and listening skills. Students work independently on translation projects. Emphasis on extensive writing practices in Uzbek and student participation in an Uzbek email conversation circle. Prerequisite: TKIC 423. Offered: S.

TKIC 411 Elementary Uzbek (5) Cirtauntas Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

TKIC 412 Elementary Uzbek (5) Cirtauntas Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

TKIC 413 Elementary Uzbek (5) Cirtauntas Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

TKIC 421 Intermediate Uzbek (3) VLPA Cirtauntas Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: either TKIC 401 or TKIC 413.

TKIC 422 Intermediate Uzbek (3) VLPA Cirtauntas Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: TKIC 421.

TKIC 423 Intermediate Uzbek (3) VLPA Cirtauntas Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: TKIC 422.

TKIC 454 Introduction to Uzbek Literature (3) VLPA Cirtauntas Readings from selected Uzbek writers. Content varies.

TKIC 455 Introduction to Uzbek Literature (3) VLPA Cirtauntas Readings from selected Uzbek writers. Content varies.

TKIC 456 Introduction to Uzbek Literature (3) VLPA Cirtauntas Readings from selected Uzbek writers. Content varies.

TKIC 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: either TKIC 404, TKIC 405, or TKIC 423.

TKIC 499 Undergraduate Research (3-5, max. 15) For Turkic language and literature majors.

Courses for Graduates Only

TKIC 542 Comparative and Historical Grammar of Turkic Languages (3) Cirtauntas Classification of the Turkic languages; alphabets used; phonology, morphology, and syntax; lexical composition; structure changing developments. Prerequisite: TKIC 404.

TKIC 546 Old Turkic (3) Cirtauntas Introduction to Runic script; phonology, morphology, and syntax of the oldest form of Turkic; reading and translation of eighth-century inscriptions of historical and literary importance. Prerequisite: permission of instructor.

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

TKIC 562 Middle Turkic (3) Cirtauntas Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Karakhanid, Khorazmian Turkic, Kipchak, and Chagatai. Prerequisite: permission of instructor.

TKIC 563 Seminar on Turkic Literature (5) Cirtauntas Topics in oral and written literature. Prerequisite: permission of instructor.

TKIC 600 Independent Study or Research (*)

Turkish

TKISH 401 Intensive Elementary Modern Turkish (15) Intensive study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if TKISH 411, 412, 413 taken.) Offered: S.

TKISH 411 Elementary Turkish (5) Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.)

TKISH 412 Elementary Turkish (5) Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.) Prerequisite: TKISH 411.

TKISH 413 Elementary Turkish (5) Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.) Prerequisite: TKISH 412.

TKISH 421 Intermediate Turkish (5) VLPA Introduction to modern Turkish literature. Prerequisite: TKISH 413.

TKISH 422 Intermediate Turkish (5) VLPA Introduction to modern Turkish literature. Prerequisite: TKISH 421.

TKISH 423 Intermediate Turkish (5) VLPA Introduction to modern Turkish literature. Prerequisite: TKISH 422.

TKISH 452 Readings in Turkish Literary History II: Literature of the Ottoman Empire (3) VLPA Kuru The parallel development of the classical high-culture literature and the popular literatures of the Ottoman Empire. Readings in poetry, history, travel-literature, drama, and popular narrative forms. Prerequisite: TKISH 423.

TKISH 456 Introduction to Ottoman Turkish (3) VLPA Kuru Introduction to Turkish in Arabic characters to cover the peculiar grammatical and syntactical problems of Ottoman.

TKISH 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: TKISH 423.

TKISH 499 Undergraduate Research (1-6, max. 18)

Courses for Graduates Only

TKISH 600 Independent Study or Research (*)

Neurobiology

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

NBIO 401 Systems Neurobiology (3) NW Robinson Introduces students to the anatomical and physiological organization of the major sensory, motor, and associative systems of the mammalian brain. Behavioral data used to stress functional integration of systems. Includes gross brain anatomy demonstration and computer tutorials. Prerequisite: NBIO 302. Offered: A.

NBIO 402 Neuropathophysiology (3) NW Crill Introduces students to the basic physiological mechanisms of information processing in the mammalian brain by having students study a series of human neurological diseases that result from a specific disruption of these mechanisms. Prerequisite: NBIO 401. Offered: W.

NBIO 403 Systems and Behavioral Neurobiology (3) NW Perkel, von der Emde Topics include information processing in sensory and motor systems, sensory-motor integration, learning, and memory. Using examples from the field of neuroethology, encourages students to independently work on problems taken from the recent neurobiological research literature. Prerequisite: NBIO 401. Offered: W.

NBIO 404 Neuropharmacology (3) NW Stella Actions of drugs on the brain at clinical, cellular, and molecular levels. Therapeutic use of drugs in treatment of neurological and psychiatric diseases. Abuse of drugs and the mechanisms of addiction, tolerance, and withdrawal. Prerequisite: NBIO 401. Offered: Sp.

NBIO 440 Topics in Current Neurobiology Research (2, max. 6) NW Credit/no credit only. Prerequisite: NBIO 302.

NBIO 450 Current Research Literature in Neurobiology (2, max. 6) NW Weekly journal club in neurobiology. Students read and discuss original research articles in neurobiology, centered around a specific topic each quarter. Credit/no credit only. Prerequisite: BIOL 202.

NBIO 499 Individual Research in Neurobiology (3-6, max. 18) Students carry out projects in laboratories of program faculty. Prerequisite: NBIO 302.

Philosophy

345 Savery



General Catalog Web page:
www.washington.edu/students/genocat/academic/philosophy.html



Department Web page:
depts.washington.edu/philweb/

Philosophy is the study of the most fundamental issues concerning reality, knowledge, and value, and of the basic concepts, principles, and arguments of the major intellectual disciplines. Its fields include metaphysics, epistemology, logic, ethics, history of philosophy, political philosophy, aesthetics, philosophy of science, philosophy of mind, philosophy of language, philosophy of law, and philosophy of religion.

Graduate Program

Graduate Program Coordinator
345 Savery, Box 353350
206-543-5855
philinfo@u.washington.edu

Master of Arts, Doctor of Philosophy

The Department of Philosophy offers programs of study leading to the Master of Arts and Doctor of Philosophy degrees, the M.A. program serving as the initial stage of the Ph.D. program.

The Master of Arts program option is a two-year non-thesis program which may be extended to three years depending on the outcome of the spring research papers. The student must take twelve courses in philosophy, satisfy a logic requirement, and at the end of the second year, submit three research papers for evaluation by the graduate faculty of the department. The courses and the papers must satisfy a distribution requirement. The departmental evaluation of the student's papers and course work determines whether an M.A. degree is awarded and also whether admission to the Ph.D. program is granted. The M.A. portion of the program serves as the initial stage of the Ph.D. program.

The Ph.D. program, which normally requires at least two years of study beyond the M.A., has three general requirements: (1) General Examination, (2) dissertation, and (3) Final Examination.

Special Requirements

An undergraduate major in philosophy is recommended, although not required, for admission to the M.A. program. An applicant's philosophical potential is assessed primarily on the basis of a sample of his or her written work in philosophy and secondarily on the basis of his or her undergraduate record, Graduate Record Examination scores, and letters of recommendation.

Financial Aid

The department has some teaching assistantships available to incoming students and the Graduate School offers some non-teaching assistantships.

Faculty

Chair

Kenneth C. Clatterbaugh

Professors

Benson, Keith R. * 1981, (Adjunct); MA, 1973, PhD, 1979, Oregon State University; history of modern American biology, marine biology, and evolutionary biology.

Boler, John F. * 1960, (Emeritus); PhD, 1960, Harvard University; medieval philosophy.

Bonjour, Laurence A. * 1977; PhD, 1969, Princeton University; epistemology, Kant, British empiricism.

Clatterbaugh, Kenneth C. * 1966; PhD, 1966, Indiana University; modern philosophy, social and political philosophy, gender studies.

Coburn, Robert C. * 1971; PhD, 1958, Harvard University; metaphysics, philosophy of religion, recent philosophy.

Cohen, S. Marc * 1973; PhD, 1967, Cornell University; ancient philosophy, metaphysics, philosophy of language, philosophy of mind.

Dietrichson, Paul * 1961, (Emeritus); PhD, 1955, Yale University; philosophy of religion, ethics, metaphysics.

Jecker, Nancy A. S. * 1982, (Adjunct); MA, 1982, Stanford University, MA, 1984, PhD, 1986, University of Washington; philosophical and ethical aspects of health care delivery and policy.

Keyt, David * 1957; PhD, 1955, Cornell University; ancient and contemporary philosophy, logic.

Lange, Marc B. * 1997; PhD, 1990, University of Pittsburgh; philosophy of science, epistemology, metaphysics.

Marks, Charles * 1975; PhD, 1972, Cornell University; philosophy of mind, modern philosophy.

Potter, Karl H. * 1970, (Emeritus); PhD, 1955, Harvard University; South Asia, Indian philosophy, epistemology.

Richman, Robert J. * 1961, (Emeritus); PhD, 1953, Harvard University; ethics, epistemology.

Staten, Henry J. * 1998, (Adjunct); PhD, 1978, University of Texas (Austin); 19th- and 20th-century British literature, history of literary criticism, contemporary theory.

Associate Professors

Mishalani, James K. * 1963, (Emeritus); PhD, 1961, Brown University; ethics, philosophical anthropology, contemporary continental philosophy.

Moore, Ronald M. * 1979; PhD, 1971, Columbia University; philosophy of law, aesthetics.

Roberts, Jean Valerie * 1991; PhD, 1982, University of Pittsburgh; ancient Greek philosophy, ethics, philosophy of feminism.

Talbott, William J. * 1989; PhD, 1976, Harvard University; epistemology, ethics, social and political philosophy, rational choice theory.

Townsend, Michael E. * 1992, (Adjunct); MA, 1978, PhD, 1982, University of Michigan, JD, 1989, Yale University; law and science; intellectual property; use of quantitative methods.

Assistant Professors

Smith, Angela * 1999; PhD, 1999, Harvard University; moral and political philosophy.

Taylor, Paul C. 1998; PhD, 1997, Rutgers University; social and political philosophy, American pragmatism, aesthetics, race theory.

Weller, Cass * 1990; PhD, 1983, University of Pittsburgh; ancient Greek philosophy, epistemology, Hume.

Woody, Andrea I. * 1997; PhD, 1996, University of Pittsburgh; philosophy of science, history of science, philosophy of feminism.

Senior Lecturer

Baker, Ann Michelle 1981; MA, 1983, PhD, 1990, University of Washington; metaphysics, epistemology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

PHIL 401 Advanced Topics in Philosophy (3-5, max 10) I&S Baker A study of philosophical topics at the advanced level. Topics vary.

PHIL 406 Philosophical Topics in Feminism (5) I&S Roberts, Woody Detailed examination of questions raised by recent feminist scholarship in particular areas of philosophy, such as political theory, ethics, epistemology, or philosophy of science. Emphasis varies.

PHIL 410 Social Philosophy (5) I&S Clatterbaugh, Coburn, Talbott, Taylor An examination of topics pertaining to social structures and institutions such as liberty, distributive justice, and human rights.

PHIL 411 Justice in Health Care (5) I&S/VLPA Jecker Examination of the ethical problem of allocating scarce medical resources. Emphasis on fundamental principles of justice that support alternative health policies. Recommended: prior courses in philosophy or medical ethics. Offered: jointly with MHE 474.

PHIL 412 Indian Philosophy (5) I&S Historical survey of the major systems and the traditional problems of philosophy in India. Readings in Buddhism, Nyaya, Samkhya, and Vedanta.

PHIL 414 Philosophy of Law (3) I&S Bonjour, Moore Nature and function of law. Relation of law to morality. Legal rights, judicial reasoning.

PHIL 418 Indian Buddhist Philosophy (3) I&S Topics from Buddhist thought, both Sravakayanist and Mahayanist, touching on the following areas: epistemology, theory of liberation, metaphysics and the theory of the absolute, cosmology, and ethics. Readings in translation. At least one course in Indian philosophy or Hinduism or Buddhism recommended.

PHIL 422 Studies in Continental Rationalism (3, max. 9) I&S Clatterbaugh, Coburn, Marks Study of one or more of the major continental Rationalists: Descartes, Spinoza, Leibniz.

PHIL 425 Studies in Nineteenth-Century Philosophy (3) I&S Baker Study of post-Kantian metaphysical theories, with special emphasis on idealism, realism, and/or pragmatism. Typical authors

include F. H. Bradley, J. McTaggart, Royce, and Green.

PHIL 426 Twentieth-Century Philosophy (5) I&S *Baker, Lange, Weller* A study of development of contemporary analytic philosophy, the revolt against idealism, and the linguistic turn in philosophy.

PHIL 430 Hellenistic Philosophy (3) I&S *Roberts* Survey of the Epicurean, Stoic, and Skeptic philosophy of the Hellenistic period. Emphasis may vary.

PHIL 431 Philosophy of Plato (3, max. 6) I&S *Cohen, Keyt, Roberts, Weller* Study of selected middle and late dialogues.

PHIL 433 Philosophy of Aristotle (3, max. 6) I&S *Cohen, Keyt, Roberts, Weller* Study of several major Aristotelian treatises.

PHIL 436 British Empiricism (3) I&S *BonJour* Examination of the metaphysical and epistemological views of Locke and Berkeley, with perhaps some attention also to Hume. Prerequisite: either PHIL 322 or PHIL 350.

PHIL 437 Philosophy of Hume (3) I&S *Marks, Weller* Study Hume's analyses of knowledge, the passions, and morals.

PHIL 438 Philosophy of Kant (5) I&S *BonJour, Weller* Systematic study of *The Critique of Pure Reason*.

PHIL 439 The Later Philosophy of Wittgenstein (3) I&S *Coburn* Detailed study of topics in the later philosophy of Wittgenstein, with particular attention to the *Philosophical Investigations*.

PHIL 440 Ethics (5) I&S *Coburn, Roberts, Smith, Talbott* 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. Emphasis varies from quarter to quarter.

PHIL 445 Philosophy of Art (5) I&S/VLPA *Moore* Critical examination of various accounts of the nature of art, artistic activity, the aesthetic experience. Problems in interpretation and evaluation of works of art.

PHIL 446 Development of Aesthetic Theory (5) I&S/VLPA *Moore, Taylor* Historical development of aesthetics, emphasizing such major figures as Plato, Aristotle, Hume, Kant, Hegel, and Goodman.

PHIL 450 Epistemology (5) I&S *Baker, BonJour, Lange, Talbott* Systematic study of some of the main problems of the theory of knowledge, such as: the definition of "knowledge;" a priori knowledge; perception and knowledge of the external world; and whether knowledge has or requires a foundation. Emphasis varies from quarter to quarter.

PHIL 453 Philosophy of Language (5) I&S/VLPA Current theories of meaning, reference, predication, and related concepts. Offered: jointly with LING 476.

PHIL 456 Metaphysics (5) I&S *Baker, Coburn* Examination of such topics as freedom of the will, the nature of persons and personal identity, the existence of God, time, necessary truth, and universals. The emphases vary from year to year.

PHIL 458 Phenomenology (5) I&S The contributions of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, and epistemology.

PHIL 459 Philosophy of Medicine (5) I&S *Jecker* Familiarizes students with central issues in the philosophy of medicine. Focuses on the nature of medical knowledge, the connection between theory and observation, the meaning of medical concepts, and the relationship between theories and the world. Recommended: prior courses in philosophy, history

of science, or history of medicine. Offered: jointly with MHE 440.

PHIL 460 Philosophy of Science (5) I&S/NW *Lange, Woody* Critical study of the nature of scientific knowledge. Topics include the relation of theory to observation, the use of mathematics, how theories change, the requirements for the meaningfulness of a theory, and nature of confirmation. Recommended: PHIL 120 or PHIL 160; prerequisite: one PHIL course.

PHIL 463 Philosophy of Mind (3) I&S *BonJour, Marks* Examination of current theories of the nature of the mind and mental processes.

PHIL 464 Philosophical Issues in the Cognitive Sciences (5) I&S/NW *Marks* Philosophical problems connected with research in psychology, artificial intelligence, and other cognitive sciences. Topics vary. Readings from both philosophical and scientific literature. Accessible to nonphilosophers with suitable interests and backgrounds.

PHIL 466 Philosophy of the Social Sciences (5) I&S *Talbott* Examination of fundamental issues in the foundations, methodology, and interpretation of the social sciences. Topics include value orientation and objectivity, methodological individualism, functionalism, reductionism, and the status of idealized models, including models involving idealized conceptions of individual rationality. Emphasis varies from quarter to quarter.

PHIL 467 Philosophy of Religion (5) I&S Study of selected topics and problems in the philosophy of religion, such as: arguments for the existence of God; the problem of evil; atheism; faith; religious experience and revelation; the attributes of God; miracles; immortality; and the relation between religion and morality. Readings from historical and contemporary authors.

PHIL 469 Existentialist Philosophy (3) I&S Examination of major ideas of selected existentialist philosophers.

PHIL 470 Intermediate Logic (5) I&S/NW, QSR *Keyt* An introduction to the concepts and methods of metatheory and their application to the sentential calculus.

PHIL 471 Advanced Logic (5) I&S/NW *Keyt* Study of the first-order predicate calculus with identity and function symbols. Consistency, soundness, completeness, compactness. Skolem-Löwenheim theorem. Formalized theories.

PHIL 472 Axiomatic Set Theory (5) I&S/NW *Keyt* Development of axiomatic set theory up to and including the consistency of the Axiom of Choice and Continuum Hypothesis with the Zermelo-Fraenkel Axioms.

PHIL 473 Philosophy of Mathematics (5) I&S/NW *Fine* Study of the traditional accounts of the nature of mathematical entities and mathematical truth given by logicism, intuitionism, and formalism, and the impact of Gödel's incompleteness theorems on these accounts.

PHIL 474 Modal Logic (5) I&S/NW Notions of necessity and possibility, using the classical systems T, S4, and S5, and the syntax and the semantics (Kripke models) of these systems.

PHIL 479 Semantics II (3) I&S/NW/VLPA *Ogihara* Formal characterization of linguistic meaning. Emphasis on nature and purpose of formal semantics and on its relation to formal syntax. Prerequisite: LING 442. Offered: jointly with LING 479.

PHIL 481 Philosophy of Biology (5) I&S/NW *Lange* Study of several current topics in philosophy of biology, which may include the logical structure of evolutionary theory, fitness, taxonomy, the concept of a

living thing, reductionism, the concept of a biological species, evolutionary explanations, and philosophical consequences of sociology. Recommended: college-level course in biological science; prerequisite: one PHIL course.

PHIL 482 Philosophy of Physical Science (5, max. 10) I&S/NW *Fine, Lange, Woody* Study of philosophical issues raised by theories in physics or chemistry, such as whether space (time) is a substance, how causation and locality are treated in quantum mechanics, temporal anisotropy and time travel, the nature of a field of force, the reduction of chemistry to physics. Prerequisite: one PHIL course.

PHIL 483 Induction and Probability (5) I&S/NW *Lange* Introduction to current accounts of evidence and observation, the confirmation of scientific theories, the logic of inductive reasoning, and the metaphysics and epistemology of chance. High school-level math used. Specific topics vary from year to year. Prerequisite: PHIL 120.

PHIL 484 Reading in Philosophy (1-5, max. 15) Individual study of selected philosophical works.

PHIL 490 Advanced Topics in Epistemology (5, max. 15) I&S *BonJour, Talbott* Intensive study of a particular topic or area in epistemology. Prerequisite: either PHIL 350 or PHIL 450.

PHIL 498 Undergraduate Internship (1-5, max. 10) *Baker, Clatterbaugh* Independent fieldwork under the supervision of a faculty member. Individual experiences vary but could include an off-campus practicum or being trained as study group leader or tutor. Offered: AWP.

Courses for Graduates Only

PHIL 500 Proseminar in Philosophy (5) Introduces incoming graduate students to topics representative of the field and the faculty's interest. Each class session is devoted to a separate topic taught by a different member of the faculty. In addition to reading and short written assignments. Students prepare a term paper on a topic presented. Offered: A.

PHIL 501 Foresight in Science and Technology: Choices and Consequences (3) Examination of the foresight (or lack of it) with which we practice science and use technology. Contrasts potential risks of various choices with potential benefits. Credit/no credit only. Offered: jointly with ENVIR 535/PHYS 535/ZOOL 523.

PHIL 505 Seminar in Teaching Philosophy (1, max. 10) *Baker* First quarter: seminar on topics of importance to a graduate student teaching two quiz sections of a large lecture course. Second quarter: focus on helping student prepare to teach own course. Prerequisite: graduate standing in philosophy. Offered: AW.

PHIL 510 Seminar in Social Philosophy (5, max. 20) *Talbott*

PHIL 514 Seminar in Legal Philosophy (5, max. 20) *Moore*

PHIL 520 Seminar in Ancient Philosophy (5, max. 20) *Cohen, Keyt, Roberts, Weller*

PHIL 522 Seminar in Modern Philosophy (5, max. 20) *Clatterbaugh*

PHIL 526 Seminar in Recent Philosophy (5, max. 20) *Keyt, Lange*

PHIL 538 Philosophy of Human Rights (5, max. 20) *Talbott*

PHIL 540 Seminar in Ethics (5, max. 20) *Coburn, Roberts, Smith, Talbott*

PHIL 545 Seminar in the Philosophy of Art (5, max. 20) *Moore, Taylor*

PHIL 556 Seminar in Metaphysics (5, max. 20) *Baker, BonJour, Coburn*

PHIL 560 Seminar in the Philosophy of Science (5, max. 20) *Fine, Lange, Woody*

PHIL 563 Seminar in the Philosophy of Mind (5, max. 20) *BonJour, Marks*

PHIL 566 Seminar in Philosophy of the Social Sciences (5, max. 20)

PHIL 570 Seminar in Logic (5, max. 20) *Keyt*
Prerequisite: PHIL 470.

PHIL 584 Reading in Philosophy (1-5, max. 12)
Intensive reading in philosophical literature.
Prerequisite: permission of graduate program coordinator.

PHIL 587 Contemporary Analytic Philosophy (5, max. 20) *Baker*

PHIL 600 Independent Study or Research (*)
Prerequisite: permission of graduate program coordinator.

PHIL 700 Master's Thesis (*)

PHIL 800 Doctoral Dissertation (*)

Physics

C121 Physics-Astronomy Building



General Catalog Web page:
www.washington.edu/students/genocat/academic/physics.html



Department Web page:
www.phys.washington.edu/

Physics is the study of the fundamental structure of matter and the interaction of its constituents, with the goal of providing a quantitative description of nature based on a limited number of physical principles.

Graduate Program

Graduate Program Coordinator
C139 B Physics-Astronomy, Box 351560
206-543-2488

The Department of Physics offers studies leading to the degrees of Master of Science and Doctor of Philosophy. The department has a permanent faculty of 44 members, about 14 research faculty, and about 48 adjunct, affiliate, and emeritus faculty. An average of twenty Ph.D. and twenty-five M.S. degrees in physics have been awarded annually in recent years.

Research Facilities

The department is well equipped, both in staff and facilities, for instruction and research in a discipline that emphasizes fundamental problems in the understanding of the physical universe. Areas of research available to the Ph.D. student within the department include atomic physics, astrophysics, condensed-matter physics, elementary-particle physics, nuclear physics, and physics education. In addition, students may do research in physics with adjunct faculty members whose primary appointment is in another department such as Aeronautics and Astronautics, Astronomy, Biochemistry, Bioengineering, Chemistry, Earth and Space Sciences, Materials Science and Engineering, or Physiology and Biophysics.

Experimental work in atomic physics is concentrated on the measurement of fundamental physical properties through laser, ion trap, and radiofrequency techniques. The emphasis on fundamental measurements is continued in experiments on the gravitational force, carried out by faculty and students in atomic physics, nuclear physics, and astrophysics. Condensed-matter experiment includes research on surfaces, interfaces, nanotubes, lower-dimensional and bulk matter, with materials as diverse as high-temperature superconductors and low-temperature hydrogen monolayers. Facilities used range from synchrotron radiation and neutron sources in the U.S. and abroad to on-campus laboratories with low-temperature, high-pressure, scanning-probe microscopy, x-ray and light scattering, and surface-physics equipment.

Members of the high-energy experimental groups are heavily engaged in experiments at the European Center for Nuclear Research in Geneva, Kamiokande in Japan, and the Fermilab in Illinois. Faculty and students of the nuclear physics group are involved in a broad spectrum of research including studies of neutrino properties, relativistic heavy ions, fundamental symmetries and nuclear astrophysics. Researchers use the on-campus accelerators of the Center for Experimental Physics and Astrophysics (CENPA), as well as major facilities in the U.S., Canada, and Europe.

Theorists in the department are concerned with problems in: the theories of elementary particles and quantum fields, string theory, nuclear and high-energy reactions from the very lowest to the very highest energies phase transitions and statistical mechanics, condensed-matter physics from localization in disordered systems to electron transport in mesoscopic systems, atomic physics, general relativity, and astrophysics. The Institute for Nuclear Theory, a national facility closely associated with the department, offers a unique opportunity for students to pursue research with distinguished permanent and visiting staff. Students in physics have the opportunity to obtain a physics degree in a number of interdisciplinary and applied physics areas through research with faculty members in other departments.

Department facilities are housed in the Physics-Astronomy Building and the Center for Experimental Physics and Astrophysics (CENPA).

Master of Science (Applications of Physics)

Admission Requirements: This option is designed for students who are currently employed and whose background is in physical science, engineering, mathematics, or computer science. Admission is based on course grades in physics and related fields, adequacy of preparation in physics, and interest in areas of instruction offered in the physics department. Entering students are expected to have an undergraduate background equivalent to a B.S. degree in physical science, engineering, mathematics, or computer science.

Graduation Requirements: As part of the standard Graduate School requirements, students are expected to complete the sequence of core courses PHYS 441, 541, and 543, and to select appropriate elective courses. In addition, students must complete an independent-study project in consultation with a faculty member. This project may be carried out at the University or at the student's place of employment. A written report as well as an oral presentation of the project are required. Students must take at least 3 credits of PHYS 600 while completing the project. Students must complete a total of 36 credits of work at the 400 level or above, with at least 18 of those credits at the 500 level or above. Of the 36 credits, at least 18 credits must be from numerically graded courses. No thesis is required.

Master of Science, Doctor of Philosophy

Admission Requirements: Undergraduate preparation should 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. Admission is determined by: the applicant's undergraduate program, undergraduate grades, Graduate Record Examination aptitude and advanced physics scores, letters of recommendation, and a statement of educational and professional objectives.

Master of Science

Graduation Requirements: Department requirements include standard Graduate School requirements. In addition, 3 credits must be in PHYS 600 and at least 12 other credits in physics graduate courses. A final examination is required. No thesis is required.

Doctor of Philosophy

Graduation Requirements: The student is expected to obtain here, or elsewhere with a master's degree, a background in physics equivalent to that contained in the following sequences of basic graduate courses: PHYS 505, 506, 511, 513, 514, 515, 517, 518, 519, 520, and 524; and in specialized courses appropriate to each student's interests. The student is required to pass, successively, a written qualifying examination (typically at the beginning of the second year), an oral General Examination for admission to candidacy, and an oral Final Examination. In order to take the General Examination, the student must have been accepted by a graduate faculty member as a research student and have completed the graduate studies outlined above. This examination concentrates on the area in which the dissertation research is planned. Teaching experience is required of all candidates. Courses in teaching techniques in physics, PHYS 501-503, are required of students holding teaching assistantships.

Financial Aid

Most graduate students are supported by fellowships and assistantships. Applications for the Ph.D. program are automatically considered for these fellowships and assistantships.

Faculty

Chair

David G. Boulware

Professors

Adelberger, Eric G. * 1972; PhD, 1967, California Institute of Technology; experimental gravitational physics; experimental nuclear physics.

Alberg, Mary Ann 1983, (Affiliate); PhD, 1974, University of Washington; theoretical nuclear physics.

Baker, Marcia * 1980, (Adjunct); MS, 1960, Stanford University, PhD, 1971, University of Washington; cloud physics, atmospheric geophysics.

Baker, Marshall * 1962; PhD, 1958, Harvard University; field theory, theoretical elementary-particle physics.

Bardeen, James M. * 1976; PhD, 1965, California Institute of Technology; general relativity, theoretical astrophysics, cosmology.

- Bertsch, George F. * 1992; PhD, 1965, Princeton University; theoretical physics, nuclear and atomic cluster physics.
- Bichsel, Hans 1992, (Affiliate); PhD, 1951, University of Basel (Switzerland); experimental nuclear physics.
- Bodansky, David . * 1954, (Emeritus); PhD, 1950, Harvard University; experimental nuclear physics.
- Boulware, David G. * 1965; PhD, 1962, Harvard University; field theory, theoretical elementary-particle physics, general relativity.
- Bowles, Thomas J. 1995, (Affiliate); PhD, 1978, Princeton University; experimental nuclear physics.
- Boynton, Paul E. * 1970; PhD, 1967, Princeton University; high-energy astrophysics, astronomy.
- Brown, Frederick C. * 1987, (Emeritus); PhD, 1950, Harvard University; use of synchrotron radiation in experimental solid state physics.
- Brown, Lowell S. * 1968, (Emeritus); PhD, 1961, Harvard University; field theory, theoretical elementary-particle physics.
- Buck, Warren W. 1999, (Adjunct); MA, 1970, PhD, 1976, College of William And Mary; physics and nuclear energy.
- Burnett, Thompson H. * 1979; PhD, 1968, University of California (San Diego); experimental elementary-particle physics.
- Cahn, John Werner 1984, (Affiliate); PhD, 1953, University of California (Berkeley); theoretical condensed-matter physics.
- Campbell, Charles T. * 1989, (Adjunct); PhD, 1979, University of Texas (Austin); physical chemistry of solid surfaces, chemisorption, catalysis, and surface analysis.
- Chaloupka, Vladimir * 1981; PhD, 1975, University of Geneva (Switzerland); experimental elementary-particle physics.
- Chayes, Jennifer T. 1997, (Affiliate); PhD, 1983, Princeton University; theoretical condensed-matter physics.
- Chopelas, Anastasia * 2002, (Research); PhD, 1981, University of California (Los Angeles); experimental condensed-matter physics.
- Clark, Kenneth C. * 1948, (Emeritus); PhD, 1947, Harvard University; optical spectroscopy, upper atmosphere.
- Cleveland, Bruce 2001, (Affiliate); PhD, 1970, Johns Hopkins University; experimental nuclear physics.
- Cook, Victor * 1963, (Emeritus); PhD, 1962, University of California (Berkeley); experimental high-energy physics.
- Cramer, John G. * 1964; PhD, 1961, Rice University; experimental nuclear physics.
- Dash, J. Gregory * 1961, (Emeritus); PhD, 1951, Columbia University; cryogenics, surface physics, thermal physics, ice physics.
- Dehmelt, Hans G. * 1955; PhD, 1950, University of Göttingen (Germany); single particle radio-frequency and laser spectroscopy of trapped electrons, positrons and ions.
- Den Nijs, Marcel P. * 1981; PhD, 1979, Katholieke University (Netherlands); theoretical condensed-matter physics.
- Doe, Peter J. * 1994; MSc, 1974, PhD, 1977, University of Durham (UK); electro-weak interactions and solar neutrino physics.
- Drobny, Gary P. * 1981, (Adjunct); PhD, 1981, University of California (Berkeley); two-dimensional and multiple quantum studies in nuclear magnetic resonance.
- Efimov, Vitaly 1990, (Affiliate); PhD, 1966, Physico-Technical Institute (Russia); theoretical nuclear physics.
- Ellis, Stephen D. * 1975; PhD, 1971, California Institute of Technology; theoretical elementary-particle physics.
- Engel, Thomas * 1980, (Adjunct); PhD, 1969, University of Chicago; surface chemistry and catalysis.
- Fain, Samuel C. * 1970; PhD, 1969, University of Illinois; experimental condensed-matter physics, surface physics.
- Farwell, George W. * 1948, (Emeritus); PhD, 1948, University of Chicago; experimental nuclear physics.
- Fortson, E. Norval * 1963; PhD, 1964, Harvard University; radio-frequency spectroscopy, experimental atomic physics.
- Gerhart, James B. * 1956, (Emeritus); PhD, 1954, Princeton University; experimental nuclear physics, physics education.
- Halpern, Isaac * 1953, (Emeritus); PhD, 1948, Massachusetts Institute of Technology; experimental nuclear physics.
- Haxton, Wick C. * 1984; PhD, 1976, Stanford University; theoretical physics, nuclear physics.
- Heckel, Blayne * 1983; PhD, 1981, Harvard University; experimental neutron and atomic physics.
- Henley, Ernest M. * 1954, (Emeritus); PhD, 1952, University of California (Berkeley); theoretical nuclear physics, theoretical elementary-particle physics.
- Hogan, Craig J. * 1990; PhD, 1980, Cambridge University (UK); astrophysical cosmology, especially the origin of astronomical structures in the expanding universe.
- Holzworth, Robert * 1982, (Adjunct); MA, 1974, PhD, 1977, University of California (Berkeley); experimental space plasma physics, atmospheric/magnetospheric electric fields, thunderstorms.
- Ingalls, Robert L. *, (Emeritus); PhD, 1962, Carnegie Mellon University; experimental condensed-matter physics.
- Jarboe, Thomas R. * 1989, (Adjunct); PhD, 1974, University of California (Berkeley); plasma physics and controlled fusion, magnetic reconnection and relaxation.
- Jonsson, Hannes * 1988, (Adjunct); PhD, 1985, University of California (San Diego); computer simulations and scattering calculation in materials and surface science.
- Kaplan, David B. * 1994; PhD, 1985, Harvard University; theoretical nuclear and elementary-particle physics.
- Lake, George Russell * 1985, (Adjunct); PhD, 1980, Princeton University; stellar dynamics, galaxy structure and formation, cosmology, computational astrophysics.
- Lord, Jere J. * 1952, (Emeritus); PhD, 1950, University of Chicago; cosmic rays, experimental elementary-particle physics.
- Lubatti, Henry J. * 1969; PhD, 1966, University of California (Berkeley); experimental elementary-particle physics.
- McDermott, Lillian C. * 1971; PhD, 1959, Columbia University; physics education.
- McDermott, Mark N. * 1962; PhD, 1959, Columbia University; radio-frequency spectroscopy.
- Miller, Gerald A. * 1975; PhD, 1972, Massachusetts Institute of Technology; theoretical nuclear physics.
- Mockett, Paul M. * 1972; PhD, 1965, Massachusetts Institute of Technology; experimental elementary-particle physics.
- Nagourney, Warren * 1977; PhD, 1972, Columbia University; experimental atomic physics, high resolution laser spectroscopy of atoms.
- Nelson, Ann E. * 1994; MA, 1981, PhD, 1984, Harvard University; theoretical elementary-particle physics.
- Ohuchi, Fumio * 1992, (Adjunct); PhD, 1981, University of Florida; thin films, electronic materials, physics and chemistry of layered materials, nanostructures.
- Olmstead, Marjorie A. * 1991; PhD, 1985, University of California (Berkeley); experimental condensed-matter physics, surface and interface physics.
- Puff, Robert D. * 1962, (Emeritus); PhD, 1960, Harvard University; many-body theory, statistical physics.
- Rehr, John J. * 1974; PhD, 1972, Cornell University; theoretical condensed-matter physics.
- Reinhardt, William P. * 1991, (Adjunct); PhD, 1968, Harvard University; theoretical and computational chemistry with applications in thermodynamics and atomic physics.
- Riedel, Eberhard K. * 1975, (Affiliate); PhD, 1966, Technical University of Munich (Germany); theoretical condensed-matter physics.
- Robertson, R. G. Hamish * 1994; MA, 1965, Oxford University (UK), PhD, 1971, McMaster University (Canada); experimental nuclear physics.
- Rothberg, Joseph E. * 1969; PhD, 1963, Columbia University; experimental high-energy physics.
- Schick, Michael * 1969; PhD, 1967, Stanford University; theoretical condensed-matter physics.
- Sharpe, Stephen R. * 1986; PhD, 1983, University of California (Berkeley); theoretical particle physics: lattice gauge theory and strong interaction phenomenology.
- Snover, Kurt Albert * 1972; PhD, 1969, Stanford University; experimental nuclear physics.
- Sorensen, Larry B. * 1983; PhD, 1980, University of Illinois; experimental condensed-matter physics.
- Spivak, Boris * 1991; PhD, 1970, Leningrad Polytechnic Institute (Russia); theoretical condensed-matter physics.
- Stern, Edward A. * 1965, (Emeritus); PhD, 1955, California Institute of Technology; experimental condensed-matter physics.
- Storm, Derek * 1979; PhD, 1970, University of Washington; nuclear physics, especially medium energy, accelerator physics.
- Stubbs, Christopher * 1981; PhD, 1988, MSc, 1988, University of Washington; observational cosmology and gravitation.
- Thouless, David * 1980; PhD, 1958, Cornell University; theoretical condensed-matter physics.
- Trainor, Thomas A. * 1973; PhD, 1973, University of North Carolina; experimental nuclear physics.

Van Dyck, Robert S, Jr. * 1971; PhD, 1971, University of California (Berkeley); experimental atomic physics.

Vilches, Oscar E. * 1968; PhD, 1966, National University of Cuyo (Argentina); low-temperature condensed-matter physics.

Wilets, Lawrence * 1958, (Emeritus); PhD, 1952, Princeton University; theoretical nuclear and atomic physics.

Wilkinson, John F. * 1994; MS, 1979, PhD, 1982, University of North Carolina; experimental nuclear and particle physics and astrophysics.

Wilkes, Richard Jeffrey * 1974; PhD, 1974, University of Wisconsin; experimental cosmic ray and elementary particle physics.

Williams, Robert W. * 1959, (Emeritus); PhD, 1948, Massachusetts Institute of Technology; experimental high-energy physics, cosmic rays.

Winglee, Robert M. * 1991, (Adjunct); PhD, 1984, University of Sydney (Australia); space plasma physics, numerical simulation of space plasmas.

Yaffe, Laurence G. * 1988; PhD, 1980, Princeton University; quantum field theory, elementary particle theory.

Associate Professors

Ao, Ping 1990, (Affiliate); PhD, 1990, University of Illinois; theoretical condensed-matter physics.

Baker, David * 1993, (Adjunct); PhD, 1989, University of California (Berkeley); protein folding, genomics.

Bulgac, Aurel * 1993; PhD, 1977, Leningrad Nuclear Physics Institute (Russia); many body theory, molecular dynamics, classical and quantum chaos.

Elliott, Steven R. * 1995; PhD, 1987, University of California (Irvine); particle and nuclear physics.

Gundlach, Jens 1984; PhD, 1990, University of Washington; experimental nuclear physics.

Quinn, Thomas R. * 1993, (Adjunct); PhD, 1986, Princeton University; Solar System dynamics and galaxy formation.

Savage, Martin J. * 1996; MSc, 1985, University of Auckland (New Zealand), PhD, 1990, California Institute of Technology; nuclear and particle physics.

Shaffer, Peter S. * 1985; PhD, 1993, University of Washington; research on the learning and teaching of physics.

Vogel, Viola * 1990, (Adjunct); Doct, 1987, Johann Wolfgang Goethe University (Germany); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, non-linear optics, microscopy.

Wettlaufer, John 1997, (Affiliate); PhD, 1991, University of Washington; ice physics.

Zhao, Tianchi * 1986; PhD, 1987, Columbia University; experimental high energy physics instrumentation and detectors.

Assistant Professors

Ankudinov, Alexei 1992, (Research); PhD, 1996, University of Washington; theoretical condensed-matter physics.

Cobden, David H. * 2001; PhD, 1991, University of Cambridge (UK); experimental condensed-matter physics.

Heron, Paula * 1995; MS, 1992, University of Ottawa (Canada), PhD, 1995, Western Ontario University

(Canada); research on the learning and teaching of physics.

Junghans, Arnd * 1999, (Research); PhD, 1998, Technical University of Darmstadt (Germany); experimental nuclear physics.

Kaplan, Lev 1999, (Research); MA, 1993, PhD, 1996, Harvard University; theoretical nuclear physics.

Keller, Sarah L. 2000, (Adjunct); PhD, 1995, Princeton University; biophysics; physical chemistry; soft condensed matter; surfactants; lipids; self-assembly.

Kovchegov, Yuri 2000, (Research); PhD, 1998, Columbia University; theoretical physics: high energy QCD, nuclear and particle physics.

Seidler, Gerald T. * 1996; MA, 1991, PhD, 1993, University of Chicago; condensed matter experiment: microstructural kinetics and nonequilibrium statistical mechanics.

van Kolck, Ubirajara 1995, (Affiliate); PhD, 1993, University of Texas (Austin); theoretical nuclear physics.

Vokos, Stamatis P. * 1992; MA, 1985, PhD, 1990, University of California (Berkeley); research on the learning and teaching of physics (physics education research).

Watts, Gordon T. * 1999; PhD, 1995, University of Rochester; accelerator-based elementary particle physics.

Senior Lecturer

Pedigo, Robert D. 2001; PhD, 1977, University of Texas (Austin); physics education.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

PHYS 401 Special Problems (*, max. 30) Supervised individual study. Offered: AWSpS.

PHYS 402 Special Problems (*, max. 30) Supervised individual study. Offered: AWSpS.

PHYS 403 Special Problems (*, max. 30) Supervised individual study. Offered: AWSpS.

PHYS 405- Physical Science by Inquiry II (5-) NW Emphasis on depth of understanding and development of reasoning and representational skills essential to the scientific process. Provides background for teaching physical science as a process of inquiry and develops scientific literacy. Offered: A.

PHYS -406 Physical Science by Inquiry II (-5) NW Emphasis on depth of understanding and development of reasoning and representational skills essential to the scientific process. Provides background for teaching physical science as a process of inquiry and develops scientific literacy. Offered: W.

PHYS 407 Physics by Inquiry II (5) NW Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 123. Offered: A.

PHYS 408 Physics by Inquiry II (5) NW Selected topics in physics, with emphasis on depth of under-

standing and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 407. Offered: W.

PHYS 409 Physics by Inquiry II (5) NW Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 408. Offered: Sp.

PHYS 410 Physics by Inquiry for In-Service Teachers (1-2, max. 10) NW A "hands-on" inquiry-oriented approach designed to train in-service teachers in the use of the physical science content for any of several science programs selected by a school or school district. Credit/no credit only.

PHYS 411 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: A.

PHYS 412 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: W.

PHYS 413 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: Sp.

PHYS 421 Atomic and Molecular Physics (3) NW Survey of the principal phenomena of atomic and molecular physics. Prerequisite: PHYS 323; PHYS 325. Offered: W.

PHYS 422 Nuclear and Elementary-Particle Physics (3) NW Survey of the principal phenomena of nuclear and elementary-particle physics. Prerequisite: PHYS 323; PHYS 325. Offered: Sp.

PHYS 423 Solid-State Physics (3) NW Survey of the principal phenomena of solid-state physics. Prerequisite: PHYS 323; PHYS 325. Offered: A.

PHYS 424 Mathematical Physics (3) NW Advanced classical mechanics. Prerequisite: PHYS 323; PHYS 325. Offered: A.

PHYS 425 Mathematical Physics (3) NW Mathematical techniques of particular use in physics, including partial differential equations. Prerequisite: PHYS 323; PHYS 325. Offered: W.

PHYS 426 Mathematical Physics (3) NW Mathematical techniques of particular use in physics, including partial differential equations. Prerequisite: PHYS 425. Offered: Sp.

PHYS 427 Applications of Physics (1-3, max. 12) NW Current applications of physics to problems in the sciences and technology.

PHYS 428 Selected Topics in Physics (1-5, max. 12) NW

PHYS 431 Modern Physics Laboratory (3) NW Measurement in modern atomic, molecular, and solid-state physics. Recommended: 30 credits in physics. Offered: A.

PHYS 432 Modern Physics Laboratory (3) NW Measurement in modern atomic, molecular, and solid-state physics. Recommended: 30 credits in physics. Offered: W.

PHYS 433 Modern Physics Laboratory (3) NW Techniques in nuclear and elementary-particle research. Prerequisite: PHYS 422. Offered: Sp.

PHYS 434 Application of Computers to Physical Measurement (3) NW Laboratory giving specific instruction and experience in interfacing laboratory equipment to computers. Prerequisite: PHYS 335. Offered: A.

PHYS 441 Quantum Physics (4) NW Introduction to concepts and methods of quantum physics: wave mechanics (de Broglie wavelength, uncertainty principle, Schrodinger equation), one-dimensional examples (tunneling, harmonic oscillator), formalism of quantum physics, angular momentum and the hydrogen atom. Recommended: 30 credits in physical science or engineering. Offered: W.

PHYS 451 Issues for Ethnic Minorities and Women In Science and Engineering (5) I&S Addresses issues faced by women and ethnic minorities in physical sciences and engineering. Focuses on participation, barriers to participation, and solutions to those issues for women and ethnic minorities in physical sciences and engineering. Offered: jointly with WOMEN 485.

PHYS 460 Water in the Environment (3) NW *Baker, Raymond, Waddington, Warren* Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with ATM S 460/ESS 424. Offered: A.

PHYS 485 Senior Honors Seminar (1, max. 3) NW Offered: A.

PHYS 486 Senior Honors Seminar (1, max. 3) NW Offered: W.

PHYS 487 Senior Honors Seminar (1, max. 3) NW Offered: Sp.

PHYS 491 Independent Research (1-3, max. 3) Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: A.

PHYS 492 Independent Research (1-3, max. 3) Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: W.

PHYS 493 Independent Research (1-3, max. 3) Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: Sp.

PHYS 494 Seminar on Current Problems in Physics (1-3, max. 3) NW Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: A.

PHYS 495 Seminar on Current Problems in Physics (1-3, max. 3) NW Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required.

Recommended: 12 credits in physics above 200 level. Offered: W.

PHYS 496 Seminar on Current Problems in Physics (1-3, max. 3) NW Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: Sp.

Courses for Graduates Only

PHYS 501 Tutorials in Teaching Physics (1, max. 2) Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: A.

PHYS 502 Tutorials in Teaching Physics (1, max. 2) Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: W.

PHYS 503 Tutorials in Teaching Physics (1, max. 2) Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: Sp.

PHYS 505 Mechanics (3) Lagrangian and Hamiltonian dynamics, with applications to various topics such as coupled oscillators, parametric resonance, anharmonic oscillations, chaos. Offered: A.

PHYS 506 Numerical Methods (3) Integration, solution of differential equations, Monte Carlo methods, function minimization, data analysis, modern computing techniques, computation in experimental physics. Offered: Sp.

PHYS 507 Physical Applications of Group Theory (3) Applications of finite and continuous groups, representation theory, symmetry, and conservation laws to physical systems. Offered: Sp.

PHYS 511 Topics in Contemporary Physics (3, max. 9) Topics of current experimental, theoretical, or technological interest in modern physics. Offered: Sp.

PHYS 513 Electromagnetism and Relativity (4) First of a three-part sequence. Principles of electrostatics, complex variable techniques, boundary value problems and their associated mathematical techniques, Green's functions. Offered: A.

PHYS 514 Electromagnetism and Relativity (3) Continuation of PHYS 513. Electric and magnetic fields in free space and material media, wave guides and cavity resonators. Offered: W.

PHYS 515 Electromagnetism and Relativity (4) Continuation of PHYS 514. Special relativity, electromagnetic radiation from accelerated charges, synchrotron radiation, Cerenkov radiation, radiation reaction. Offered: Sp.

PHYS 517 Quantum Mechanics (4) First of a three-part sequence. Modern non-relativistic quantum mechanics developed, beginning with its basic principles. Dirac and abstract operator notation introduced, starting with simple examples. Offered: A.

PHYS 518 Quantum Mechanics (4) Continuation of PHYS 517. Modern non-relativistic quantum mechanics. The character of the theory illustrated both with physical examples and with conceptual problems.

Topics include: atomic structure, scattering processes, density operator description of mixed states, and measurement theory. Abstract operator methods emphasized in the exposition of angular momentum, scattering, and perturbation theory. Offered: W.

PHYS 519 Quantum Mechanics (4) Continuation of PHYS 518. Modern non-relativistic quantum mechanics. Physical examples and conceptual problems. Topics include: atomic structure, scattering processes, density operator description of mixed states, and measurement theory. Abstract operator methods emphasized in the exposition of angular momentum, scattering, and perturbation theory. Offered: Sp.

PHYS 520 Advanced Quantum Mechanics—Introduction to Quantum Field Theory (4) Multi-particle systems, second quantization, diagrammatic perturbation theory, radiation, correlation functions and multi-particle scattering, relativistic theories, renormalizability, basic quantum electrodynamics, and other applications. Offered: A.

PHYS 521 Advanced Quantum Mechanics—Introduction to Quantum Field Theory (3) Multi-particle systems, second quantization, diagrammatic perturbation theory, radiation, correlation functions and multi-particle scattering, relativistic theories, renormalizability, basic quantum electrodynamics, and other applications. Offered: W.

PHYS 522 Advanced Quantum Mechanics: Introduction to Modern Quantum Field Theory (3) Functional integrals, symmetry breaking, critical phenomena and continuum limits, and non-perturbative methods. Credit/no credit only. Offered: Sp.

PHYS 524 Thermodynamics and Statistical Mechanics (4) Statistical mechanical basis of the fundamental thermodynamical laws and concepts; classical and quantum statistical distribution functions; applications to selected thermodynamic processes and examples of Bose and Fermi statistics. Offered: W.

PHYS 525 Statistical Mechanics (3) Introduction to equilibrium and non-equilibrium aspects of many-body systems; scale invariance and universality at phase transitions and critical phenomena; exactly soluble models; Markov processes, master equations and Langevin equation in non-equilibrium stochastic processes. Prerequisite: PHYS 524. Offered: A.

PHYS 527 Current Problems in Physics (1) Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: A.

PHYS 528 Current Problems in Physics (1) Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: W.

PHYS 530 Laser Physics (4) Physics underlying laser design and operation in the context of common laboratory systems. Topics may include continuous and pulsed lasers; solid, liquid, and gas gain media; Q-switching, mode-locking, resonator theory, nonlinear optics, and others. Prerequisite: basic quantum mechanics, electromagnetism, and optics; recommended: PHYS 541.

PHYS 541 Applications of Quantum Physics (4) Techniques of quantum mechanics applied to lasers, quantum electronics, solids, and surfaces. Emphasis on approximation methods and interaction of electromagnetic radiation with matter. Prerequisite: PHYS 421 or PHYS 441 or equivalent. Offered: Sp.

PHYS 542 Numerical Methods in Physics (4) Numerical methods for analysis and computation in physics. Topics may include integration, differential equations, partial differential equations, optimization, data handling, and Monte Carlo techniques. Emphasis is applications in physics. Prerequisite: 30

credits in physical sciences, computer science, or engineering.

PHYS 543 Electromagnetic Theory (4) Principal concepts of electromagnetism. Static electric and magnetic fields. Boundary-value problems. Electric and magnetic properties of materials. Electromagnetic waves and radiation. Prerequisite: 30 credits in physical sciences, computer science, or engineering. Offered: A.

PHYS 544 Applications of Electromagnetic Theory (4) Emphasis may vary from year to year. Topics may include electromagnetic waves, radiation, scattering, wave guides, plasma physics, quantum electronics, and accelerator physics. Prerequisite: PHYS 543 or equivalent.

PHYS 545 Contemporary Optics (4) Coordinated lecture and laboratory treatment of topics in contemporary optics. Subjects include Fourier optics, lens systems, interferometry, laser optics, holography, polarization, crystal optics, birefringence, laser and conventional light sources, optical detectors. Prerequisite: PHYS 543 or equivalent.

PHYS 546 Condensed-Matter Physics (4) Introduction to the theory of solids: crystal structure in real space and reciprocal space, phonons, free electrons, band theory, semiconductor devices. Prerequisite: PHYS 441 or equivalent.

PHYS 547 Electronics for Physics Research (4) Electronic techniques as applied in physics research. Topics include noise, control-system analysis, operational amplifiers, lock-in amplifiers, precision power supplies and metering, data transmission, microprocessors. Several integrated measurement systems are examined in the context of specific research problems. Prerequisite: elementary electronics.

PHYS 550 Atomic Physics (3) Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: PHYS 519.

PHYS 551 Atomic Physics (3) Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: PHYS 519.

PHYS 554 Nuclear Astrophysics (3) Big bang nucleosynthesis; nuclear reactions in stars; solar neutrinos and neutrino oscillations; core-collapse supernovae; nucleosynthesis in stars, novae, and supernovae; neutron stars; composition and sources of cosmic rays; gamma ray bursts; atmospheric neutrinos. Offered: jointly with ASTR 510; A.

PHYS 555 Cosmology and Particle Astrophysics (3) Big bang cosmology; relativistic world models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter. Offered: jointly with ASTR 513; W.

PHYS 557 High Energy Physics (3) First quarter of a three-quarter series. Emphasis on the experimental foundations of particle physics. Prerequisite: PHYS 519; recommended: PHYS 520, which may be taken concurrently. Offered: A.

PHYS 558 High Energy Physics (3) Second quarter of a three-quarter series. Phenomenology of the standard model of strong and electro-weak interactions, including an introduction to Feynman diagrams. Prerequisite: PHYS 519; recommended: PHYS 520 and PHYS 521, which may be taken concurrently. Offered: W.

PHYS 559 High Energy Physics (3) Third quarter of a three-quarter series. Topics of current interest in high-energy particle physics. Prerequisite: PHYS

519; recommended: PHYS 520 and 521, which may be taken concurrently. Offered: Sp.

PHYS 560 Theoretical Nuclear Physics (3) First of a two-part sequence. Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: PHYS 519. Offered: A.

PHYS 561 Theoretical Nuclear Physics (3) Continuation of PHYS 560. Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: PHYS 519. Offered: W.

PHYS 564 General Relativity (3) First of a two-part sequence. 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: PHYS 515.

PHYS 565 General Relativity (3) Continuation of PHYS 564. 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: PHYS 515.

PHYS 567 Theory of Solids (3) First quarter of a course on modern solid state and condensed matter physics, aimed at bringing student's knowledge up to the level of current literature. Topics include structural, electronic, and vibrational properties; precision response functions and dynamics; transport theory; and cooperative phenomena. Prerequisite: PHYS 519, PHYS 524. Offered: AW.

PHYS 568 Theory of Solids (3) Second quarter of a course on modern solid state and condensed matter physics, aimed at bringing the student's knowledge up to the level of current literature. Additional topics (see PHYS 567) include magnetism, quantum Hall effect, superconductivity. Offered: WSp.

PHYS 570 Quantum Field Theory (3) Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Credit/no credit only. Prerequisite: PHYS 522.

PHYS 571 Quantum Field Theory (3) Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Credit/no credit only. Prerequisite: PHYS 522.

PHYS 572 Modern Quantum Field Theory (3) Advanced topics in quantum field theory. Credit/no credit only. Prerequisite: PHYS 570, PHYS 571.

PHYS 575 Selected Topics in Applications of Physics (*, max. 30)

PHYS 576 Selected Topics in Experimental Physics (*, max. 30)

PHYS 578 Selected Topics in Theoretical Physics (*, max. 30) Credit/no credit only.

PHYS 580 Physics Colloquium (*, max. 30) Credit/no credit only. Offered: AWSp.

PHYS 581 Seminar in High-Energy Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 582 Seminar in Particle Theory (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 583 Seminar in Relativistic Astrophysics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 584 Seminar in Atomic Physics and Coherent Spectroscopy (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 585 Seminar in Experimental Nuclear Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 586 Seminar in Condensed Matter Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 587 Seminar in Nuclear Theory (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 588 Particle Astrophysics Seminar (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 589 Seminar in Problems of Physics Education (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 590 Seminar in Statistical Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 600 Independent Study or Research (*) Study or research under the supervision of individual faculty members. Credit/no credit only. Prerequisite: permission of supervisor. Offered: AWSpS.

PHYS 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson. Offered: AWSpS.

Political Science

101 Gowen



General Catalog Web page:
www.washington.edu/students/genocat/academic/political_sci.html



Department Web page:
www.washington.polisci.edu

Students of political science examine the theory and practice of government and politics. They acquire knowledge of political institutions and processes and learn to think critically about public policies and their consequences. They learn how to evaluate individual, group, and mass behavior in political settings. Because of their understanding and interest in political systems, students who major in political science enter such career fields as government service, law, business, journalism, politics, public-policy analysis, and education.

The department is organized into four major fields of study: political theory, American government and politics, international relations, and comparative politics. Several subfields—public law, law and public policy, political communication, political culture, and political economy—cut across these main areas and provide focused specialization for both undergraduate and graduate students. The department has long been renowned in comparative and international politics, especially in the study of Asian political phenomena, in public law, and in American government and politics. The department has also augmented its faculty strength in public policy, political and feminist theory, and political economy.

Graduate Program

Graduate Program Coordinator
215 Smith, Box 353530
206-543-1898
polsgrad@u.washington.edu

Graduate study in political science integrates traditional education in political science's primary fields with other fields in the social sciences, allowing an eclectic, interdisciplinary approach.

The department has long been outstanding in comparative and international politics, and has augment-

ed its faculty strength in American politics, Western European politics, political theory, international relations, political economy, public policy, public law, political communication, and methodology. Graduate students can pursue studies in other campus units, such as the School of Marine Affairs, the Graduate School of Public Affairs, the Henry M. Jackson School of International Studies, the School of Communications, and the School of Law.

Master of Arts, Doctor of Philosophy

Graduate work in political science is organized primarily as preparation for the Doctor of Philosophy degree. The department does not offer a terminal Master of Arts degree, so the Master of Arts program serves as the initial stage of the Ph.D. program.

The department admits for autumn quarter only, with an application deadline of January 15. Admission and financial-aid decisions are based on the applicant's academic transcript, Graduate Record Examination general test scores (no subject test is required), three letters of reference, a statement of purpose, and a writing sample. Foreign students are required to submit TOEFL scores.

Master of Arts

A bachelor's degree is required for admission to the graduate program. To earn the M.A. degree, students must complete a three-course political methodology sequence, satisfy course requirements in two fields, and submit and orally defend an essay of distinction. One of the fields must be chosen from four general fields: political theory, international relations, comparative politics, and American politics. The second field may be a second general field or one of the following specialized fields: area study, public law, political communication, public policy process, political methodology, or political economy. Completion of the M.A. degree generally requires two years of full-time study.

Doctor of Philosophy

Most students are expected to have completed an M.A. degree in political science in this department for the Ph.D. program. The doctoral student must prepare a total of three fields, including at least one general field (see general and specialized fields above) and no more than one constructed field. Students must also complete a three-course political methodology sequence (usually completed as part of the M.A.). Competence in a foreign language is required only if deemed appropriate by the student's supervisory committee. To advance as a doctoral candidate, students must complete all of the above, write examinations in each of the three fields, and defend their dissertation prospectus. Once advanced to candidacy, students must write and orally defend their dissertation in order to graduate. The Ph.D. program requires a minimum of three years of full-time course work (including the satisfaction of M.A. requirements) followed by the completion of the dissertation project.

Research Facilities

The University library system, the largest research library in the Pacific Northwest, has a collection of five million volumes, with specialized collections for the Pacific Northwest, Near East, South Asia, and Slavic and East European areas. A political science reference librarian is available in the Suzzallo and Allen Libraries to assist graduate students and the specialized needs of the department. Specialized access to computing facilities and extensive data holdings is available through the Center for Social Science Computation and Research and the Political Science Computer Classroom. The University is a member of the Inter-University Consortium for Political and Social Research.

Financial Aid

Fellowships, research assistantships, and teaching assistantships are available to qualified graduate students including those in their first year of study.

Faculty

Chair

Stephen J. Majeski

Professors

Bachman, David M. * 1991, (Adjunct); PhD, 1984, Stanford University; Chinese politics and foreign policy and China's political economy (1949-present); U.S.-China relations.

Bennett, W. Lance * 1974; MPhil, 1973, PhD, 1974, Yale University; American politics, comparative politics, political communication, mass media, political culture.

Brass, Paul R. * 1965, (Emeritus); PhD, 1964, University of Chicago; comparative government, international relations.

Burstein, Paul * 1985, (Adjunct); PhD, 1974, Harvard University; political sociology, social movements, social stratification, public policy, law.

Caporaso, James A. * 1988; PhD, 1968, University of Pennsylvania; research methodologies, international political economy, comparative politics, European community.

Cassinelli, Charles W. * 1960, (Emeritus); PhD, 1953, Harvard University; comparative government (Latin America).

Dobel, J. Patrick * 1985, (Adjunct); PhD, 1976, Princeton University; political theory, ethics and public policy, organizational theory.

Gerberding, William P. *, (Emeritus); PhD, 1959, University of Chicago; American government and politics.

Gore, William J. * 1966, (Emeritus); PhD, 1952, University of Southern California; public policy, public administration.

Hartsock, Nancy C.M. * 1984; PhD, 1972, University of Chicago; feminist theory, Marxism, contemporary political theory.

Hellmann, Donald C. * 1967; PhD, 1964, University of California (Berkeley); Japanese politics and international relations.

Jones, Bryan D. * 1996; PhD, 1970, University of Texas (Austin); decision-making and public policy processes in American government.

Keeler, John T. * 1980; PhD, 1978, Harvard University; comparative politics (Western Europe), international relations.

Kiser, Edgar Vance * 1988, (Adjunct); PhD, 1987, University of Arizona; political sociology, theory, historical sociology.

Lang, Gladys Engel * 1984, (Emeritus); PhD, 1954, University of Chicago; political effects of mass media, sociology of art, political movements and crowd behavior.

Lev, Daniel S. * 1970, (Emeritus); PhD, 1964, Cornell University; comparative politics (Southeast Asia).

Levi, Margaret * 1974; PhD, 1974, Harvard University; comparative politics, political economy, labor politics.

Majeski, Stephen J. * 1984; PhD, 1981, Indiana University; international relations, foreign policy, peace and conflict resolution.

Matthews, Donald Rowe * 1976, (Emeritus); PhD, 1953, Princeton University; American government and politics, comparative politics (Norway, U.K.).

May, Peter J. * 1979; PhD, 1979, University of California (Berkeley); policy processes; policy design and implementation; environmental regulation.

McCann, Michael W. * 1982; MA, 1976, PhD, 1983, University of California (Berkeley); American government and politics, public law, political theory.

McCrone, Donald J. * 1979, (Emeritus); PhD, 1966, University of North Carolina; American politics, political economy, methodology.

Migdal, Joel S. * 1980, (Adjunct); MA, 1968, PhD, 1972, Harvard University; state and society in the Third World; Middle East politics.

Modelski, George * 1967, (Emeritus); PhD, 1954, University of London (UK); international relations, international political economy.

Olson, David J. * 1974; PhD, 1971, University of Wisconsin; American government and politics (urban, state, and labor relations).

Reshetar, John S, Jr. * 1957, (Emeritus); PhD, 1950, Harvard University; comparative government (Soviet Union), international relations.

Scheingold, Stuart A. * 1969, (Emeritus); PhD, 1963, University of California (Berkeley); American politics (public law).

Taylor, Michael John * 1985; PhD, 1976, University of Essex (UK); political theory, political economy.

Townsend, James R. * 1968, (Emeritus); PhD, 1965, University of California (Berkeley); comparative government (China), politics of development.

Ward, Michael D. * 1997; PhD, 1977, Northwestern University; international relations, political economy, political geography, statistical models.

Associate Professors

Di Stefano, Christine * 1985; PhD, 1984, University of Massachusetts; political theory (modern and contemporary), feminist theory, political culture.

Domke, David S. * 1998, (Adjunct); PhD, 1996, University of Minnesota; communication effects; political cognition; political elites and public opinion; race, gender, media.

Gastil, John W. * 1997, (Adjunct); PhD, 1994, University of Wisconsin; deliberation and democracy, group decision making, political discourse, political philosophy, civic.

Gill, Anthony J. * 1994; MA, 1989, PhD, 1994, University of California (Los Angeles); comparative politics, Latin America, political economy, methodology.

Goldberg, Ellis * 1985; PhD, 1983, University of California (Berkeley); political economy of the Middle East, comparative politics.

Gottfried, Alex 1951, (Emeritus); MA, 1948, PhD, 1952, University of Chicago; American government and politics.

Hanson, Stephen E. * 1990; MA, 1986, PhD, 1991, University of California (Berkeley); Soviet, post-Soviet and comparative politics.

Ingebritsen, Christine * 1992, (Adjunct); PhD, 1993, Cornell University; Scandinavian domestic and foreign policies; European community integration and Scandinavia.

Kier, Elizabeth L. * 1998; PhD, 1992, Cornell University; international security, civil military relations and Western Europe.

Litfin, Karen T. * 1991; PhD, 1992, University of California (Los Angeles); international environmental politics, globalization processes, technology and politics.

Mayerfeld, Jason * 1991; MA, 1988, PhD, 1992, Princeton University; political theory, ethics.

Mercer, Jonathan L. * 1996; PhD, 1993, Columbia University; international relations theory, security, political psychology, rationality and emotion.

Rivenburgh, Nancy * 1989, (Adjunct); MS, 1982, Boston University, PhD, 1991, University of Washington; international communications; the role of media in international and intercultural relations.

Rohn, Peter H. * 1962, (Emeritus); PhD, 1958, University of Washington; international relations, international law.

Simpson, Andrea Y. * 1993; PhD, 1993, Emory University; ethnic identity and its effect on political attitudes and behaviors.

Smith, Steven Rathgeb 1996, (Adjunct); MSW, 1978, Washington University, PhD, 1988, Massachusetts Institute of Technology; nonprofit and public management, state and local government, health and social policy.

Whiting, Susan H. * 1994; PhD, 1995, University of Michigan; political economy of development in post-1949 China.

Wilkerson, John D. * 1990; MA, 1989, PhD, 1991, University of Rochester; American government and politics, quantitative methodology.

Assistant Professors

Cichowski, Rachel A. 2001; MA, 1997, PhD, 2002, University of California (Irvine); law and courts, comparative politics, integration and democratization in Europe, women's rights.

Givens, Terri E. 1999; MA, 1996, PhD, 2000, University of California (Los Angeles); comparative politics, Western Europe, political parties, political economy.

Lovell, George I. 2001; PhD, 1997, University of Michigan; American government, public law, American political development.

Moy, Patricia * 1998, (Adjunct); PhD, 1998, Cornell University; political communication, public opinion, media effects and research methodology.

Quinn, Kevin M. 2000; PhD, 1999, Washington University (St. Louis); political methodology, comparative political economy, formal modeling.

Simon, Adam F. * 1997; MA, 1993, PhD, 1997, University of California (Los Angeles); American government, methodology, political communication, voting, behavior media.

Smith, Mark A. * 1997; PhD, 1997, University of Minnesota; American politics, interest groups, political economy, Congress, public policy.

Wibbels, Erik M. 2000; PhD, 2000, University of New Mexico; comparative politics, political economy, developmental economics, comparative federalism.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Political Science

POL S 401 Advanced Special Topics in Political Theory (5, max. 10) I&S Topics can include, but are not limited to, analytical theory pertaining to justice, exploitation, and freedom; revolution and social changes; collective choice and action; sexuality and politics; critical theory; Marxist theory; post-structuralism. Content varies. Recommended: POL S 201.

POL S 403 Advanced Special Topics in International Relations (5, max. 10) I&S Examination of contemporary developments in the field of international relations. Content varies according to the nature of developments and research interests of the instructor.

POL S 404 Topics in Public Policy (3-5, max. 6) I&S Examines selected issues of importance in all areas of public policy. Focus on in-depth analysis of vital public policy issues and the integration of economic, political, and administrative perspectives on them. Offered: jointly with PB AF 499.

POL S 405 American Politics Seminar (5, max. 10) I&S Intensive reading and research in selected problems or fields of political analysis.

POL S 407 International Conflict (5) I&S Many forms of international conflict, including global wars, local wars, antiregime wars, military interventions, and international crises. Several political, social, and anthropological explanations for conflicts and examination of alternative world futures.

POL S 409 Undergraduate Seminar in Political Economy (5, max. 10) I&S Seminar in political economy with focus on Marxian and public choice approaches to political economy. Explores the questions raised by each approach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Recommended: ECON 300; POL S 270. Offered: jointly with ECON 409.

POL S 410 Technology, Politics, and the State (5) I&S Relationships between politics, technological change, and development of multinational corporations. Considers whether the relations between political and economic systems of industrial societies have been fundamentally altered by the increased importance and interdependence of government, experts, and new technological possibilities for intervention in social life.

POL S 411 Theories of the State (5) I&S Topics may include origins and development of the state; arguments about the necessity, desirability, and proper role of the state; the nature and operation of modern states and the international state system; the legitimacy of modern state power.

POL S 412 Democratic Theory (5) I&S Explores the concept of democracy and theoretical models purporting to describe its central features: majority rule, participation, and deliberation. Themes also include: representative vs. direct democracy; the rights of minorities; the relationship between democracy and other political theories such as liberalism, socialism, and conservatism. Prerequisite: POL S 201; either POL S 308, POL S 309, POL S 310, or POL S 318.

POL S 413 Contemporary Political Theory (5) I&S Analysis of political theorists, exploring contemporary theories of humanity and society that form the basis for differing political ideas.

POL S 414 Politics and Culture (5) I&S How people interpret and shape the political world around them through the use of such cultural resources as language, symbolism, myth, and ritual. The various uses of these cultural elements establish the place of the individual in society, influence the perception of political events, and create opportunities for individual and mass political responses.

POL S 415 Women's Rights in an Integrated Europe (5) I&S Examines the transformation in women's rights policy within the European community from the late 1950s through the present. Focuses on the legal rules and bodies that govern not only these policy domains, but also their evolution and impacts. Offered: jointly with LSJ 428.

POL S 416 Economic Theory as Applied to the Political System (5) I&S Explanation and evaluation of the political system, using elementary economics theory. Topics include alternative voting rules, the political effectiveness of various types of groups, causes and consequences of logrolling, and bureaucratic organizations. Prerequisite: ECON 300. Offered: jointly with ECON 452.

POL S 419 United States-China Relations (5) I&S Surveys the history of United States-China relations and examines the evolution of bilateral relations, particularly since 1949. Focus on the period since 1972 and the major issues as they have evolved since that time, including trade, human rights, security, and Taiwan. Offered: jointly with SISEA 459.

POL S 420 Soviet and Russian Foreign Policy (5) I&S Ideological, historical, and strategic components of Soviet foreign policy; Gorbachev's "new thinking" and the collapse of the USSR; redefining post-Soviet "Russia"; Russian military and security policy; Russia and the West; Russian relations with the Newly-Independent States.

POL S 421 Relations Among Communist and Post-Communist States (5) I&S Major disputes and types of relationships among different communist states; international effects of the communist collapse; comparative dynamics of state-building, market reform, and democratic transition; international integration and domestic politics in the former Soviet bloc; ethnic conflict and the problem of state boundaries; redefining security in the post-communist milieu.

POL S 422 International Environmental Politics Seminar (5) I&S Study of the practical and theoretical challenges associated with global ecological interdependence. Examination of international treaties and institutions, state, and nonstate actors with an emphasis on the emerging concept of sustainability.

POL S 423 International Law (5) I&S Origin and present status of efforts to make rules of conduct for sovereign states; simulation of a treaty-drafting conference, with students playing roles of legal advisers to foreign governments.

POL S 426 World Politics (5) I&S The nation-state system and its alternatives, world distributions of preferences and power, structure of international authority, historical world societies and their politics. Offered: jointly with SIS 426.

POL S 427 International Political Economy (5) I&S Examines major theoretical problems, substantive issues, and school of thought in international political economy (IPE), including issues of trade, production, and finance. Preparation for critical analysis of dilemmas entailed in establishing and maintaining

an instrumentally effective and ethically acceptable IPE system.

POL S 428 Military Intervention (5) I&S Historical and theoretical analysis of military intervention in the post-World War II era. Considers how and why interventions occur and evaluates intervention as a foreign-policy response.

POL S 429 National and International Security (5) I&S Examines what constitutes U.S. national interests; causes of war and means of deterring war; discusses role nuclear weapons play in international security; how to deter use of chemical and biological weapons; desirability of non-lethal weapons; and role for economic sanctions, intelligence, and ethics.

POL S 430 Civil-Military Relations in Democracies (5) I&S *E. Kier* Explores issues of civil-military relations in the United States including debates about the garrison state hypothesis; military advice on the use of force; the civil-military "gap"; and issues of race, gender, and sexual orientation in the military.

POL S 431 International Relations in the Middle East (5) I&S Study of domestic sources of foreign policy in the Middle East; politics of oil; the East-West rivalry in the arena; and conflict and collaboration among the local powers.

POL S 432 Political Islam and Islamic Fundamentalism (5) I&S Study of resurgence, since mid-1970s of political Islam and what has come to be called Islamic fundamentalism, especially in the Middle East. Topics include the nature and variety of political Islam today, causes and implications of the current resurgence, and comparison with previous resurgences. Offered: jointly with SIS 406.

POL S 434 International Relations of South Asia (5) I&S Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia. Offered: jointly with SISSA 434.

POL S 435 Japanese Government and Politics (5) I&S Government and politics of Japan with emphasis on the period since 1945. Offered: jointly with SISEA 435.

POL S 439 Politics of Divided Korea (5) I&S Governments, politics, and economy of South and North Korea, the inter-Korea relations, and the two Koreas' relationship with the major powers—especially the United States—with emphasis on the post-cold war period. Offered: jointly with SISEA 439.

POL S 441 Government and Politics of Russia (5) I&S Ideological and historical bases of Soviet politics; Leninism; Stalinism; Gorbachev's perestroika and the collapse of the USSR; the role of Yeltsin; problems of Russian state-building, market reform, and democratic transition; political parties and civil society; the relationship between the center and the regions; the problem of Russian national identity.

POL S 442 Government and Politics of China (5) I&S Post-1949 government and politics, with emphasis on problems of political change in modern China. Offered: jointly with SISEA 449.

POL S 443 Comparative Political Societies (5) I&S Analyses of modern and premodern types of stable political society; special attention to contemporary representative democracy.

POL S 445 Politics and Society in Eastern Europe (5) I&S Political and social issues in lands east of the Elbe, treating some historical problems but focusing particularly on developments since 1945. Includes all communist states of Eastern Europe and their successors. Offered: jointly with SISRE 445.

POL S 446 Peasants in Politics (5) I&S Interdisciplinary study of peasants, with special

attention to questions of rural transformation. Peasant involvement in an increasingly interdependent world. Rebellion and revolution, impact of the international market, agricultural development. Offered: jointly with SIS 444.

POL S 447 Comparative Politics Seminar (5, max. 10) I&S Selected comparative political problems, political institutions, processes, and issues in comparative perspective. Strongly recommended: POL S 204.

POL S 448 Politics of the European Community (5) I&S Examines the origins, structures, and political dynamics of the European Community. Attention given to theories of integration, to relations between the European Community and member states, and to the role of the European Community in world politics.

POL S 449 Politics of Developing Areas (5) I&S Comparative study of problems of national integration and political development in the new states of Asia and Africa.

POL S 450 State-Society Relations in Third World Countries (5) I&S Relationships among political, social, and economic changes in Asia, Africa, and Latin America. Problems of economic and political development, revolution and reform, state-society relations, imperialism and dependency. Offered: jointly with SIS 456.

POL S 452 Mass Media and Public Opinion (5) I&S Examines the foundations of the idea of public opinion in a democratic environment and the role of mass communication in the organization, implementation, and control of that opinion. Considers these relationships from the perspectives of societal elites, media, and citizens. Offered: jointly with COM 414.

POL S 461 Mass Media Law (5) I&S Survey of laws and regulations that affect the print and broadcast media. Includes material on First Amendment, libel, invasion of privacy, freedom of information, copyright, obscenity, advertising and broadcast regulation, and matters relating to press coverage of the judicial system. Offered: jointly with COM 440.

POL S 462 The Supreme Court in American Politics (5) I&S 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 464 The Politics of American Criminal Justice (5) I&S Political forces and value choices associated with the enforcement of criminal law. Distribution of resources among participants in the criminal justice system (e.g., police, attorneys, defendants, and judges). Understanding and evaluation of the interaction of criminal justice processes with the political system.

POL S 466 Feminist Legal Studies: Theory and Practice (5) I&S Examines feminist theoretical analyses of the law. Engages in current debate on the study of critical race, gender, and class theory. Includes: women in prison, public assistance, the sex industry, women and health care, and immigration law. Recommended: WOMEN 200 or WOMEN 310. Offered: jointly with LSJ 466/WOMEN 410.

POL S 468 Comparative Media Systems (5) I&S Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with COM 420/SIS 419.

POL S 470 Public Bureaucracies in the American Political Order (5) I&S Growth, power, and roles of governmental bureaucracies in America: conflict and conformity with American political thought, other political institutions, and the public.

POL S 473 Decision-Making in Politics (5) I&S Process of decision-making in politics at elite and mass levels, comparison of approaches based on the comprehensive rationality of decision makers with approaches based on limitations on the cognitive capacities of decision makers. Applications to real decision-making situations.

POL S 474 Government and the Economy (5) I&S Interaction between politics and the economy. Impact of policy makers on economic performance. Models of partisan and political business cycles. Concepts of economic voting. Marxist theories of modern capitalist economics. Recommended: ECON 201; MATH 124 or MATH 134.

POL S 476 Strategy in Politics (5) I&S Explores the problem of finding fair methods for making social decisions, and examines alternative methods of social choice. Emphasis on the importance of agenda control for outcomes, and the implications of theories of social choice for common interpretations of concepts such as democracy and the general will. Recommended: POL S 101 or POL S 202; POL S 481.

POL S 481 Big City Politics (5) I&S Contemporary big city politics, focusing on Seattle and the largest twenty-five cities. Social, economic, and political trends that have shaped characteristics of large American cities. Distribution and use of economic and political power among parties and groups. Future of large cities and politics of change.

POL S 488- Honors Senior Thesis (5-) I&S Students individually arrange for independent study of selected topics under the direction of a faculty member. Research paper is student's senior thesis. Students meet periodically as a group to discuss research in progress. Recommended: 15 credits POL S 398.

POL S 489 Honors Senior Thesis (-5) I&S Students individually arrange for independent study of selected topics under the direction of a faculty member. Research paper is student's senior thesis. Students meet periodically as a group to discuss research in progress. Recommended: 15 credits POL S 398.

POL S 490 Foundations of Political Analysis (5) I&S Fundamental issues pertaining to research in political science: "logics of inquiry," problems of concept formation, and development of research methods. Positivist, postempiricist, and other arguments about the nature of scientific knowledge.

POL S 491 Political Research Design and Analysis (5) I&S Major quantitative methods of empirical research in political science. Primary emphasis on research design, data collection, data analysis, and use of computers.

POL S 492 Advanced Political Research Design and Analysis (5) I&S Third methods course in political research. Testing theories with empirical evidence. Examines current topics in research methods and statistical analysis in political science. Content varies according to recent developments in the field and with interests of instructor.

POL S 493 Qualitative Research Methods (5) I&S Introduction to qualitative methods in political science, emphasizing practical experience with techniques. Readings and exercises cover research design, multiple methods, varieties of qualitative data, measurement and validation, participant observation, interviewing, and content analysis. Research decision-making issues include analytical strategies, presentation of data, ethics, epistemology, and theory-building.

POL S 494 Advanced Quantitative Political Methodology (5) *Quinn, Ward* Theory and practice of likelihood inference. Topics covered include probability modeling, maximum likelihood estimation, models for binary responses, count models, sample selection, and basis time series analysis. Prerequisite: POL S 491; POL S 492. Offered: jointly with CS&SS 494.

POL S 496 Undergraduate Internship (5, max. 15) Students serving in approved internships.

POL S 497 Political Internship in State Government (5, max. 20) Students serving in approved internship program with state government agencies.

POL S 498 The Washington Center Internship (15) Full-time academic internship with the Washington Center in Washington, DC Includes internship activities, academic seminar, assemblies, and related activities. Credit/no credit only. Recommended: POL S 202; 45 UW credits.

POL S 499 Individual Conference and Research (2-5, max. 20) Intensive study with faculty supervision. No more than one registration in 499 under same instructor.

Courses for Graduates Only

POL S 505 Comparative Politics (5) Core course. Modern theories, approaches, and methods in the study of comparative politics.

POL S 509 Political Theory—Core (5, max. 10) Introduction to central themes in political theory and the works of major political theorists, past and present.

POL S 511 Seminar in Ethical and Political Theory (5) Ethical writings of major political philosophers. Coherent themes arising from these works and assessment of their impact on concepts of politics.

POL S 513 Issues in Feminist Theory (5) Contemporary issues in feminist theory as they affect studies of women, politics, and society.

POL S 514 Selected Topics in Political Theory (5, max. 15) Selected topics, historical and conceptual, national, regional, and universal. Prerequisite: permission of instructor.

POL S 515 Political Theory Research Seminar (5) Survey of paradigmatic research approaches in political theory through the exploration of a theme (canonical text, theoretical concept, and specific topic). Methods covered may include rational choice, psychoanalytic, Straussian, Marxian, and feminist approaches. Students carry out substantive theoretical research. Recommended: second- or third-year graduate standing.

POL S 516 Special Topics in American Political Thought (3/5) Special topics or themes in the development of American political culture.

POL S 517 Marxism and Critical Theory (5) Works of Marx and Engels as well as selected works of twentieth-century Marxist and critical theorists. Themes such as Marx's method, twentieth-century interpretations of Marx, and relationship of twentieth-century theorists to their eighteenth- and nineteenth-century forebears.

POL S 519 Modern Scandinavian Politics (5) Analyzes the political, economic, and historical development of Sweden, Norway, Denmark, Iceland, and Finland from World War II to the present. Readings focus on domestic and foreign policies that distinguish these countries from other advanced industrial societies. Offered: jointly with SCAND 519.

POL S 520 Seminar on Russian Foreign Policy (3) Selected topics in the development and objectives of the foreign policy of the Russian Federation. Prerequisite: permission of instructor.

POL S 521 International Relations I: Theory and Method (5) Part one of the core course in the field of international relations. Reviews contemporary theory, research, and methodology in the study of world politics.

POL S 522 International Political Economy (5) Theories of international political economy. Focuses on the emergence and development of the modern world system, the transition from feudalism to capitalism, and the institution of the nation-state system. Examines the political economy of trade, investment, and the international division of labor from a variety of theoretical perspectives. Prerequisite: POL S 521.

POL S 525 International Law—Policy (5) 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: POL S 423 or permission of instructor.

POL S 527 Special Topics in International Relations Research (5, max. 15) Examination of current topics in the theory and practice of world politics. Content varies according to recent developments in the field and research interests of the instructor.

POL S 528 Advanced International Relations Theory (5) Covers advanced works in international relations theory. e.g., realism, neorealism, game theory, and theories of cooperation and conflict. Includes some classic works (Thucydides, Hobbes, E. H. Carr) to show continuity of debates in the present. Modern theories of war, conflict, cooperation, and international institutions also explored. Prerequisite: POL S 521.

POL S 530 Transatlantic Relations: The United States and Europe in World Politics (5) Fulfills required component of "American Module" of Transatlantic Studies program. Addresses political dynamics of relations between United States and Europe from American republic's founding to post-Cold War era. Limited to students in Transatlantic Studies program.

POL S 532 The Chinese Political System (5) Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor. Offered: jointly with SISEA 532.

POL S 533 Seminar on Contemporary Chinese Politics (5) Research on selected problems in contemporary Chinese politics. Prerequisite: POL S 532 or permission of instructor. Offered: jointly with SISEA 533.

POL S 534 International Affairs (3) Provides a broad understanding of international issues and United States policy. Students explore US foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with PB AF 530/SIS 534.

POL S 535 International Relations of Modern China (5) Foreign policy of the People's Republic of China: historical antecedents; domestic and international systemic determinants; and Chinese policies toward major states, regions, and issues. Prerequisite: a course on contemporary Chinese politics or history, or permission of instructor. Offered: jointly with SISEA 535.

POL S 537 Approaches to East European Politics (3-5) Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of east-central and southeastern Europe. Prerequisite: permission of instructor. Offered: jointly with SISRE 504; alternate years.

POL S 538 Government and Politics in the Middle East and North Africa (5) 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 instrumentation of change; and problems of international relations and regional conflict and integration.

POL S 539 International Relations of Northeast Asia (5) Comprehensive survey of contemporary international relations of Northeast Asia with emphasis on Russia, Japan, China, and the United States. Multidisciplinary approach placing contemporary problems in historical context, drawing on modern social science theories. Connections between defense and economics are examined. Prerequisite: permission of instructor. Offered: jointly with SISEA 551.

POL S 541 Institutions and Institutional Change in the Soviet Union, Russia, and the Newly Independent States (5) Critical appraisal of the principal theories and research methods dealing with the development of the Soviet state from 1917-1991 and the formation of the newly-independent states after the Soviet collapse. Prerequisite: permission of instructor.

POL S 542 Seminar: State and Society (5) Examines the mutually conditioning relationship between states and the societies they seek to govern. Studies states as large, complex organizations and their interactions with society on different levels. Shows that interactions on any level affect the nature of the state on other levels as well. Offered: jointly with SIS 542.

POL S 543 Latin American Politics (5) Theories of authoritarianism, corporatism, democratization, and revolution in Latin America. Explores role of international and domestic economic factors shaping politics and the affect of politics on economic development. Examines elite behavior and grassroots social movements.

POL S 544 Problems in Comparative Government (5, max. 15) Selected problems in the comparative analysis of political institutions, organizations, and systems.

POL S 547 Politics of Reform (5) Examines cases of reform in democratic political systems, e.g., Roosevelt's New Deal, Allende's Chilean "revolution," Mitterrand's socialist experiment in France, and the Thatcher government in Britain.

POL S 548 Comparative Political Parties (3) Role of political parties in the modern state. Similarities and differences in origins and development of political parties and functions they perform, both in established democracies and in developing countries.

POL S 550 American Politics—Core (5) Core course in American government and politics. Systematic survey of the literature; focuses on national politics. Prerequisite: undergraduate courses in American government and politics.

POL S 551 Political Communication (5) Survey of contemporary and some historical political communications research, emphasizing quantitative aspects. May include discussions and demonstrations of experimental, survey, aggregate, and content analysis methods. Designed to foster substantive comprehension of political communication literature, familiarity with research techniques, and cre-

ation of empirical projects. Offered: jointly with COM 551.

POL S 553 Public Opinion (5) Selected problems in opinion formation, characteristics, and role of public opinion in policy-making process. Prerequisite: POL S 452.

POL S 554 Legislative Politics (5) Selected problems in legislative processes and leadership, state and national.

POL S 555 American Politics Topics (5, max. 10) Examination of current topics in the theory and practice of American politics. Content varies according to recent developments in the field and research interests of the instructor.

POL S 560 Hierarchical Modeling for the Social Sciences (4) Explores ways in which data are hierarchically organized, such as voters nested within electoral districts that are in turn nested within states. Provides a basic theoretical understanding and practical knowledge of models for clustered data and a set of tools to help make accurate inferences. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505-506 or equivalent. Offered: jointly with CS&SS 560/STAT 560.

POL S 561 Law and Politics (5) Points and levels at which law and politics intersect. What is distinctive about legal forms; how these legal forms influence, and are influenced by, politics. Conceptions of law, courts and public policy, law and bureaucracy, civil and criminal justice, and the legal profession.

POL S 562 Law, Politics, and Social Control (5) Explores works of social scientists and lawyers regarding these competing conceptions of social control: as the seamy side of law—reinforcing equitable patterns of domination and disciplining deviants; as law embodying society's basic values, articulating minimum rules for harmonious social interaction.

POL S 563 Supreme Court in American Politics (5) Explores the tendency in the United States to turn to the Supreme Court to provide constitutional solutions for some of our biggest social, economic, and political problems. Focuses on the controversies concerning the legitimacy and capacity of the Supreme Court to intervene in American politics and public policy.

POL S 564 Law and the Politics of Social Change (5) Explores the many ways that law figures into the politics of social struggle and reform activity. Analyzes law in terms of particular state institutions (courts, agencies), professional elites (lawyers, judges), and especially cultural norms ("rights" discourses) that are routinely mobilized by reform-movement activists.

POL S 566 Problems in Comparative Legal Institutions (3) Social science inquiry in comparative legal institutions. Worldwide scope, with attention to both theory of law in society and development and practice of legal institutions.

POL S 571 American National Institutions (5) Answers the question, "Do institutions matter?" Surveys American national institutions from theoretical perspectives, focusing on how they affect the manner in which decisions are made. Employs cross-institutional perspective of American institutions.

POL S 572 Administrative and Executive Leadership (3) Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered: jointly with PB AF 503.

POL S 573 Topics in Public Policy (5, max. 10) Specialized research topics with a policy process or related theoretical content.

POL S 574 Environmental Regulation Policy (5) Scholarly and practical aspects of environmental regulation. Examines literature concerning regulatory policy design, policy instruments, federalism, compliance and enforcement. Studies selected federal, state, and other nations' environmental policies. Participants are expected to have a good understanding of American policy processes.

POL S 575 Public Policy Processes (5) Political science frameworks, approaches, and theories concerning development and implementation of public policies within American political systems. Governmental behaviors and processes, including rational, political, and bureaucratic models of governmental decision making; agenda-building processes; and normative perspectives concerning role of governmental entities. Offered: jointly with PB AF 575.

POL S 577 The Politics of Social Movements (5) Theoretical inquiry directed to questions of collective action and political tactics by social movement groups. Case studies include labor, civil rights, women's, environmental, and other movements in twentieth-century United States.

POL S 578 Health Politics and Policy (5) Introduces central themes of health-policy research: health is not health care and politics has much to do with why our health-care system works as it does. Investigates how social science helps us understand health issues.

POL S 582 The Political Economy of Social Change (5) Social change and property rights theory. Exploration of long-term secular change through works whose approaches derive from neoclassical economics and analytical Marxism. Evolution and transformation of property rights over land, labor, and capital and the consequences of the property rights structure for political and economic institutions.

POL S 583 Economic Theories of Politics (5) Problems of public goods provision and collective action. Collective action theories and applications as well as critical review of the concept of rationality.

POL S 587 Politics of Urban Reform (5) Interpretations of urban reformers at turn of this century and during 1960s and 1970s. Historical and political science literature on the subject. Prerequisite: graduate student standing and permission of instructor.

POL S 589 Special Topics in Political Economy (3, max. 9) Evaluating research in political economy as well as developing research problems. Topics vary with instructor and with current problems in the literature. Prerequisite: POL S 406, POL S 416, ECON 400, and permission of instructor.

POL S 590 Seminar in Political Behavior (5, max. 10) Analysis of behavioral research in selected fields of political science.

POL S 593 Theories of Decision Making (5) Explanation of political decisions using models of such theoretical processes as preference formation, learning, heuristics, noncooperative games, collective action, agenda manipulation, and coalition formation. Examination of competing notions of political rationality and irrationality and criteria for their evaluation. Strategies for design of decision research. Prerequisite: POL S 491 or permission of instructor.

POL S 594 Political Communication Research Practicum: Community, Communication, and Civic Engagement (5) Overview of the research

process, including literature review, hypothesis generation, data gathering, empirical analysis, and writing for publication. Topics vary with instructor, but generally address questions of how communication affects democracy and citizen engagement in national or international contests. Offered: jointly with COM 556.

POL S 595 College Teaching of Political Science (1)

POL S 597 Directed Readings (1-10, max. 10) Intensive reading in the literatures of political science, directed by the chair of the doctoral supervisory committee. Credit/no credit only.

POL S 598 Independent Writing I (1-5, max. 5) Supervised research and writing for graduate students completing the MA essay of distinction.

POL S 599 Independent Writing II (3-5) Supervised research and writing for graduate students completing the Ph.C. essay of distinction.

POL S 600 Independent Study or Research (*)

POL S 800 Doctoral Dissertation (*)

Law, Societies, and Justice

LSJ 401 Field Experience in Society and Justice (5) Participant observation in some public or private agency relevant to the system of justice.

LSJ 420 The Politics of Rights (5) *M. McCann* Examines rights in practical and social interaction, rights as social conventions, relations of rights practices to official state policies, disputing practices, interest formation, and identify construction at individual and group levels. Explores how rights practices figure into the constellation of contested power relations within modern societies.

LSJ 428 Women's Rights in an Integrated Europe (5) *I&S* Examines the transformation in women's rights policy within the European community from the late 1950s through the present. Focuses on the legal rules and bodies that govern not only these policy domains, but also their evolution and impacts. Offered: jointly with POL S 415.

LSJ 440 Criminal Law and Procedure (4) *I&S* Substantive and procedural criminal law for lay persons; analysis of the philosophy behind the law, with an emphasis on due process in adult and juvenile courts; case-analysis teaching technique.

LSJ 466 Feminist Legal Studies: Theory and Practice (5) *I&S* Examines feminist theoretical analyses of the law. Engages in current debate on the study of critical race, gender, and class theory. Includes: women in prison, public assistance, the sex industry, women and health care, and immigration law. Recommended: WOMEN 200 or WOMEN 310. Offered: jointly with POL S 466/WOMEN 410.

LSJ 470 Evaluation Research in Criminal Justice (5) *I&S* Social science research methods relevant to criminal justice evaluation and operations research. Ethical considerations, formulation of goals and objectives, problem definition and research design, sources and methods of data collection, descriptive statistics, data interpretation, and utilizations of research results.

LSJ 473 Corrections (5) *I&S* Analyzes research on diversionary methods, treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution, probation, parole, halfway houses, other alternatives to incarceration; correctional institutions. Organization of state, federal systems. Problems of administration. Subsidies, governmental control. Planning, public participation. Recommended: SOC 371 and SOC 372. Offered: jointly with SOC 473.

LSJ 474 Geography and the Law (5) I&S *Herbert* Examines the relationship between geography, law, and socio-legal analysis; reviews significant instances where law and geography intersect, such as the regulation of public space, the regulation of borders and mobility, and disputes over property and land use. Offered: jointly with GEOG 474.

LSJ 476 Miscarriages of Justice (5) I&S Examines legal and social factors that shape criminal case outcomes, analyzing how one type of miscarriage of justice—wrongful conviction—occurs. How can cases of wrongful conviction be explained? Why are some people, against whom there is only weak evidence, convicted—and sometimes even executed? Offered: jointly with SOC 476.

LSJ 480 The Police (5) I&S Conceptual and empirical issues concerning multifaceted and changing roles of the American police.

LSJ 485 Introduction to Organized and White Collar Crime (3) I&S Overview of organized and white collar crime. Exposure to definitional problems, distinctive characteristics, potential areas of overlap, and barriers to more effective social control. Addresses impediments resulting from inadequate conceptualizations, legal and operational difficulties in pursuing offenders, and effects of corruption and discretion in the justice system.

LSJ 490 Special Topics in Society and Justice (1-5, max. 15) I&S Examination of various current topics or issues concerning the criminal justice system in our society.

LSJ 499 Readings in Society and Justice (1-5, max. 10) Individual readings in society and justice.

Psychology

119A Guthrie



General Catalog Web page:
www.washington.edu/students/genocat/academic/psychology.html



Department Web page:
depts.washington.edu/psych/

Psychology involves the scientific study of behavior and its causes and the understanding of human behavior in a variety of settings. Psychology is studied either as a natural science, which stresses physical and biological causes of behavior, or as a social science, which stresses the effects of the social setting on human behavior. Major areas of emphasis are human cognition, animal behavior, physiological and sensory bases of behavior, personality and clinical psychology, developmental psychology, social psychology, and quantitative techniques.

Graduate Program

Graduate Program Coordinator
219 Guthrie, Box 351525
206-543-4612
psygrad@u.washington.edu

Graduate work in psychology is organized primarily as preparation for the Doctor of Philosophy degree. The optional Master of Science degree is taken by some doctoral students in the course of their work toward the doctorate.

For graduate instruction, the department is organized into six major areas of study: animal behavior, adult and child clinical, cognition and perception, developmental, physiological, and social psychology and personality. Specialization also exists in the

subareas of community, law, sport, and quantitative psychology.

The program in clinical psychology is accredited by the American Psychological Association and provides scientific and professional training.

Admissions Qualifications

An undergraduate degree in psychology is desirable, but not required. Some preparation in biological, social, or quantitative sciences is strongly advised. Applicants are judged on a number of criteria, including academic and research backgrounds, Graduate Record Examination scores, and written evaluations submitted by former professors or supervisors. Admission of new students occurs in autumn quarter. The deadline for receipt of admissions material is December 15.

Master of Science (Optional)

A master's-degree-only program is not available. Doctoral students have the option of obtaining a master's degree while working toward the Ph.D.

Graduation Requirements: Completion of first-year graduate program (see Doctor of Philosophy degree requirements below) and an appropriate research program, including a research thesis.

Doctor of Philosophy

Graduation Requirements: Completion of course work in major and out-of-area requirements, completion of required course work in statistics and general methodology, independent research, General Examination, dissertation, and Final Examination. Minimum 3.00 GPA overall must be maintained; a minimum grade of 3.0 is required for all courses used to satisfy requirements. First-year requirements: Demonstrate competence in statistics and experimental design; complete at least 3 credits of independent predoctoral research and report that research at the department's annual Research Festival.

Assistantships, Fellowships, or Traineeship Opportunities

Research and teaching assistantships are generally available. Traineeships and fellowships are also available.

Faculty

Chair

Michael D. Beecher

Professors

Barash, David P. * 1973; MA, 1968, PhD, 1970, University of Wisconsin; sociobiology, psychological aspects of the arms race and nuclear war, peace studies, animal behavior.

Barnard, Kathryn E. * 1972, (Adjunct); MSN, 1962, Boston University, PhD, 1972, University of Washington; ecological factors of child development.

Becker, Joseph * 1965, (Emeritus); PhD, 1958, Duke University; psychosocial aspects of depression.

Beecher, Michael D. * 1978; MA, 1965, PhD, 1970, Boston University; animal behavior, animal communication, sensory processes.

Bernstein, Ilene L. * 1974; MA, 1967, Columbia University, PhD, 1972, University of California (Los Angeles); neurobiology of taste aversion learning; developmental and genetic contributions to taste preference.

Booth, Cathryn L. * 1980, (Adjunct Research); PhD, 1974, Ohio State University; mother-infant interaction, observational methodology, child birth experiences and attachment.

Bowen, Deborah J. * 1986, (Adjunct); PhD, 1986, Uniformed Service University of the Health Sciences; health psychology.

Brenowitz, Eliot A. * 1987; PhD, 1982, Cornell University; animal behavior, neuroethology, neuroendocrinology, animal communication.

Buck, Steven L. * 1979; PhD, 1976, University of California (San Diego); human visual psychophysics, color vision, animal learning.

Carr, John E. * 1963, (Emeritus); PhD, 1963, Syracuse University; phobic disorders, patient therapist matching and therapy outcome, cross-cultural psychopathology.

Casseday, John H. * 1996; MA, 1963, PhD, 1970, Indiana University; neuroethology of sensory systems, echolocation and function of auditory midbrain.

Cauce, Ana Mari * 1986; PhD, 1984, Yale University; at-risk children, adolescents, and families; normative development in ethnic minority youth.

Dale, Philip S. * 1968, (Affiliate); PhD, 1968, University of Michigan; language and cognitive development in normal and exceptional children.

Dawson, Geraldine * 1985; PhD, 1979, University of Washington; developmental disabilities, autism, and neuropsychology.

Diaz, Jaime * 1978; PhD, 1975, University of California (Los Angeles); psychological brain development, neurophysiology, developmental psychopharmacology, effects of drugs.

Doerr, Hans O. * 1967, (Emeritus); PhD, 1965, Florida State University; psychophysiology of central and autonomic nervous systems, neuropsychology.

Donovan, Dennis 1981, (Adjunct); MA, 1972, Western Washington University, PhD, 1980, University of Washington; cognitive-behavioral factors in substance abuse and addictive behaviors.

Fiedler, Fred E. * 1969, (Emeritus); PhD, 1949, University of Chicago; leadership and group effectiveness, social and organizational psychology.

Fuchs, Albert F. * 1969, (Adjunct); PhD, 1966, Johns Hopkins University; oculomotor physiology, vision.

Gottman, John M. * 1986; PhD, 1971, University of Wisconsin; children's emotional and social development, meta-emotion in families, marriages.

Greenberg, Mark T. * 1977, (Affiliate); PhD, 1978, University of Virginia; developmental psychopathology, prevention of mental disorders in childhood.

Greenwald, Anthony G. * 1986; PhD, 1963, Harvard University; social cognition, attitudes, self and self-esteem, methodology, unconscious cognition.

Guralnick, Michael J. 1986; MS, 1964, PhD, 1967, Lehigh University; developmental disabilities, peer relations, social and language development, evaluation systems.

Heiman, Julia R. * 1980, (Adjunct); PhD, 1975, State University of New York (Stony Brook); sexuality and sexual relationships, prevention and treatment of family abuse.

Hunt, Earl B. * 1966, (Emeritus); PhD, 1960, Yale University; individual differences in cognition, cognition in education and the work place.

Keating, John P. * 1972, (Affiliate); PhD, 1972, Ohio State University; social psychology, media effect on

attitude, psychology and religion, emergency behavior psychology.

Kiyak, H. Asuman * 1977, (Adjunct); MA, 1974, PhD, 1977, Wayne State University; geriatric dentistry, behavioral aspects of health care.

Kuhl, Patricia K. * 1976, (Adjunct); MA, 1971, PhD, 1973, University of Minnesota; speech perception.

Linehan, Marsha M. * 1977; PhD, 1971, Loyola University (Chicago); behavioral assessment and therapy, suicide and parasuicide, borderline personality disorders.

Lockard, Joan S. * 1971; PhD, 1963, University of Wisconsin; primate social behavior, animal behavior, sociobiology, human ethology, neurobehavior.

Loftus, Elizabeth F. * 1973; PhD, 1970, Stanford University; cognition, memory, eye-witness testimony, psychology and law.

Loftus, Geoffrey R. * 1972; PhD, 1971, Stanford University; perception, memory, cognitive processes and information processing.

Lunneborg, Clifford E. * 1962, (Emeritus); PhD, 1959, University of Washington; psychometrics, individual differences, multivariate analysis, statistical computing.

Marlatt, G. Alan * 1972; PhD, 1968, Indiana University; cognitive-behavior therapy and assessment, addictive behaviors, relapse prevention, harm reduction.

McCauley, Elizabeth 1979, (Adjunct); PhD, 1973, State University of New York (Buffalo); developmental psychopathology focused on affective disorders, behavioral genetics.

McMahon, Robert J. * 1987; PhD, 1979, University of Georgia; assessment, prevention, treatment of children with conduct disorders; developmental psychopathology.

Meltzoff, Andrew N. * 1977; PhD, 1976, Oxford University (UK); perceptual, cognitive and social development in infants.

Mitchell, Terence R. * 1969; PhD, 1969, University of Illinois; leadership, group processes, motivation, turnover.

Morrison, Diane M. * 1980, (Adjunct Research); PhD, 1982, University of Washington; sexual decision-making, attitudes and behavior, teen pregnancy.

Patterson, David R. * 1984, (Adjunct); PhD, 1982, Florida State University; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma.

Ramsay, Douglas S. * 1983, (Adjunct); DMD, 1983, University of Pennsylvania, PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

Rubel, Edwin W. * 1986, (Adjunct); PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Sackett, Gene P. * 1970; PhD, 1963, Claremont Graduate School; experimental psychology, primate behavior, early experience and development.

Sarason, Irwin G. * 1956; PhD, 1955, Indiana University; personality, social support, stress and anxiety.

Sax, Gilbert * 1965, (Emeritus); PhD, 1958, University of Southern California; measurement, statistics and research design.

Smith, Ronald E. * 1969; PhD, 1968, Southern Illinois University; clinical, personality, sport psychology.

Smoll, Frank L. * 1976; PhD, 1970, University of Wisconsin; developmental kinesiology, children's sports, sport psychology, behavioral assessment of coaches.

Speltz, Matthew L. 1981, (Adjunct); MA, 1975, Western Washington University, PhD, 1980, University of Missouri; developmental psychotherapy, family therapy, pediatric behavioral medicine.

Spieker, Susan J. * 1983, (Adjunct Research); PhD, 1982, Cornell University; developmental psychology, infant security, mother-infant interaction.

Streissguth, Ann P. 1972, (Adjunct); MA, 1959, University of California (Berkeley), PhD, 1964, University of Washington; psychology and behavioral teratology.

Teller, Davida Y. * 1965; PhD, 1965, University of California (Berkeley); vision, psychophysics, development of vision.

Teri, Linda * 1984, (Adjunct); PhD, 1980, University of Vermont; controlled clinical trials of caregiving training for patients with Alzheimer's.

Vitaliano, Peter P. * 1978, (Adjunct); PhD, 1975, Syracuse University; psychiatric methodology (epidemiology, design, psychometrics), behavioral medicine.

Vitiello, Michael V. * 1982, (Adjunct); PhD, 1980, University of Washington; sleep, sleep disorders, circadian rhythms, aging, behavioral medicine.

Weinstein, Philip * 1972, (Adjunct); PhD, 1971, University of Kentucky; dental behavioral science, treatment and prevention of fear and pain, clinical assessment.

Westrum, Lesnick E. * 1966, (Adjunct); MD, 1963, University of Washington, PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

Associate Professors

Baer, John S. * 1986; PhD, 1986, University of Oregon; clinical psychology, addictive behaviors, early intervention.

Bassok, Miriam * 1997; MA, 1978, PhD, 1984, Hebrew University (Israel); learning, problem solving, analogical reasoning.

Brown, Jonathon D. * 1989; PhD, 1986, University of California (Los Angeles); self-concept and social behavior; coping with failure and disappointment.

Burns, Edward M. * 1984, (Adjunct); PhD, 1977, University of Minnesota; psychoacoustics.

Corina, David P. * 1993; PhD, 1991, University of California (San Diego); cognitive neuropsychology, psycholinguistics, computational modeling.

Covey, Ellen * 1996; MS, 1976, University of Houston, PhD, 1980, Duke University; structure and function of the central auditory system.

Craft, Suzanne * 1994, (Adjunct); PhD, 1985, University of Texas (Austin); neuropsychology of attention and memory in development and aging.

Culbert, Sidney S. * 1951, (Emeritus); PhD, 1950, University of Washington; perception, psycholinguistics, intercultural communication.

Fitts, Douglas A. * 1981; PhD, 1978, Washington State University; neurobiology, salt/water regulation, thirst.

Frey, Karin S. * 1983, (Adjunct Research); PhD, 1978, University of Washington; social-emotional development, adult-child and peer interaction, motivation, teacher development.

George, William H. * 1991; PhD, 1982, University of Washington; alcohol use and sexual behavior, addiction issues, sexual assault issues, racism issues.

Ginorio, Angela B. * 1981, (Adjunct); PhD, 1979, Fordham University; women and science, violence against women, sexual harassment, racial identity among Latino/as.

Gonzalez, Richard D. * 1990, (Affiliate); PhD, 1990, Stanford University; judgment and decision making, measurement statistics, group dynamics, psychology and law.

Ha, James * 1991; PhD, 1989, Colorado State University; animal behavior, especially ethology, evolution, infant primate development, and statistics.

Kahn, Peter H., Jr. 2000, (Research); PhD, 1988, University of California (Berkeley); social cognition and development; multicultural psychology, environmental psychology.

Katz, Lynn Fainsilber 1991, (Research); PhD, 1990, University of Illinois (Champaign-Urbana); antisocial children, social psychophysiology, family interaction, parent-child interaction.

Kenney, Nancy J. * 1976; PhD, 1974, University of Virginia; neural and endocrine controls of food and fluid intake, physiological basis of motivation.

Kerr, F. Beth * 1974; PhD, 1974, University of Oregon; cognition, human motor control and learning, attention, human factors.

Kivlahan, Daniel R. * 1983, (Adjunct); PhD, 1983, University of Missouri; evaluating assessment, prevention, and treatment approaches for addictive behaviors.

Kohlenberg, Robert J. * 1968; PhD, 1968, University of California (Los Angeles); clinical behavior modification, learning, biofeedback, psychotherapy.

Kyes, Randall C. * 1994; PhD, 1989, University of Georgia; primate behavior and ecology, neural mechanisms of behavior.

Miyamoto, John M. * 1984; PhD, 1985, University of Michigan; mathematical psychology, preference and utility theory, cognitive theories.

Mizumori, Sheri J. 2000; PhD, 1985, University of California (Berkeley); plasticity of neural and behavioral function during learning and memory.

Olavarria, Jaime F. * 1990; MD, 1974, State University of Chile, PhD, 1984, University of California (Berkeley); neurophysiological and neuroanatomical basis of vision.

Osterhout, Lee E. * 1991; PhD, 1990, Tufts University; psycholinguistics, cognitive psychophysiology.

Rose, Richard M. * 1966, (Emeritus); PhD, 1964, University of Pennsylvania; stochastic models, psychophysics, sleep.

Shoda, Yuichi * 1996; PhD, 1990, Columbia University; social and personality psychology; social cognition; computational modeling; health and coping.

Unis, Alan S. * 1987, (Adjunct); MD, 1976, University of Pittsburgh; researching the role of dopamine.

Assistant Professors

Beauchaine, Theodore P. 2000; PhD, 2000, State University of New York (Stony Brook); autonomic

nervous system functioning and psychopathology, child development, statistics.

Canfield, James G. 2000, (Research); PhD, 1995, University of Utah; neuroethological approach to the study of brain-behavior relationships.

Carlson, Stephanie M. * 1998; PhD, 1997, University of Oregon; cognitive and social development in pre-school children.

Comtois, Katherine Ann 1991, (Adjunct); PhD, 1992, University of Maryland; services research, borderline personality disorder, women, dual diagnosis.

Larimer, Mary E. * 1995, (Adjunct); PhD, 1992, University of Washington; prevention of alcohol problems among college students.

Lengua, Liliana J. * 1996; PhD, 1994, Arizona State University; stress, temperament, coping, ecological models of the development of psychological symptomatology.

O'Donnell, Sean * 1996; PhD, 1993, University of Wisconsin; genotypic and endocrine effects on social organization and division of labor in insects.

Richards, Jane M. 2000; PhD, 2000, Stanford University; social/personality psychology, stress, emotion.

Rudd, Michael * 1998; PhD, 1987, University of California (Irvine); mathematical and computer modeling of mechanisms underlying visual perception.

Simoni, Jane M. 2001; PhD, 1990, University of California (Los Angeles); HIV/AIDS; influence of culture and social support on psychological well-being.

Von Der Emde, Gerhard 2000; PhD, 1997, University of Erlangen (Germany); neurobiology, behavioral science, sensory physiology, sensory-motor integration, electroreception.

Zoellner, Lori A. * 2000; PhD, 1997, University of California (Los Angeles); anxiety disorders: etiology, maintenance, and their treatment with particular interest in PTSD, OCD.

Senior Lecturers

Barrett, Kimberly * 1990; EdD, 1989, University of San Francisco; substance abuse and the family and the impact of racism on children.

Fagan, Corey N. * 1989; PhD, 1988, University of Massachusetts; clinical psychology, program evaluation research, individual and family therapy.

Little, Laura M. 1998; PhD, 1998, University of New Mexico; quantitative methodology.

McDermott, Lois J. 1984; PhD, 1979, University of Chicago; human sexuality and reproductive physiology.

Passer, Michael W. * 1977; MA, 1972, PhD, 1977, University of California (Los Angeles); social psychology, organizational psychology, teaching of psychology.

Lecturer

Joslyn, Susan L. 1995; PhD, 1995, University of Washington; cognition, autobiographical memory, multitasking, applied issues.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

PSYCH 400 Learning (5) I&S/NW Experimental research and basic theories primarily in animal learning. Prerequisite: either PSYCH 101 or PSYCH 102.

PSYCH 401 Observing Interaction (4) I&S *Gottman* Surveys the methods of systematic observational research for the study of interaction. Emphasis on summarizing quantitative data for analysis of pattern and sequence, and for theory development. Prerequisite: PSYCH 101; PSYCH 209.

PSYCH 402 Infant Behavior and Development (3/5) I&S *Meltzoff* Psychological development in the first two years of life. Basic and advanced techniques for assessing psychological development in infancy. Classic theories of human infancy and examination of a wide range of new experiments about infant behavior and development. Prerequisite: either PSYCH 306 or PSYCH 414. Offered: A.

PSYCH 403 Motivation (5) I&S/NW Theory and research on reinforcement, punishment, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite: either PSYCH 101 or PSYCH 102.

PSYCH 404 Psychobiology of Motivation (5) I&S/NW Physiological mechanisms underlying thirst, salt appetite, hunger, reproduction, drug addiction, and fear. Evolutionary and learning processes that influence motivation. Prerequisite: either PSYCH 202 or PSYCH 222. Offered: Sp.

PSYCH 406 Insect Behavior (4) NW *O'Donnell* Explores complexity and diversity of behavior in insects and related invertebrate animals. Overview of important lineages of insects and major behavioral traits. Examines how insect biology both constrains behavior and provides evolutionary opportunities. Prerequisite: either PSYCH 200, PSYCH 300, or BIOL 180. Offered: Sp.

PSYCH 407 History of Psychology (5) I&S Historical and theoretical background of the basic assumptions of modern psychology, including such doctrines as behaviorism, determinism, and associationism and the scientists who developed them. Prerequisite: either PSYCH 101 or PSYCH 102.

PSYCH 408 Mechanisms of Animal Behavior (4) NW *Beecher, Brenowitz, O'Donnell* Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior. Prerequisite: either PSYCH 200, BIOL 102, BIOL 220, or BIOL 203. Offered: jointly with ZOO 408; W.

PSYCH 409 Sociobiology (5) NW *Beecher, Rohwer* Biological bases of social behavior, emphasizing evolution as a paradigm. Emphasizes how to think like evolutionary biologist, especially with regard to interest conflict. Topics are individual versus group selection, kin selection, altruism, mating systems, sexual conflict, alternate reproductive strategies, and parent/offspring conflict. Prerequisite: either PSYCH 200, BIOL 220, or both BIOL 202 and BIOL 203. Offered: jointly with ZOO 409.

PSYCH 410 Child and Adolescent Behavior Disorders (5) I&S *Barrett, Beauchaine, Katz,*

McMahon Introduction to psychopathology in children and adolescents, and an overview of principal modes of intervention. Particularly for students interested in advanced work in clinical psychology, social work, or special education. Prerequisite: PSYCH 305; PSYCH 306. Offered: WS.

PSYCH 412 Behavioral Genetics (4) NW *O'Donnell* Role of genetics in determining variation in human and animal behavior and in regulating behavioral development. Techniques for quantifying genetic variation, behavioral effects, and gene expression. Prerequisite: either PSYCH 200, PSYCH 300, or BIOL 180. Offered: W.

PSYCH 414 Cognitive Development (5) I&S Key theoretical and research approaches to cognitive development from infancy through adolescence. Sensorimotor development, language development, imitation, number concepts, logical reasoning, memory, cognition in adolescents, intelligence, and the role of biology, environment, and experience. Prerequisite: PSYCH 209; PSYCH 306.

PSYCH 415 Personality Development of the Child (5) I&S *Carlson* Socialization theory and research, infant attachment and social relationships, development of aggressive and altruistic behaviors, sex-role development, moral development, parent and adult influences. Applied issues in social development and policy. Prerequisite: PSYCH 306.

PSYCH 416 Animal Communication (5) NW *Beecher, Brenowitz, O'Donnell* Evolution and mechanisms of animal communication and related processes of perception, thinking, and social behavior. Prerequisite: either PSYCH 200, BIOL 102, or BIOL 203.

PSYCH 417 Human Behavior as a Natural Science (5) I&S/NW *Lockard* Evolution of human social behavior and the adaptive significance of communication systems from a sociobiological and anthropological perspective. Prerequisite: either PSYCH 200, or BIO A 201, or BIOL 202 and BIOL 203. Offered: WS.

PSYCH 418 Primate Social Behavior (5) NW *Lockard* Social behavior, ecology, and group structure of monkeys and apes from an evolutionary, sociobiological, and anthropological perspective. Prerequisite: either PSYCH 200, or BIO A 201, or BIOL 202 and BIOL 203. Offered: Sp.

PSYCH 419 Behavioral Studies of Zoo Animals (5, max. 10) NW *Lockard* Observational studies of behavior of zoo animals to expand basic knowledge of animal behavior, conservation of endangered species, and research methodology with discussions and tours focusing on zoo philosophy and operations. Offered in cooperation with Woodland Park Zoo. Prerequisite: either PSYCH 200, or BIO A 201, or BIOL 202 and BIOL 203. Offered: AS.

PSYCH 420 Drugs and Behavior (3) NW *Diaz* Animal and clinical research on the behavioral consequences of drug intake. Prerequisite: PSYCH 322.

PSYCH 421 Neural Basis of Behavior (5) NW *Diaz* Anatomical and physiological principles and resultant behavior involved in the integrative action of the nervous system. 431 recommended but not required to follow 421. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: AS.

PSYCH 422 Physiological Psychology (5) NW Physiological mechanisms in behavior, including those basic to emotion, fatigue and sleep, learning, and memory. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: Sp.

PSYCH 424 Vision and Its Physiological Basis (5) NW *Teller* Behavioral neurobiology of human vision: color vision, acuity and spatial vision, light and dark

adaptation, visual development. Correlation of visual functioning with known optical, biochemical, physiological, and anatomical substrates. Prerequisite: either PSYCH 101, PSYCH 102, BIOL 202, or ZOO 301. Offered: jointly with P BIO 424; W.

PSYCH 426 Neurobiology of Learning and Memory (4) NW Mizumori Theory and research on how animals learn and remember, including basic concepts of brain plasticity, how brain areas and neurons adapt to changes in experiences throughout the lifespan, and cellular and structural substrates of a "memory." Prerequisite: either PSYCH 222, PSYCH 322, PSYCH 333, PSYCH 421, PSYCH 422, or PSYCH 423. Offered: Sp.

PSYCH 427 Behavioral Endocrinology (5) NW Lattemann The endocrine system and how its secretions influence and are influenced by behavior; relationships between the nervous and endocrine systems. Prerequisite: PSYCH 421.

PSYCH 428 Human Motor Control and Learning (5) I&S/NW Kerr Current theory and research in human motor performance and skill acquisition. Prerequisite: PSYCH 209; either PSYCH 202 or PSYCH 222. Offered: W.

PSYCH 429 Brain Anatomy for the Behavioral Scientist (1) NW Diaz Detailed review of the neuroanatomical features of the sheep brain with laboratory demonstrations. Prerequisite: PSYCH 421 which may be taken concurrently. Offered: A.

PSYCH 430 Development of Brain Connections (4) NW Olavarria Analysis of innate and environmental factors that play a role in the development of brain connections. Critical review of current literature on the various strategies used by neurons to find their appropriate targets. Prerequisite: either PSYCH 222, PSYCH 333, PSYCH 421, PSYCH 422, or PSYCH 423. Offered: Sp.

PSYCH 432 Visual Perception (4) I&S/NW Rudd Surveys current facts/theories about how our brains interpret the images formed by our eyes to create a presentation of the visual environment. Topics include 3-D vision; color, form, motion, and object perception; and visual illusions. Prerequisite: either PSYCH 222, PSYCH 333, or PSYCH 355. Offered: W.

PSYCH 436 Developmental Aspects of Sport Competition (4) I&S Small Biophysical and psychosocial influences of sport participation on growth and development of children and youth. Competition readiness, injuries, stress, aggression, roles and responsibilities of parents and coaches. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: AS.

PSYCH 437 Motor Development (4) NW Small Analysis of motor development from prenatal origins through adolescence with emphasis on relations between biophysical and psychosocial development of children and youth. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: Sp.

PSYCH 438 Social Psychology of Sport (4) I&S Smith, Small Reciprocal effects of interpersonal and group influence processes, e.g., social facilitation, behavior modification, observational learning, individual versus group performance, group cohesion, leadership, aggression. Prerequisite: PSYCH 101; PSYCH 102; PSYCH 209.

PSYCH 441 Perceptual Processes (5) I&S/NW Theory and findings in perception with a focus on visual perception in humans. Discrimination and constancy for simple judgments, segregation and identification of visual objects, and specific areas of investigation such as reading and computer vision. Prerequisite: PSYCH 333.

PSYCH 445 Theories of Social Psychology (5) I&S J.D. Brown Evaluation of the major theories of human

social behavior supported by the empirical literature; theories of social cognition and thought; major theories of social interaction, group processes, and social learning. Prerequisite: PSYCH 345.

PSYCH 446 Personality Assessment (3) I&S R. Smith Measurement of personality variables in personality research, social psychology, and clinical psychology. Theoretical conceptions underlying various clinical and experimental scales and an assessment of their construct validity and behavioral correlates. Prerequisite: PSYCH 205; either PSYCH 213 or PSYCH 217; PSYCH 305.

PSYCH 447 Psychology of Language II (4) I&S/VLPA Corina, Osterhout Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: jointly with LING 447.

PSYCH 448 Seminar in Psychology (1-15, max. 15) Selected research topics of contemporary interest. Quarterly listings of specific offerings are available at departmental advisory office. Offered: A/W/Sp.

PSYCH 450- Honors Research Seminar in Psychology (2-, max. 4) Bassok Senior thesis research; preparation of senior thesis; oral presentation of research. Four credits of 450 required for all senior honors and distinction candidates in conjunction with 498 and 499. Offered: A/W/Sp.

PSYCH 451 Health Psychology (5) I&S/NW Overview of the psychological and behavioral factors in health and disease. Includes research on both psychological causes and treatments. Topics include stress, risky behaviors, patient-provider interactions, pain, behavioral/medical treatments, and lifestyle interventions. Prerequisite: either PSYCH 101 or PSYCH 102; PSYCH 209; either PSYCH 205, PSYCH 222, PSYCH 305, or PSYCH 345.

PSYCH 452 Psychology of the Self-Concept (4) I&S J.D. Brown Examines psychological theory and research on the role of the self-concept in regulating behavior. Topics include the development of the self-concept; self-awareness; and self-esteem maintenance. Prerequisite: PSYCH 345. Offered: W.

PSYCH 454 Personality and Social Influence (4) I&S Shoda Survey of various theories and research for analyzing person-situation interactions—how the qualities of persons and situations combine to generate thoughts, feelings, and behaviors of a person in a given social situation. Prerequisite: PSYCH 209; either PSYCH 205 or PSYCH 345. Offered: A.

PSYCH 457 Language Development (5) I&S/VLPA First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Prerequisite: either PSYCH 306, LING 200, or LING 400. Offered: jointly with LING 457.

PSYCH 460 Cognitive Neuropsychology (4) NW Corina, Osterhout Discussion of neural systems underlying cognitive behavior with particular focus on breakdown of cognition following brain damage. Topics include object and space perception, language, voluntary movement, attention, and memory. Examination of contributions from related areas of neuroimaging, visual perception, linguistics, physiology, and neuroscience. Prerequisite: either PSYCH 222, PSYCH 333, PSYCH 355, or PSYCH 421.

PSYCH 462 Human Memory (5) I&S Joslyn Research and theory in key areas of memory. Issues covered include information processing theory, the link between memory processes and their biological underpinnings, autobiographical memory, implicit memory, and the effect of emotion on memory. Prerequisite: PSYCH 209; recommended: PSYCH 355. Offered: A.

PSYCH 465 Intelligence (5) I&S Hunt Analysis of individual differences in cognition. Includes description/use of psychometric ("intelligence test") models, test scores' relationship to academic and non-academic performance, information processing and biological models of intelligence (including genetic models). Discussion of male-female and demographic group differences in cognition. Prerequisite: either PSYCH 213 or PSYCH 217; PSYCH 355.

PSYCH 467 Eyewitness Testimony (3) I&S E. Loftus Perception, memory, and retrieval of real world events. The eyewitness in the legal system. Psychologists as expert witnesses regarding eyewitness accounts. Prerequisite: either PSYCH 101 or PSYCH 102; PSYCH 355. Offered: W.

PSYCH 469 Psychology of Reasoning (4) I&S Bassok Cognitive processes in human learning, problem solving, deductive and inductive reasoning. Prerequisite: 2.0 in PSYCH 209.

PSYCH 470 Psychology and Music (5) I&S/VLPA Covey Introduction to the scientific study of musical behavior. An overview of current topics in the psychology of music from the areas of musical perception and cognition, musical development, music therapy, musical performance, and composition. Includes psychoacoustical and neuropsychological foundations, research methods, and some basic material in music theory. Prerequisite: either PSYCH 101 or PSYCH 102.

PSYCH 471 Applied Issues in Cognition (4-5, max. 10) I&S Joslyn Examines cognitive issues in applied settings, such as the workplace and education. Topics include such issues as attention, expertise, problem solving, decision-making, human error, automation, navigation, and individual differences. Prerequisite: PSYCH 209.

PSYCH 480 Ideas of Human Nature (5) I&S Barash Reviews various approaches to the nature of human nature, including ideas from ancient philosophy, theories of the soul, empiricism, idealism, conditioning, social constructions, concepts of Freud, Marx, the existentialists, and neo-Darwinism. Prerequisite: either PSYCH 101 or PSYCH 102.

PSYCH 488 Stress and Coping (4) I&S/NW Reviews theories and research concerning stress and its roles in behavior, personality, development, health, and interpersonal relationships. Coping analyzed as a factor in the way people respond to stressful circumstances. Prerequisite: either PSYCH 205 or PSYCH 305. Offered: Sp.

PSYCH 489 Clinical Psychology (3) I&S George Basic issues, methods, and research: professional issues, psychological assessment, and approaches to psychotherapy and behavioral change. Prerequisite: either PSYCH 205 or PSYCH 305.

PSYCH 490 Stress Management (3) I&S/NW Nature of stress. Physiological responses to stress and relaxation. Techniques of stress management with training in relaxation, biofeedback, meditation, cognitive restructuring, exercise, nutrition, interpersonal communication skills, and time management. Prerequisite: either PSYCH 101 or PSYCH 102. Offered: S.

PSYCH 494 Field Study in Animal Behavior (2-3, max. 9) Kyes Field experience in areas relating to animal behavior through participation in seminar discussion and field exercises and training at foreign and domestic field study sites. Prerequisite: PSYCH 200.

PSYCH 496 Undergraduate Teaching Experience in Psychology (2-3, max. 6) Students are trained as assistants in quiz sections or as supplemental tutors for undergraduate psychology courses. Designed especially for those students planning graduate work

or education certification. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree. Offered: AWSpS.

PSYCH 497 Undergraduate Fieldwork (2-5, max. 10) Individual consultation with faculty member and supervised practicum experience in a broad range of community settings and agencies dealing with psychological problems. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree.

PSYCH 498 Directed Reading in Psychology (1-3, max. 18) Readings in special interest areas under supervision of departmental faculty. Discussion of reading in conference with the instructor. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree. Offered: AWSpS.

PSYCH 499 Undergraduate Research (1-3, max. 18) Design and completion of individual research projects. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree. Offered: AWSpS.

Courses for Graduates Only

PSYCH 500 Laboratory in Statistical Computation I (2) *Miyamoto* Techniques of computation using statistical software on personal computers. Organization of data files, transformations of variables, graphical representations of data, descriptive statistics, elementary inferential statistical analyses. Prerequisite: concurrent enrollment in PSYCH 513 or permission of instructor. Offered: A.

PSYCH 501 Laboratory in Statistical Computation II (2) Techniques of statistical computation using statistical software on personal computers and mainframe computers. Multiple regression, analysis of variance and covariance. Planned and post hoc comparisons and confidence intervals. Data analytic diagnostics for violations of regression assumptions. Prerequisite: PSYCH 500 and PSYCH 513, concurrent enrollment in PSYCH 514, or permission of instructor. Offered: W.

PSYCH 502 Mathematical Modeling for Psychology and the Neurosciences (3) *Rudd* Introduces a collection of mathematical models increasingly important to research in psychology and neuroscience, including random walks, differential equations, linear systems theory, Fourier analysis, nonlinear systems, and neural modeling. Topics illustrated by examples from recent literature. Prerequisite: undergraduate statistics.

PSYCH 503 Developmental Psychology and the Human Relationship with Nature (4) *Kahn* Theories of development used to investigate the ontogenesis of the human relationship with nature. An emphasis on social cognition, children's environmental moral reasoning, the effects of technology in children's lives, and evolutionary theory. Offered: W.

PSYCH 504 Biological Basis of Development (4) *Bernstein* Embryological, genetic, physiological, and evolutionary perspectives of human development; biological development in infancy; sensory development and its influence on the development of perception; primate models for human development. First quarter of a three-quarter proseminar required for graduate majors in developmental psychology. Offered: A.

PSYCH 505 Early Cognitive and Linguistic Development (4) *Meltzoff* Focus on the origins and early development of thought and language. Piagetian theory and modern-day revisions of it emphasized. In depth examination of historical and philosophical bases for current empirical research. Second quarter of a three-quarter proseminar,

required for graduate majors in developmental psychology. Offered: W.

PSYCH 506 Personality and Social Development (4) *Carlson* Theories and empirical literature in personality and social development throughout infancy, childhood. Third quarter of a three-quarter proseminar required for graduate majors in developmental psychology. Offered: Sp.

PSYCH 508 Research Methods in Social Psychology (4, max. 8) *Greenwald* Examination of methodological, practical, and communication problems associated with research on human behavior. Topics include: selecting research problems, use of theory, types of validity, common sense about statistics, when to replicate, dealing with unpredicted results, strategies for presentation and publication. Offered: Sp.

PSYCH 511 Personality (3) *Shoda, R. Smith* Review of personality research. Roles of cognitive, affective, motivational, and psychodynamic processes. Critical evaluation of current personality research as it relates to concepts of personality, its antecedents, and influences over behavior. Attention to role of personality variables in social relationships.

PSYCH 513 Introduction to Statistics and Data Analysis (4) *Miyamoto* Basic concepts of statistical theory and methods of data analysis. Emphasis on the integration of statistical theory, statistical computation, and psychological research methods. Required of all first-year graduate students in psychology. Prerequisite: concurrent enrollment in PSYCH 500 or permission of instructor. Offered: A.

PSYCH 514 Linear Models and Data Analysis (4) Analysis of data in the behavioral sciences. Required of all first-year graduate majors. Prerequisite: PSYCH 500, PSYCH 513; concurrent registration in PSYCH 501, or permission of instructor. Offered: W.

PSYCH 515 Multivariate Statistics (4) *Rude* An introduction to statistical modeling; interactive data analyses; use of regression, ANOVA, logistic regression, and log-linear models in explanatory studies. Prerequisite: PSYCH 514.

PSYCH 517 Advanced Research Methods (5) *Beauchaine* Surveys advances clinical research methods not covered in the required statistics sequence. Examples include structural equation modeling, hierarchical linear modeling, growth curve modeling, and taxometric analyses. Hands-on experience gained through weekly assignments using each method. Prerequisite: PSYCH 514.

PSYCH 518 Single Subject Design and Research (3) *Kohlenberg* Single subject designs (reversal, multiple baseline, changing criterion) and their application to clinical cases. Prerequisite: graduate major standing in clinical psychology or permission of instructor. Offered: W.

PSYCH 519 Statistical Methods in Longitudinal Research (3) *Sackett* Those aspects of statistics and experimental design unique to, or heavily used in, developmental research; behavioral observation methods, analysis of variance and nonparametric techniques, time series and survival, analysis and repeated measure techniques for studying change over time. Prerequisite: PSYCH 514 or equivalent.

PSYCH 521 Higher Order Cognition (3) *Bassok* Survey of research on higher-order cognition with an emphasis on theoretical accounts of knowledge representation. Topics include problem solving, inductive and deductive reasoning, hypothesis testing, causal inferences, similarity judgments, and categorization.

PSYCH 522 Cognitive Perception (3) *G. Loftus* Current topics in perception, psychophysics, senso-

ry memory, pattern recognition, letter and word perception, and visual masking. Prerequisite: PSYCH 441 and PSYCH 517, or permission of instructor. Offered: Sp.

PSYCH 523 Cognition (5) *Hunt* Survey of the major influences on human cognition. Discussion of biological, information processing, and content-based theories of thought. Applications described in memory, language, decision-making, and problem solving. Prerequisite: completion of departmental mathematical and statistical requirement through PSYCH 514.

PSYCH 524 Cognitive Approaches to Human Memory (3) *E. Loftus* Examination of current topics in human memory from the perspective of cognitive psychology. Prerequisite: PSYCH 355 or permission of instructor. Offered: Sp.

PSYCH 525 Assessment of Intelligence (5) *Lengua* Current theory and research on intelligence and intelligence testing; training in administration, scoring, and interpretation of major intelligence tests; ethical issues in assessment. Prerequisite: graduate major standing in child clinical or clinical psychology, or graduate minor standing in child clinical psychology. Offered: Sp.

PSYCH 526 Psychological Assessment of Children (5) *Dawson* Assessment techniques appropriate to children, including those for infants, special problems of preschool and school-age children; projective tests, family interviews, and target observational assessment; training in administration of selected techniques. Prerequisite: PSYCH 525 and permission of instructor.

PSYCH 533 Teaching of Psychology (3) *Passer* Examines issues concerning the teaching of psychology, including educational goals, course development, instructional methods, T.A.-student and T.A.-faculty relations, grading, student diversity, and problem situations. Assignments are designed to enhance students' organizational, presentational, and problem-solving skills. Credit/no credit only. Prerequisite: graduate standing in the Department of Psychology.

PSYCH 535 Approaches to Psychological Assessment (4) Problem-solving approach to psychological assessment; review of psychological tests and procedures and presentation of approaches to their clinical interpretation and use. Required for all graduate students majoring in clinical and child-clinical psychology. Prerequisite: graduate major standing in clinical psychology. Offered: Sp.

PSYCH 536 Behavioral Assessment (4) *Linehan* Research, theory, and technique in behavioral assessment. Emphasis on assessing for change and relationship between assessment and therapy. Interviewing, observational techniques, self-monitoring, simulated environments, and physiological, self-report, and imaginal procedures. Prerequisite: clinical psychology graduate standing and permission of instructor.

PSYCH 538 Systems of Psychotherapy (3) *George, Marlatt* Theory and research of major systems of psychotherapy, including the psychodynamic, behavioral, cognitive, and family systems approaches as an introduction to subsequent practice in clinical psychology. Required for all graduate students majoring in clinical psychology. Prerequisite: graduate major standing in clinical psychology and permission of instructor. Offered: A.

PSYCH 540 Seminar in Clinical Psychology (2) *Baer, Cauce, Dawson, George, Kohlenberg, Linehan, Marlatt, McMahon, Smith, Zoellner* Prerequisite: permission of instructor.

PSYCH 541 Seminar in Cognitive Processes (2) *E. Loftus, G. Loftus* Prerequisite: permission of instructor.

PSYCH 542 Seminar in Animal Behavior (2) *Barash, Beecher, Brenowitz, Lockard, O'Donnell* Prerequisite: permission of instructor.

PSYCH 543 Seminar in Developmental Psychology (2) *Carlson, Gottman, Meltzoff, Sackett* Prerequisite: permission of instructor.

PSYCH 549 Seminar in Physiological Psychology (2) *Bernstein, Diaz, Kenney, Teller* Prerequisite: permission of instructor.

PSYCH 550 Seminar in Psycholinguistics (2) *Osterhout* Prerequisite: PSYCH 447 or PSYCH 457.

PSYCH 552 Seminar in Quantitative Techniques (2) *Hunt, Lunneborg* An introduction to the use of mathematical modeling in psychology and the behavioral sciences. Topics vary.

PSYCH 553 Seminar in Social-Personality Research (2) *J.D. Brown, Greenwald, Shoda* Prerequisite: permission of instructor.

PSYCH 554 Seminar in Decision Processes (2) *Miyamoto* Prerequisite: permission of instructor.

PSYCH 559 Seminar in Current Research in Vision (1) *Buck, Olavarria, Teller* Prerequisite: permission of instructor.

PSYCH 560 Seminar (*, max. 30) Prerequisite: permission of instructor. Offered: AWSpS.

PSYCH 562 Evolutionary Psychology of Gender, Mating and Reproduction (3) *Barash, Beecher, O'Donnell* Reviews evidence for biological factors influencing human mating and reproductive behavior, through application of concepts and theory from animal behavior, behavioral genetics, and evolutionary biology. Offered: W.

PSYCH 565 Quantifying Brain Structure (3) Covers concepts and applications of statistically unbiased methods for quantifying brain structure. Hands-on learning and application of concepts, sampling strategies and calculations for unbiased stereological measure of the size and number of various brain components.

PSYCH 571 Child Psychopathology (5) *McMahon* Broad survey of major categories of child and adolescent disorders. Emphasis on scientific, empirical approach to description, classification, and research literature on these disorders. Required for all graduate students majoring in child clinical psychology. Prerequisite: graduate standing in psychology or permission of instructor.

PSYCH 572 Approaches to Child Treatment (4) *Barrett, Beauchaine, Dawson* Major approaches to child psychotherapy, including specific applications, issues in treatment, and research. Prerequisite: graduate major standing in child clinical psychology or permission of instructor. Offered: Sp.

PSYCH 574 Community Psychology (4) Overview of key issues and concepts in the field of community psychology. History of field and overview of different models used to conceptualize system-level mental health issues and delivery systems. Emphasizes theory and research rather than intervention. Prerequisite: psychology graduate student or permission of instructor.

PSYCH 580 Minority Mental Health (3) *Barrett, George* Surveys topics on mental health and treatment of racial and ethnic minorities. Theory emphases include: models addressing ethnic identity, cross-cultural differences, models of culturally sensitive intervention. Practice emphases include

unique psychotherapy strategies for: African-, Asian-, and Latino-Americans, and American Indians. Prerequisite: graduate clinical major standing in psychology or permission of instructor.

PSYCH 581 Cross-Cultural Competency I (2) *Barrett, George* Focuses on development of multicultural competence in the provision of psychological services to meet APA guidelines for ethnic, linguistic, and culturally diverse populations. Students address personal development, increase their knowledge of diverse groups, and study effective models of intervention in working with clients of diverse backgrounds. Prerequisite: PSYCH 575.

PSYCH 582 Cross-Cultural Competency II (2) *Barrett, George* Third in the graduate multicultural-competence sequence. Focuses on American ethnic minorities, multiracial children and families, social action, and organizational development. Prerequisite: PSYCH 581.

PSYCH 583 Research Methods in Clinical and Community Psychology (4) *Lengua* Addresses issues concerning the design and implementation of research in clinical and community psychology. Topics include validity; reliability; experimental, quasi-, and non-experimental designs; causal inference; interpretation of data; and research ethics. Provides students with tools to evaluate research, develop hypotheses, and design rigorous empirical studies. Offered: A.

PSYCH 584 Behavioral Methods: Clinical Interventions (3) *Linehan* Provides students with basic skills required for competent practice of cognitive and behavioral therapies. Topics include behavioral skills training, cognitive restructuring, contingency management, and exposure-based procedures. Prerequisite: second year of graduate clinical psychology, social work, psychosocial nursing, or psychiatric residency.

PSYCH 586 Clinical Personality Assessment (3) *R. Smith* Use of objective personality inventories in the description of normal and abnormal personality and use of such information in case conceptualization and treatment planning. Minnesota Multiphasic Personality Inventory, Millon Clinical Multiaxial Inventory. Credit/no credit only. Prerequisite: clinical psychology graduate standing.

PSYCH 587 Clinical Methods: Interviewing (2) *Fagan* Provides the foundation for developing good clinical skills. Enables students to conduct an initial clinical interview and generate a diagnostic formulation, problem list, and treatment plan after taking a complete history. Limited to and required of all second-year clinical psychology graduate students. Credit/no credit only. Offered: A.

PSYCH 588 Clinical Methods: Ethics (2) *Fagan* Enables students to acquire a thorough working knowledge of the American Psychological Association's Ethical Standards for Psychologists; an awareness of Washington state law as it affects psychologists and a knowledge of how to identify and solve ethical dilemmas. Limited to and required of all second-year clinical psychology graduate students. Credit/no credit only. Offered: W.

PSYCH 589 Advanced Clinical Practicum (4) *Cauce, Dawson, George, Kohlenberg, Marlatt, McMahon, Smith* Supervised psychotherapy involving several individual clients. Separate consultations with instructor for intensive supervision of each case. Occasional meetings in small groups of instructors and students to discuss case material. Assigned readings appropriate to each case with opportunities to discuss these with instructor. Credit/no credit only. Prerequisite: clinical psychology graduate standing and permission of instructor. Offered: AWSpS.

PSYCH 590 Practicum in Psychological Assessment (2) Demonstration and practice of selected psychological test procedures and interviewing skills. Concurrent registration in 535 required. Required for all first-year graduate students majoring in clinical and child-clinical psychology. Prerequisite: graduate major standing in clinical or child-clinical psychology and permission of instructor.

PSYCH 591 Issues in Clinical Psychology (1, max. 3) Personal and professional issues in clinical psychology. Required for all first-year graduate students majoring in clinical and child-clinical psychology. Credit/no credit only. Prerequisite: graduate major standing in clinical psychology. Offered: AW.

PSYCH 593 Clinical Colloquium and Clinic Practicum (1-6, max. 24) *Fagan* Required of all clinical psychology graduate students seeing clients in the clinic. Clinical colloquium required of all second-year students, optional for others. Credit/no credit only. Offered: AWS.

PSYCH 594 Advanced Personality Theory (5) *Linehan* Conceptual models of behavioral functioning, cognition, emotion, and environment as organizers of behavior and other critical issues in personality theory. Opportunity to integrate previous courses, research, and practice, and arrive at coherent theoretical framework. Required for graduate majors in clinical psychology.

PSYCH 595 Behavior Disorders (5) *Zoellner* Major types of behavior disorders, with emphasis on clinical manifestations, relevant research, and theoretical perspectives. Required for all graduate students majoring in clinical psychology. Prerequisite: graduate major standing in clinical psychology or permission of instructor. Offered: W.

PSYCH 596 Psychology of Behavior Change (5) *Kohlenberg* Behavioral theory and behavioral approaches to treatment. Prerequisite: PSYCH 595 and permission of instructor. Offered: Sp.

PSYCH 597 Fieldwork in Clinical Psychology (1-5, max. 36) *Baer, Cauce, Dawson, George, Kohlenberg, Linehan, Marlatt, R. Smith* Prerequisite: second-year graduate major standing and permission of departmental faculty.

PSYCH 598 Directed Reading in Psychology (*, max. 30) Selected topics. Prerequisite: permission of a supervising psychology faculty member.

PSYCH 599 Directed Research in Psychology (1-3, max. 24) Supervised participation in research. Prerequisite: permission of a supervising psychology faculty member.

PSYCH 600 Independent Study or Research (*) Offered: AWSpS.

PSYCH 700 Master's Thesis (*) Offered: AWSpS.

PSYCH 800 Doctoral Dissertation (*) Offered: AWSpS.

Romance Languages and Literature

C104 Padelford

The department consists of two divisions: French and Italian Studies and Spanish and Portuguese Studies. The divisions offer programs designed to develop competence in the reading, speaking, and writing of the languages and in the study of the literatures and cultures.

French and Italian Studies

C254 Padelford

 *General Catalog Web page:*
www.washington.edu/students/gencat/academic/romance.html

 *Division Web page:*
depts.washington.edu/frenital/

Graduate Program

Graduate Program Coordinator
C259 Padelford, Box 354360
206-616-5366

The Division of French and Italian Studies offers programs of graduate study leading to the degrees of Master of Arts in French or Italian and Doctor of Philosophy in French. Students who wish to complete their doctoral studies in Italian may do so through the Department of Comparative Literature.

The Master of Arts degree consists of 45 credits of courses taken at the 400 and 500 levels (plus 10 credits for exam preparation). The M.A. Final Examinations are both written and oral and are administered in the last or sixth quarter of study.

The doctoral program in French requires a total of 77 credits beyond the 55 for the M.A. (including 27 dissertation credits). Doctoral students should devote at least two-thirds of their course work to the fields of specialization. Some training in the history of language is required. The General Examination is divided into three broad areas: century or literary movement, critical problem, and outside or constructed area. A dissertation is also required.

Information on specific requirements for the various degree programs is available upon request from the office of the graduate advising assistant, the graduate program coordinator, or on the division's Web page (depts.washington.edu/frenital/).

Financial Aid

The department awards annually a number of teaching assistantships. Research assistantships are available on a limited and competitive basis. The assistant normally participates in teaching three classes during the academic year. Each class is limited to approximately 25 students and meets five hours a week for the 10 weeks of the quarter.

Faculty

Chair

John T. Keeler

Professors

Borch-Jacobsen, Mikkel * 1986; Doct, 1981, University of Strasbourg (France); French twentieth-century literature, theory and criticism, psychoanalysis.

Christofides, Constantine * 1966, (Emeritus); PhD, 1956, University of Michigan; medieval, seventeenth century, Romanesque.

Clausen, Meredith L. 1979, (Adjunct); MA, 1972, PhD, 1975, University of California (Berkeley); twentieth-century architecture.

Creore, A. Emerson 1979, (Emeritus); MA, 1936, University of Rochester, PhD, 1939, Johns Hopkins University.

Friedman, Lionel J. 1961, (Emeritus); PhD, 1950, Harvard University.

Handwerk, Gary J. *, (Adjunct); PhD, 1984, Brown University; British, German, and French nineteenth- and twentieth-century narrative; 916.

Jonas, Raymond A. * 1985, (Adjunct); PhD, 1985, University of California (Berkeley); modern France.

Keeler, John T. * 1980; PhD, 1978, Harvard University; comparative politics (Western Europe), international relations.

Leiner, Jacqueline * 1963, (Emeritus); DResLE, 1969, University of Strasbourg (France); modern French literature.

Nostrand, Howard L. 1982, (Emeritus); MA, 1933, Harvard University, Doct, 1934, Universite de Paris VI (France); French culture and civilization.

Pace, Antonio 1980, (Emeritus); MA, 1937, Syracuse University, PhD, 1943, Princeton University; Italian language and literature.

Vance, Eugene * 1990; PhD, 1964, Cornell University; medieval literature, the history of criticism, and discourse analysis.

Associate Professors

Collins, Douglas P. * 1980; PhD, 1978, University of Missouri; twentieth-century French literature.

Dale, Robert C. * 1963, (Emeritus); PhD, 1963, University of Wisconsin; nineteenth-century French literature, cinema.

Delcourt, Denyse * 1990; PhD, 1987, University of Montreal (Canada); French middle ages, French Renaissance, French women writers and Quebecois literature.

Ellrich, Robert J. * 1964, (Emeritus); PhD, 1960, Harvard University; eighteenth-century French literature.

Friedrich, Pia * 1965, (Emeritus); PhD, 1946, University of Turin (Italy); pedagogy and twentieth-century Italian literature.

O'Neil, Mary R. * 1983, (Adjunct); PhD, 1982, Stanford University; Renaissance/Reformation, early modern Europe, social history, Italy before 1700.

Sbragia, Albert J. * 1989; PhD, 1988, University of California (Berkeley); modern and contemporary Italian literature and cinema.

Wortley, W. Victor * 1965, (Emeritus); PhD, 1964, University of Oregon; seventeenth-century French theatre and prose (nonfiction).

Assistant Professors

Collins, Jeffrey L. * 1994, (Adjunct); MA, 1989, Yale University, MA, 1992, Cambridge University (UK), PhD, 1994, Yale University; 17th-/18th-century European art and architecture; American material culture.

Jackson, Dianah Leigh * 1998; PhD, 1999, University of Minnesota; the body in Enlightenment culture and the epistolary novel.

Rubino, Nancy I. * 1997; PhD, 1996, Columbia University; 19th-century French literature; specializing in Modernism and Decadence.

Senior Lecturer

Yowell, Donna Lynne * 1988; PhD, 1987, University of California (Berkeley); medieval Italian literature, Dante, Occitan lyric.

Lecturers

Collins, Helene V. 1984; PhD, 1995, University of Washington; French pedagogy and curriculum development, French cinema studies.

Leporace, Giuseppe 1987; MA, 1989, University of Washington; Italian pedagogy and translation.

Meyer, Hedwige M. 1988; MA, 1992, University of Washington; French pedagogy.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

French

FRENCH 406 Advanced French Composition (5) VLPA Extensive guidance in advanced French composition, emphasizing stylistics and grammar. Prerequisite: FRENCH 303.

FRENCH 411 Topics in the Middle Ages (5) VLPA Sixteenth-century literature with emphasis on poetry and the general artistic ambiance. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 412 Topics in Sixteenth Century French Literature (5) VLPA An introduction to major French literary texts of the Sixteenth Century. Prerequisite: FRENCH 303; FRENCH 304.

FRENCH 413 Topics in Seventeenth Century (5) VLPA Seventeenth-century literature, with emphasis on the development of classicism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 414 French Literature of the Eighteenth Century: Enlightenment (5) VLPA Eighteenth-century literature, with emphasis on the development of the Enlightenment ideology. Prerequisite: FRENCH 303; either FRENCH 304, FRENCH 305, or FRENCH 306. May not be repeated after achieving a grade of 2.0.

FRENCH 415 French Literature of the Eighteenth Century: Post-Enlightenment (5) VLPA Eighteenth-century literature, with emphasis on the "dark side of the Enlightenment" and nascent romanticism.

Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 418 French Literature of the Early Twentieth Century (5) VLPA Twentieth-century literature, with emphasis on the period 1900-1939. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 432 Critical Approaches to French Fiction (5) VLPA Addresses theory and practice of fiction within the context of a given century or movement. Content varies. Prerequisite: FRENCH 303.

FRENCH 435 Topics in Non-Fiction (5) VLPA Content varies. Prerequisite: FRENCH 303.

FRENCH 441 Québécois Literature (5) VLPA Readings of novels, plays, and occasionally, poetry. Special attention paid to how Québécois authors represent in their works the complex socio-political reality of their culture. Conducted in French. French majors required to read and write in French; all others may read and write in English. Prerequisite: FRENCH 303; FRENCH 306. Offered: jointly with SISC4 441.

FRENCH 445 Women Writers and Feminist Theory (5) VLPA Focus on French women writers from different periods and places. Gender issues addressed in critical fashion, considering the different historical and ideological contexts in which each of the works were produced. Prerequisite: FRENCH 303.

FRENCH 450 Themes in French Literature and Culture (5) VLPA Interdisciplinary studies in French literature and culture, focusing on the construction and representation of gender roles in the French novel from the early eighteenth century. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 455 One Author in French Literature/Culture (5, max. 15) VLPA In depth focus on the works of one author in French Literature or Culture. Prerequisite: FRENCH 303.

FRENCH 458 French Art and Literature: Period Studies (5) VLPA Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Recommended: background in French literature.

FRENCH 461 Seventeenth-Century Drama (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 465 Twentieth-Century Drama (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 470 Cinema (5) VLPA Major films and figures of French cinema from the beginnings to the present. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 486 Literature of the Enlightenment in English (5) VLPA

FRENCH 488 Women in French Literature in English (5) VLPA Masterpieces of French literature are read in an attempt to understand French attitudes toward women. From the sixteenth century, with a concentration on the twentieth century.

FRENCH 490 Honors Seminar (2-5, max. 10) VLPA Special studies in French literature. Required of candidates for honors and distinction in French.

FRENCH 499 Special Topics (1-5, max. 10) Topics to meet special needs. Prerequisite: FRENCH 303.

Courses for Graduates Only

FRENCH 515 French Literature of the High Middle Ages (5, max. 10) Old French literature, from the beginning to 1315. Prerequisite: permission of instructor.

FRENCH 523 Studies in Fiction: 1660-1800 (5, max. 10)

FRENCH 525 Studies in Fiction: 1850-1900 (5, max. 10)

FRENCH 555 French Nonfiction (5, max. 10)

FRENCH 576 Critical Methodology (5) Basic scholarly tools of bibliography; historical review of literary doctrine; an introduction to critical methodology.

FRENCH 577 Modern Critical Methods (5) Modern critical methodology and theory.

FRENCH 590 Special Seminar and Conference (1-10, max. 30) Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program coordinator.

FRENCH 591 Literary Problems: Middle Ages (5, max. 10)

FRENCH 592 Literary Problems: Renaissance (5, max. 10)

FRENCH 593 Literary Problems: Seventeenth Century (5, max. 10)

FRENCH 594 Literary Problems: Eighteenth Century (5, max. 10)

FRENCH 595 Literary Problems: Nineteenth Century (5, max. 10)

FRENCH 596 Literary Problems: Twentieth Century (5, max. 10)

FRENCH 600 Independent Study or Research (*)

FRENCH 700 Master's Thesis (*) Credit/no credit only.

FRENCH 800 Doctoral Dissertation (*) Credit/no credit only.

Italian

ITAL 401 Medieval Italian Readings (5) VLPA Exploration of medieval Italian cultural history through a broad variety of literary and other textual traditions.

ITAL 402 Early Modern Italian Readings I (5) VLPA Readings in Italian Quattro/Cinquecento, covering the period of the Renaissance.

ITAL 403 Early Modern Italian Readings II (5) VLPA Readings in Italian Sei/Settecento, covering the periods of Baroque and Enlightenment literature.

ITAL 404 Modern Italian Readings I (5) VLPA Readings in Italian Ottocento, covering the period of Romanticism. Prerequisite: ITAL 203.

ITAL 405 Modern Italian Readings II (5) VLPA Readings in Italian Novecento, covering the work of major Italian twentieth-century authors. Prerequisite: ITAL 203.

ITAL 414 Literature of the Renaissance: Cinquecento (5) VLPA The high Renaissance. Bembo and the Petrarchans, Machiavelli, Guicciardini, Castiglione, Ariosto, Guarini, Tasso.

ITAL 465 Contemporary Italian Narrative (5, max. 15) VLPA Critical reading of selected modern exponents of the short story and novel.

ITAL 466 Italian Society in Cinema and Literature in Italian (5, max. 15) I&S/VLPA *Sbragia* Studies the evolution of Italian postwar society through the analysis of film and literature as well as critical, historical, and sociological readings. Offered in Italian.

ITAL 470 Dante (5) VLPA Introduction to Dante's *Commedia* and minor works, conducted in Italian. Prerequisite: ITAL 303.

ITAL 480 Dante's Comedy in English (5) VLPA Introduction to Dante's *Comedy*. Considers formal, structural, linguistic, literary, historical, cultural, philosophical, and theological issues raised by the text. Discusses the main currents of twentieth-century Dante criticism.

ITAL 481 Dante's Comedy in English (5) VLPA Second half of a two-quarter series. Close study of Dante's *Purgatory* and *Paradiso* and retrospective reading of *Inferno*. Explores Dante's concept of art, both human and divine, as it is developed in and defines the poem. Prerequisite: ITAL 480.

ITAL 490 Proseminar in Italian Literature (3-5) VLPA Intended to help the student achieve a mature critical mastery of Italian literature.

ITAL 499 Special Topics (1-5, max. 10) Topics to meet special needs.

Courses for Graduates Only

ITAL 501 Medieval Italian Readings (5) Yowell Exploration of medieval Italian cultural history through a broad variety of literary and other textual traditions.

ITAL 502 Early Modern Italian Readings I (5) Readings in Italian Quattro/Cinquecento over the period of the Renaissance. Covers major intellectual, literary, and cultural movements and figures of the period, including humanistic rediscovery of Graeco-Roman models, chivalric poems, comic theater.

ITAL 503 Early Modern Italian Readings II (5) Scalabrini Readings in Italian Sei/Settecento, covering the periods of Baroque and Enlightenment literature.

ITAL 504 Modern Italian Readings I (5) Sbragia, Scalabrini Readings in Italian Ottocento, covering the period of Romanticism.

ITAL 505 Modern Italian Readings 2 (5) Sbragia, Scalabrini Readings in Italian Novecento, covering the work of the major Italian twentieth-century authors.

ITAL 514 Dante (5, max. 10)

ITAL 590 Special Seminar and Conference (1-10, max. 30) Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of instructor.

ITAL 592 Literary Problems: Renaissance (5, max. 10)

ITAL 596 Literary Problems: Twentieth Century (5, max. 10)

ITAL 600 Independent Study or Research (*)

Spanish and Portuguese Studies

C104 Padelford



General Catalog Web page:
www.washington.edu/students/gencat/academic/romance.html



Division Web page:
depts.washington.edu/spanport/

Graduate Program

Graduate Program Coordinator
C104 Padelford, Box 354360
206-543-2075
spanport@u.washington.edu

The Division of Spanish and Portuguese Studies offers programs of graduate study leading to the Master of Arts degree.

The Master of Arts degree program in Hispanic Literary and Cultural Studies was reformed and updated in 2001 to foster study of Hispanic culture, literature, and language together. The program calls attention to the rich diversity of Hispanic cultural texts and to their interdisciplinary study while also promoting broad understanding of Spanish and Latin American literature. The program gives careful attention to acquainting students with the traditions of scholarship in the field as well as a range of current textual theory, criticism, and research methods. Study of Portuguese and other Romance literatures and cultures, comparative literature, Romance and Spanish linguistics, and other related disciplines may be included in the Master's degree program. The degree is earned normally in six academic quarters.

Students who wish to pursue advanced study in Spanish and Portuguese in a post-Master's degree program may do so by entering the doctoral studies programs of Comparative Literature or other departments of the University.

Information on specific requirements for the various degree programs is available upon request from the office of the division's academic counselor or on the division's Web page (depts.washington.edu/spanport/).

Financial Aid

The department awards annually a number of teaching assistantships. The assistant normally participates in teaching three classes during the academic year. Each class is limited to approximately 25 students and meets five hours a week for the ten weeks of the quarter.

Faculty

Chair

Cynthia Steele

Professors

Anderson, Farris Furman * 1967, (Emeritus); MA, 1962, Duke University, PhD, 1968, University of Wisconsin; nineteenth- and twentieth-century Spanish literature; Spanish grammar.

Hunn, Eugene S. * 1972, (Adjunct); PhD, 1973, University of California (Berkeley); cognitive anthropology, ethnobiology, cultural ecology and evolution, North American Indians.

Lawson, Victoria A. * 1986, (Adjunct); PhD, 1986, Ohio State University; Latin America, political economy of development, feminist theory in development.

O'Hara, Edgar * 1989; PhD, 1989, University of Texas (Austin); Latin American poetry and essay, composition and creative writing.

Steele, Cynthia * 1986; PhD, 1980, University of California (San Diego); Latin American literature and society, cinema, postcolonial and feminist theory.

Associate Professors

Deyoung, Terri L. * 1991, (Adjunct); PhD, 1988, University of California (Berkeley); Arabic language and literature.

Flores, Lauro H. * 1980, (Adjunct); PhD, 1980, University of California (San Diego); Chicano literature, contemporary Latin American literature (narrative).

Fuchs, Barbara * 1997, (Adjunct); PhD, 1997, Stanford University; early modern English and Spanish literature and culture; literature and imperialism.

Geist, Anthony L. * 1987; PhD, 1978, University of California (Berkeley); twentieth-century Spanish literature: ideology and literary form.

Petersen, Suzanne Helen * 1973; PhD, 1976, University of Wisconsin; medieval Spanish literature, pan-Hispanic ballad.

Shipley, George A. * 1967; PhD, 1968, Harvard University; Spanish golden age literature.

Assistant Professor

Santianez, Nil 1999; PhD, 1991, University of Illinois; nineteenth-century Spanish literature, Realism, Modernism, literary theory.

Senior Lecturers

Basdeo, Ganeshdath D. 1985; MA, 1976, University of Washington; second-year Spanish, Spanish linguistics.

Borreguero, Paloma A. 1990; MA, 1992, University of Washington; Spanish language and culture, pedagogy and teaching methodology.

Gillman, Maria 1990; MA, 1986, Oregon State University; third-year Spanish curriculum and pedagogy, Latin American culture.

Lecturers

Bensadon, Leon M. 1989; MA, 1991, University of Washington; Spanish language and reading for graduate students.

Fox, Joan H. 1984; MA, 1973, University of British Columbia (Canada); Spanish language, translation, business Spanish.

Gonzalez, Jorge 1988; MM, 1986, University of Wisconsin; Spanish language.

Kennedy, Donally S. 1986; MA, 1988, University of Washington; Spanish language.

Raneda-Cuartero, I. 1997; MA, 1994, University of Wisconsin; second- and third-year Spanish language, Spanish culture.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Romance Languages and Literature

Courses for Graduates Only

ROMAN 600 Independent Study or Research (*)
Credit/no credit only.

ROMAN 700 Master's Thesis (*) Credit/no credit only.

ROMAN 800 Doctoral Dissertation (*) Credit/no credit only.

Romanian

RMN 401 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Offered: jointly with ROMN 401; A.

RMN 402 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Prerequisite: RMN/ROMN 401. Offered: jointly with ROMN 402; W.

RMN 403 Elementary Romanian (5) Designed to increase vocabulary and enhance knowledge of grammar through readings in modern Romanian. Prerequisite: RMN/ROMN 402. Offered: jointly with ROMN 403; Sp.

Spanish

SPAN 400 The Syntactic Structure of Spanish (5) VLPA *Strozer, Zagona* Scientific study of the syntax of Spanish: structure of phrases, transformationally derived structures, grammatical relations, principles of interpretation. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 400.

SPAN 401 The Morphological Structure of Spanish (5) VLPA *Strozer, Zagona* Principles of word formation, including derivational and inflectional morphology. Relationship between inflectional morphology and other components of grammar. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 401.

SPAN 402 The Phonological Structure of Spanish (5) VLPA *Strozer, Zagona* Phonological component of the generative grammar of Spanish; representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 402.

SPAN 403 The Evolution of the Spanish Language (5) VLPA *Zagona* Historical survey of Spanish phonology, morphology, and syntax, from Latin origins to the modern language. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 403.

SPAN 406 Advanced Spanish Grammar (5) VLPA Problems of Spanish grammar. Differences from English grammar. Techniques for the effective teaching of Spanish. Prerequisite: SPAN 303; SPAN 323. Offered: jointly with SPLING 406.

SPAN 407 Dialects of World Spanish (5) Introduction to dialectal variants of Spanish. Considers standardization and the real academia; variation and change; pragmatics and politeness; Spanish in contact; sound, word formation, and grammar variation. Taught in Spanish. Prerequisite: SPAN 303; either SPAN 323, LING 200, or LING 400. Offered: jointly with SPLING 407.

SPAN 409 Spanish Phonetics (5) VLPA Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities. Prerequisite: SPAN 301; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 409.

SPAN 414 Spanish Literature: Eighteenth Century (5) VLPA Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 415 Spanish Literature: Nineteenth Century (5) VLPA Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 420 Spanish Poetry: Origins Through the Fifteenth Century (5) VLPA Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 426 Hispanic Poetry (5) VLPA 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. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 433 Golden Age Prose (5) VLPA Representative, and outstanding, prose works of sixteenth- and seventeenth-century Spain. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 436 Spanish Novel of the Nineteenth Century (5) VLPA Representative works of Galdos, Clarin, Pereda, Valera, and Blasco Ibanez. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 437 Spanish Novel: 1900-1936 (5) VLPA Spanish novel from the generation of 1898 to the beginning of the Civil War (1936). Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 439 Women Writers (5) I&S/VLPA Feminist analysis of selected texts by Chicana/Latina writers in the United States as well as by Spanish-American, Luso-Brazilian and/or Spanish women writers in their specific socio-historical contexts. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 447 Spanish Theatre Since the Civil War (5) VLPA Works of Spain's major dramatists of the post-war period. Special attention given to the social and political context of the theatre in Spain under the Franco regime. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 453 Cervantes and His Times (5) VLPA Study of Cervantes and his moment in Spanish history, with special attention to his cultural and artistic environment. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 462 Early Spanish Civilization (5) I&S/VLPA Development of Spanish society and art forms from early times to 1700. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 464 Chicana Expressive Culture (5) I&S/VLPA Expressive culture of Mexican women in United States. Cultural and artistic practices in home, film, literary (print, oral) performing and visual arts. Focuses on ways Chicana visual artists re-vision traditional iconography. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 465 Contemporary Chicano Literature (5) VLPA Examination of one or more problems, themes, and/or figures in the developing body of Chicano lit-

erature. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 466 Chicano Literature: Fiction (5) VLPA Nineteenth- and early twentieth-century fiction, as well as contemporary works, are examined in attempts to trace the development of Chicano fiction in the proper historical trajectory. Prerequisite: either SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 467 Spanish Women (5) I&S/VLPA Women's culture in Spain, focusing on women's experience during Civil War; persecution and censorship of women activists, artists, intellectuals during Franco years; changes in women's culture brought about by reintroduction of democracy; major issues addressed by contemporary Spanish feminists. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 468 Latin American Women (5) I&S/VLPA The elaboration of discourses of identity in relation to gender, ethnicity, social class, and nationality, by women writers from South America, Mexico, Central America, and the Caribbean. Testimonial literature, literature and resistance, women's experimental fiction. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303. Offered: jointly with WOMEN 468.

SPAN 473 Latin American Fiction: Nineteenth Century (5, max. 15) VLPA Study of prose fiction in Latin America in the nineteenth century. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 474 Latin American Fiction: Twentieth Century (5) VLPA Study of prose fiction in Latin America in the twentieth century. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 475 Latin American Poetry: Colonial Through Nineteenth Century (5) VLPA Poetic movements of the seventeenth, eighteenth, and nineteenth centuries in Spanish American, Renaissance, baroque, neoclassicism, romanticism, and modernism. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 476 Contemporary Latin American Poetry (5) VLPA Evolution of Latin American poetry, from postmodernism and vanguardism to the most recent poetic expression. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 477 Latin American Essay (5) VLPA Literary expression of ideas in Latin American countries, nineteenth and twentieth centuries. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 479 The City and Latin American Literature: Points of Departure (5) VLPA/I&S *O'Hara* Representations of Latin American, United States, and European cities by Latin American authors, and of Latin American and Latino cities by authors from other literary traditions. The literary relation of urbanization to modernization, globalization, exile, and alienation. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 480 Spanish Medieval Literature (5) VLPA Principal literary works of the Spanish Middle Ages in the context of evolving intellectual, spiritual, and artistic climates of the period. Covers the evolution of narrative and lyric prose and verse in both their traditional and learned manifestations. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 481 Sixteenth- and Seventeenth-Century Spanish Literature (5) VLPA Spanish literature of the sixteenth and seventeenth centuries. Close study of key texts from all genres as well as their socio-historical contexts. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 482 Eighteenth- through Twentieth-Century Spanish Literature (5) VLPA Survey of Spanish literature since 1700, and its historical context. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 483 Latin American Literature: Origins to Independence (5) VLPA The elaboration of discourses of legitimization by the Spanish conquistadores, and of resistance and accommodation by native and mestizo peoples; the development of a New World Baroque aesthetic; literatures of independence from Spain and of nation-building. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 484 Latin American Literature: Modernismo to the Present (5) VLPA Principal literary movements of Latin America, late nineteenth century to the present, with particular emphasis on poetry and narrative: modernismo, postmodernismo, the vanguard, nueva and novísima narrativa. Includes essays and autobiographical writings to help place the literary works in socio-historical perspective. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 485 Cultural Studies of Latin America (5) I&S/VLPA Identity, representation, and transculturation in Latin American popular culture. Topics vary but may include cinema, folk art, and historical, ethnographic, and travel writing. Prerequisite: SPAN 303; SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SISLA 485.

SPAN 486 Photography and Cultural Studies in Latin America (5) I&S/VLPA Interdisciplinary exploration of the connections between visual anthropology (ethnography through photography and film), documentary and art photography, and colonial and post-colonial discourse in Latin America during the twentieth century. Offered: jointly with SISLA 486.

SPAN 487 Mexican Cinema (5) I&S/VLPA *Steele* Analysis of representative films about post-revolutionary Mexico by directors from both the Golden Age of Mexican Cinema (1940-1960) and the Mexican New Film movement (1975-the present). Revolutionary nationalism, modernization and its discontents; construction of gender, class and ethnicity; migration and globalization. Prerequisite: SPAN 303; SPAN 322 and one additional 300-level course beyond 303.

SPAN 488 The Fantastic in Latin American Literature (5) VLPA *O'Hara* Introduction to the Fantastic in literature, in contrast to realism, and how the concept has been adapted by Latin American authors. May focus on a particular writer: Augusto Monterroso (Guatemala) or Julio Cortazar (Argentina), or survey various authors. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 489 The Mexico-U.S. Border in Literature and Film (5) I&S/VLPA *Doremus, Steele* Analysis of the Mexico-U.S. Border region in literature and film of the 1990s and early 2000s. Includes migration, tourism, NGOs, globalization, transnational commerce, multiculturalism, and politics of gender, sexuality and race. Prerequisite: SPAN 303; either SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SISLA 489.

SPAN 490 Honors Seminar (2-5, max. 10) VLPA Special studies in Spanish literature. Required of candidates for Honors and Distinction in Spanish.

SPAN 491 Individual Authors and Special Topics in Spanish Literature (5, max. 10) VLPA Focus on an individual Spanish author or a special problem in Spanish literature. Prerequisite: SPAN 303; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 493 Foreign Study (2-10, max. 20) VLPA Advanced study in Spanish speaking country outside the standard Spanish curriculum of the University of Washington. Prerequisite: SPAN 303; one additional 300-level course above SPAN 303.

SPAN 495 Study in Spain (12) VLPA Study in Spain. Course content varies from year to year. Consult the Division of Spanish and Portuguese for availability and further requirements.

SPAN 499 Special Topics (1-5, max. 10) Topics to meet special needs.

Courses for Graduates Only

SPAN 510 Methodology of Spanish Language Teaching (3) *Borneguero* Theoretical and practical foundation for teaching Spanish. Major topics include modern theories of language and language acquisition which underlie modern methods of foreign language teaching, teaching techniques, testing, classroom relations. Emphasis on the multiple-approach direct method. Required for beginning Spanish Teaching Assistants. Credit/no credit only.

SPAN 561 Spanish-American Novel From 1940 to the Present (5)

SPAN 571 The Modern Essay in Spanish America (5)

SPAN 573 Twentieth-Century Spanish-American Poetry (5, max. 10)

SPAN 577 Contemporary Literary Theory (5) Introduction to various structuralist and poststructuralist theories of literary analysis, including those developed by Hispanic theorists, and their application to the study of texts from the Spanish and Latin American traditions.

SPAN 590 Special Seminar and Conference (1-10, max. 30) Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program coordinator.

SPAN 591 Literary Problems: Middle Ages (5, max. 10)

SPAN 592 Literary Problems: Renaissance (5, max. 10)

SPAN 595 Literary Problems: Nineteenth Century (5, max. 10)

SPAN 596 Literary Problems: Twentieth Century (5, max. 10)

SPAN 597 Literary Problems: Spanish-American Colonial Literature (5, max. 10)

SPAN 598 Literary Problems: Latin America (5, max. 10)

SPAN 600 Independent Study or Research (*)

SPAN 700 Master's Thesis (*) Credit/no credit only.

SPAN 800 Doctoral Dissertation (*) Credit/no credit only.

Russian, East European, and Central Asian Studies

See International Studies.

Scandinavian Studies

318 Raitt



General Catalog Web page:
www.washington.edu/students/genocat/academic/scandinavian.html



Department Web page:
depts.washington.edu/scand/

The Department of Scandinavian Studies is concerned with the study of languages, literature, history, politics, and cultures of Denmark, Finland, Iceland, Norway, Sweden, and the Baltic States of Estonia, Latvia, and Lithuania. Emphasis is placed both on contemporary literature and culture and on historical development. Although most courses designed for majors are taught in the original languages, a broad spectrum of courses designed primarily for nonmajors is offered in English.

Graduate Program

Graduate Program Coordinator
318 Raitt, Box 353420
206-543-0645
uwscand@u.washington.edu

The Department of Scandinavian Studies offers graduate programs of study leading to the Master of Arts and Doctor of Philosophy degrees. For the M.A. degree, the emphasis may be placed on Old Icelandic (Old Norse), Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies. Ph.D. degree aspirants must complete one year's study of Old Icelandic and concentrate their studies primarily within one of four areas: Danish language and literature, Finnish language and literature, Norwegian language and literature, Swedish language and literature, or Scandinavian philology and linguistics.

For the graduate student, the programs in Scandinavian languages and literature open several areas of study: medieval, with extensive study of Old Scandinavian languages and literature, particularly Old Icelandic; modern, including the eighteenth century, romanticism, the modern breakthrough, and the twentieth century. Attention is paid to the history of the Scandinavian languages, prose fiction, drama, and poetry. Opportunities for supervised study and specialization also exist in such areas as Scandinavian history, politics, mythology, and folklore. There are also opportunities for comparative literature study.

Master of Arts

For the M.A. degree, two options are available, each allowing the student to emphasize a target language while pursuing courses in Scandinavian languages, literature, or area studies.

1. An emphasis on Scandinavian languages and literature includes acquisition of a working knowledge of literary history, critical theory and text analysis, plus study of one secondary area.

2. An emphasis on Scandinavian area studies includes the study of Scandinavian folklore, mythology, history, politics, and society, with an emphasis in one of these areas.

Admission Requirement: Bachelor of Arts degree with major in Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies, or equivalent background.

Graduation Requirements: Minimum of 40 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 non-thesis program. Candidates in Scandinavian languages and literature must satisfy the departmental requirements in Old Icelandic.

Doctor of Philosophy

For the Ph.D. degree, the student concentrates primarily on one of two areas: Scandinavian languages and literature, or Scandinavian philology and linguistics, with an emphasis on the student's chosen target language. Major attention is given to the history of the Scandinavian languages, literary history and theory, and genre study. Opportunities for graduate work also exist in such areas as Scandinavian history, politics, mythology, and folklore.

Admission Requirement: Master of Arts degree with major in Scandinavian languages and literature or equivalent background.

Graduation Requirements: 40 credits beyond the master's degree in courses or seminars in Scandinavian languages and literature and related subjects approved by the department, one year's study of Old Icelandic, a reading knowledge of French and German (other non-Scandinavian languages may be substituted with faculty approval), General Examination for admission to candidacy, 27 credits of SCAND 800 (dissertation) taken over at least three quarters, and a Final Examination on the dissertation.

Financial Aid

Teaching assistantships in Danish, Finnish, Norwegian, Swedish, and Scandinavian Area Studies are usually available, as well as occasional research assistantships. If funding allows, a Baltic-language teaching assistantship may be available.

Faculty

Chair

Terje I. Leiren

Professors

Leiren, Terje I. * 1977; PhD, 1978, North Texas State University; Scandinavian history, nationalism, immigration, ethnicity.

Rossel, Sven H. * 1974, (Affiliate); PhD, 1968, University of Copenhagen (Denmark); Danish language and literature, Scandinavian ballads, comparative literature.

Steene, Birgitta * 1973, (Emeritus); PhD, 1960, University of Washington; Scandinavian drama and film, children's literature, comparative literature.

Associate Professors

Bryant-Bertail, Sarah * 1990, (Adjunct); PhD, 1986, University of Minnesota; Western and Asian drama,

theater history, performance practices, film, critical theory.

Conroy, Patricia L. * 1972; PhD, 1974, University of California (Berkeley); Scandinavian philology, Icelandic language and literature, Danish, Faroese.

Gavel Adams, Ann-Charlotte * 1986; PhD, 1990, University of Washington; August Strindberg, Scandinavian women's literature, Scandinavian turn-of-the-century drama and art.

Ingebrietsen, Christine * 1992; PhD, 1993, Cornell University; Scandinavian domestic and foreign policies, European community integration and Scandinavia.

Remley, Paul G. * 1988, (Adjunct); PhD, 1990, Columbia University; Old and Middle English, medieval languages and literatures, critical theory.

Sehmsdorf, Henning K. * 1967, (Emeritus); PhD, 1968, University of Chicago; folklore and mythology, Norwegian language and literature, comparative literature.

Sjavik, Jan * 1978; PhD, 1979, Harvard University; Norwegian language and literature, prose fiction, literary theory.

Stecher Hansen, Marianne T. * 1988; MA, 1981, University of Washington, PhD, 1990, University of California (Berkeley); Danish language and literature, Scandinavian novel, Isak Dinesen (Karen Blixen), H. C. Anderson.

Warme, Lars G. * 1975, (Emeritus); PhD, 1974, University of California (Berkeley); Swedish language and literature, Scandinavian novel, comparative literature.

Assistant Professor

Nesting, Andrew K. 2001; PhD, 2001, University of Washington; Finnish language and literature, cultural theory, globalization, cinema.

Senior Lecturers

Brandl, Klaus K. * 1991; PhD, 1991, University of Texas (Austin); foreign language pedagogy, applied linguistics, foreign language teacher training.

Dubois, Ia G. 1989; PhD, 1991, University of Washington; Swedish language and literature, ethnicity.

Lecturer

Smidchens, Guntis I. 1993; MA, 1988, Indiana University; Estonian, Latvian, and Lithuanian languages and literatures; Baltic studies; folklore.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Danish

DANISH 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Danish language, literature, or related fields.

Estonian

ESTO 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Estonian language, culture, or society.

Finnish

FINN 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Finnish language, culture, or society.

Latvian

LATV 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Latvian language, culture, or society.

Lithuanian

LITH 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Lithuanian language, culture, or society.

Norwegian

NORW 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Norwegian language, literature, or related fields.

Scandinavian

SCAND 403 Scandinavian Immigration in History and Literature (5) VLPA/I&S History and literature of Scandinavian immigration to North America, including immigrant life and culture, community structures and traditions, and the literature about and by immigrants from Denmark, Finland, Iceland, Norway, and Sweden. Offered: jointly with HSTEU 403.

SCAND 427 Scandinavian Women Writers in English Translation (5) VLPA Selected works by major Scandinavian women writers from mid-nineteenth-century bourgeois realism to the present with focus on feminist issues in literary criticism. Offered: jointly with WOMEN 429.

SCAND 431 The Northern European Ballad (5) VLPA Integrative study of the Northern European Ballad, with an emphasis on texts, performance, context, history, theory, genre classification, and interpretive approaches. Offered: jointly with C LIT 431.

SCAND 445 The Nordic-Baltic Region and the War: Literary Representations (5) Treatment of Nazism, Stalinism, collaboration, resistance, national identities in literary texts written during/after World War II in Scandinavia and the Baltic region. Surveys different national destinies (German-occupied Denmark and Norway, neutral Sweden, Finland at war, Soviet-occupied Baltic states, Iceland) through literary texts related to period. Offered: jointly with EURO 445.

SCAND 454 Baltic History (5) I&S Overview of the history of the area occupied by the Baltic countries of Latvia, Lithuania, and Estonia. Emphasizes their emergence as modern European nation-states. Era from World War I to present treated in depth, including the historical role and present situation of non-Baltic peoples, particularly Russians. Offered: jointly with HSTEU 454.

SCAND 460 History of the Scandinavian Languages (5) VLPA Development of languages from common Scandinavian to contemporary Danish, Norwegian, Swedish, Faroese, and Icelandic. Recommended: DANISH 203, FINN 203, NORW 203, or SWED 203.

SCAND 462 Isak Dinesen and Karen Blixen (5) VLPA The fiction of Isak Dinesen (pseudonym for Karen Blixen) reevaluated in light of current issues in literary criticism, particularly feminist criticism. Close readings of selected tales, essays, and criticism. Offered: jointly with WOMEN 462.

SCAND 465 Baltic States Since 1991 (5) I&S Intensive interdisciplinary survey of social, political and economic developments in Estonia, Latvia, and Lithuania since 1991. Offered: jointly with SISRE 465.

SCAND 481 August Strindberg and European Cultural History (5) I&S/VLPA Examines the work of Swedish dramatist, novelist, and painter August Strindberg, in the context of European literary movements and history of ideas from 1880 to 1912, and Strindberg's influence on 20th-century drama and film. Offered: jointly with EURO 481.

SCAND 490 Special Topics (1-5, max. 15) Special topics in Scandinavian art, literature, culture, and history. Course offerings based on instructor's specialty and student demand.

SCAND 495 Foreign Study: Research Project (1-5, max. 10) Research on approved topic.

SCAND 498 Senior Essay (5) VLPA Undergraduate research and the writing of a senior essay in Scandinavian area studies.

SCAND 499 Independent Study or Research (1-5, max. 10) Independent study or research in Scandinavian area studies. May be done in a Scandinavian language or in English.

Courses for Graduates Only

SCAND 500 Introductory Readings in Old Icelandic (5) Systematic study of the grammatical structure of Old Icelandic and the reading of several short prose works.

SCAND 501 Old Icelandic Language and Literature (5) Reading of a major work in Old Icelandic literature as a vehicle for discussions about literary history and genre, narrative, and rhetorical strategies.

SCAND 503 Methods of Scandinavian Studies (5) Introduction to Scandinavian studies on the graduate level with emphasis on Scandinavian literature, folklore, history, and politics.

SCAND 504 Contemporary Literary Theory (5) Contemporary literary theory and its application to Scandinavian texts. Prerequisite: graduate student standing or permission of instructor.

SCAND 505 Topics in Scandinavian Drama and Film (5, max. 15) Seminar on a selected topic in Scandinavian drama or film, such as an author (Holberg, Ibsen, Strindberg, Bergman), a period, a genre, or a movement.

SCAND 508 Topics in Scandinavian Prose (5, max. 15) Seminar on various topics in Scandinavian prose, including shorter prose texts, as well as a selection of the significant novels of the nineteenth and twentieth centuries.

SCAND 515 Pre-Nineteenth-Century Scandinavian Literature (5) Seminar on Scandinavian literature of the sixteenth, seventeenth, and eighteenth centuries.

SCAND 518 Foreign Language Teaching Methodology (2) Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/NEAR E 518/SCAND 518/SLAV 518.

SCAND 519 Modern Scandinavian Politics (5) Analyzes the political, economic, and historical development of Sweden, Norway, Denmark, Iceland, and Finland from World War II to the present. Readings focus on domestic and foreign policies that distinguish these countries from other advanced industrial societies. Offered: jointly with POL S 519.

SCAND 520 Topics in Scandinavian Poetry (5, max. 15) Seminar on selected periods of Scandinavian poetry: romanticism, symbolism, mod-

ernism, and contemporary poetry. Poetry examined in relation to the literary canon of each country and to Scandinavian literature as a whole. International influences also discussed.

SCAND 525 Topics in Scandinavian History (5, max. 15) Seminar on selected topics in Scandinavian history.

SCAND 533 Interdisciplinary Approaches to Community in Scandinavia (5) Humanistic examination of community creation, maintenance, and change in the Nordic region. Examples drawn from folklore, literature, activism, popular culture, history. Focus on issues of gender, belief, and art in relation to community. Coursework includes both individual and collaborative assignments.

SCAND 590 Special Topics in Scandinavian Literature (1-5, max. 15)

SCAND 595 Teaching Assistant Workshop (1) Focuses on topics in language pedagogy. Required for teaching assistants in Scandinavian languages. Required for all teaching assistants. Credit/no credit only.

SCAND 600 Independent Study or Research (*)
Prerequisite: permission of instructor.

SCAND 700 Master's Thesis (*)

SCAND 800 Doctoral Dissertation (*)

Swedish

SWED 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Swedish language, literature, or related fields.

Slavic Languages and Literatures

M253 Smith

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/slavic.html

 *Department Web page:*
depts.washington.edu/slavweb/

The Department of Slavic Languages and Literatures offers instruction in the principal East European languages and literatures and in Slavic linguistics, working closely with the School of International Studies. Languages may include Bulgarian, Czech, Polish, Romanian, Russian, Croatian/Serbian, and Ukrainian.

Graduate Program

Graduate Program Coordinator
M268 Smith, Box 353580
206-543-6848

The Department of Slavic Languages and Literatures offers a complete program of courses and seminars leading to the Master of Arts and Doctor of Philosophy degrees in Russian and East European languages, literatures, and cultures. Languages taught in the department include Czech, Old Church Slavonic, Polish, Russian, and Croatian/Serbian.

The graduate program is organized to permit completion of the master's degree in four to six quarters and the doctoral degree in three additional years. The duration of each program, however, will depend on the extent of the student's preparation upon entrance into the program.

Research Facilities

The Suzzallo Library holdings include some 400,000 titles in Slavic languages and in other languages on Slavic subjects. It subscribes to all important periodicals and newspapers in Russian and other languages and has exceptionally strong holdings in rare and antiquarian Slavic titles on microfilm and microfiche.

Admission Qualifications

For the Master of Arts Program: Bachelor of Arts degree with major in Russian or Eastern European languages and literatures, or equivalent background.

For the Doctor of Philosophy Program: Master of Arts degree with major in Slavic Languages, Literatures, and Cultures.

Assistantship Opportunities

The department regularly offers a number of teaching assistantships. In conjunction with the Henry M. Jackson School of International Studies, students in the department are eligible for several other types of fellowships.

Faculty

Acting Chair

Galya Diment

Professors

Augerot, James E. * 1960; MA, 1959, New Mexico Highlands University, PhD, 1968, University of Washington; Slavic linguistics, Romanian, Bulgarian.

Diment, Galya * 1989; MA, 1978, Claremont Graduate School, PhD, 1987, University of California (Berkeley); Russian literature, comparative literature, modernism, cultural studies, Russian film.

Kapetanic, Davor * 1972, (Emeritus); MA, 1954, PhD, 1972, University of Zagreb (Yugoslavia); Yugoslav literature, Slavic literary theory.

Kramer, Karl D. * 1970, (Emeritus); MA, 1957, PhD, 1964, University of Washington; Russian literature.

Micklesen, Lew R. * 1966, (Emeritus); PhD, 1951, Harvard University; Slavic linguistics.

Associate Professors

Coats, Herbert S. * 1968, (Emeritus); MA, 1964, Fordham University, PhD, 1970, University of Illinois; Slavic linguistics, Russian phonology, Russian syntax, Slavic accentuation.

Crnkovic, Gordana * 1993; MA, 1991, Stanford University, PhD, 1993, Stanford University; East European literature, film and cultural studies, former Yugoslavia, theory, American literature.

Dziwirek, Katarzyna A. * 1993; MA, 1984, University of Illinois, MA, 1985, University of Lodz (Poland), PhD, 1991, University of California (San Diego); linguistics, syntax and typology.

West, James D. * 1972; PhD, 1970, Cambridge University (UK); Russian literature, philosophy and art, comparative European culture studies/cultural nationalism.

Senior Lecturer

Polack, Zoya M. 1973; MA, 1975, University of Washington; Russian and Ukrainian languages.

Lecturers

Boyle, Eloise M. 1995; MA, 1983, PhD, 1988, Ohio State University; twentieth-century Russian literature, pedagogy, second language acquisition.

Soldanova, Jaroslava M. 1998; MA, 1976, Palacky University (Czech Republic); Czech literature and culture, Czech language.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

Slavic Languages and Literatures

SLAVIC 498- Senior Honors Thesis ([3-9, max. 9]-) VLPA Directed research on a topic approved by department for a thesis presented in partial fulfillment of requirement for degrees "with honors" or "with distinction." Offered: AWSpS.

Courses for Graduates Only

SLAVIC 600 Independent Study or Research (*)

SLAVIC 800 Doctoral Dissertation (*)

Bulgarian

BULGR 401 Elementary Bulgarian (5) Introduction to Bulgarian phonology and grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. Offered: A.

BULGR 402 Elementary Bulgarian (5) Introduction to Bulgarian phonology and grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. Prerequisite: BULGR 401. Offered: W.

BULGR 403 Elementary Bulgarian (5) Reading of modern texts to increase command of grammar and vocabulary. Prerequisite: BULGR 402. Offered: Sp.

Croatian-Serbian

CR SB 401 Elementary Croatian/Serbian (5) Comprehensive introduction to spoken and written literary Croatian and Serbian. Offered: A.

CR SB 402 Elementary Croatian/Serbian (5) Comprehensive introduction to spoken and written literary Croatian and Serbian. Prerequisite: CR SB 401, which may be taken concurrently. Offered: W.

CR SB 403 Elementary Croatian/Serbian (5) Comprehensive introduction to spoken and written literary Croatian and Serbian. Prerequisite: CR SB 402, which may be taken concurrently. Offered: Sp.

CR SB 404 Advanced Croatian/Serbian (5) VLPA Continuation of 401, 402, 403; reinforces basic grasp of language and enlarges both vocabulary and command of grammatical patterns through the reading of contemporary short stories both Croatian and Serbian. Prerequisite: CR SB 403. Offered: A.

CR SB 405 Advanced Croatian/Serbian (5) VLPA Continuation of 401, 402, 403; reinforces basic grasp of language and enlarges both vocabulary and command of grammatical patterns through the reading of contemporary short stories both Croatian and Serbian. Prerequisite: CR SB 404. Offered: W.

CR SB 406 Advanced Croatian/Serbian (5) VLPA Continuation of 401, 402, 403; reinforces basic grasp of language and enlarges both vocabulary and com-

mand of grammatical patterns through the reading of contemporary short stories both Croatian and Serbian. Prerequisite: CR SB 405. Offered: Sp.

CR SB 420 Literature of the Former Yugoslavia and the Yugoslav Successor States (5) VLPA Twentieth-century prose of the former Yugoslavia. Cultural identity at the crossroads between East and West. Relation of Yugoslav literature, created on the European margin, to the European cultural centers. Literature and the myths of socialism and nationalism. Yugoslav oral tradition. Issues of gender.

Czech

CZECH 401 Elementary Czech (5) Introduction to spoken and written Czech. Offered: A.

CZECH 402 Elementary Czech (5) Introduction to spoken and written Czech. Prerequisite: CZECH 401. Offered: W.

CZECH 403 Elementary Czech (5) Modern Czech prose, leading to a command of the language as a research tool and providing an adequate basis for further study. Prerequisite: CZECH 402. Offered: Sp.

CZECH 404 Advanced Czech (5) VLPA Continuation of 401, 402, 403. Selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. Reinforces and extends basic knowledge of Czech grammar and vocabulary. Prerequisite: CZECH 403. Offered: A.

CZECH 405 Advanced Czech (5) VLPA Continuation of 401, 402, 403. Selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. Reinforces and extends basic knowledge of Czech grammar and vocabulary. Prerequisite: CZECH 404. Offered: W.

CZECH 406 Advanced Czech (5) VLPA Continuation of 401, 402, 403. Selected readings from the main works of Czech authors of the nineteenth and twentieth centuries. Reinforces and extends basic knowledge of Czech grammar and vocabulary. Prerequisite: CZECH 405. Offered: Sp.

Polish

POLSH 401 Elementary Polish (5) Principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. Offered: A.

POLSH 402 Elementary Polish (5) Principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. Prerequisite: POLSH 401. Offered: W.

POLSH 403 Elementary Polish (5) Designed to enlarge general vocabulary by the reading of short texts selected from Polish authors of the nineteenth and twentieth centuries. Prerequisite: POLSH 402. Offered: Sp.

POLSH 404 Advanced Polish (5) VLPA Continuation of 401, 402, 403. Selected readings of the main works from nineteenth and twentieth centuries. Reinforces basic knowledge of vocabulary, grammatical patterns, and conversation. Prerequisite: POLSH 403. Offered: A.

POLSH 405 Advanced Polish (5) VLPA Continuation of 401, 402, 403. Selected readings of the main works from nineteenth and twentieth centuries. Reinforces basic knowledge of vocabulary, grammatical patterns, and conversation. Prerequisite: POLSH 404. Offered: W.

POLSH 406 Advanced Polish (5) VLPA Continuation of 401, 402, 403. Selected readings of the main works from nineteenth and twentieth centuries. Reinforces basic knowledge of vocabulary, grammatical pat-

terns, and conversation. Prerequisite: POLSH 405. Offered: Sp.

Romanian

ROMN 401 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Offered: jointly with RMN 401; A.

ROMN 402 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Prerequisite: ROMN/RMN 401. Offered: jointly with RMN 402; W.

ROMN 403 Elementary Romanian (5) Designed to increase vocabulary and enhance knowledge of grammar through readings in modern Romanian. Prerequisite: ROMN/RMN 402. Offered: jointly with RMN 403; Sp.

Russian

RUSS 401 Advanced Russian (5) VLPA Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: either RUSS 303 or RUSS 350. Offered: AWSp.

RUSS 402 Advanced Russian (5) VLPA Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: RUSS 401. Offered: AWSp.

RUSS 403 Advanced Russian (5) VLPA Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: RUSS 402. Offered: AWSp.

RUSS 420 Topics in Russian Literary and Cultural History (5, max. 20) VLPA A special topic in the literary and cultural history of Russia. Topics vary.

RUSS 421 Post-Soviet Literary and Cultural Scene (5, max. 15) VLPA Russian literature of the second half of the twentieth century. In English.

RUSS 422 Russian Literature in Emigration and Exile (5) VLPA Examines writers who left the Soviet Union during the post-Stalin period up to the fall of communism or who, though they resided in the USSR, published through unofficial channels. Discussion of Aksyonov, Siniavsky, Voinovich, Zinoviev, and others.

RUSS 430 Major Authors (5, max. 15) VLPA Major Russian writers of the nineteenth and twentieth centuries. Among authors read are Pushkin, Gogol, Lermontov, Turgenev, Tolstoy, Dostoevsky, Chekhov, Babel, Ilf and Petrov, Olesha. Content varies.

RUSS 450 Intensive Fourth-Year Russian (15) VLPA Covers material of 401, 402, 403 in one quarter. Meets three hours daily. See credit note above. Prerequisite: either RUSS 303 or RUSS 350. Offered: S.

RUSS 451 Structure of Russian (5) VLPA Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations in popular speech, examination of common roots and productive derivational elements in Russian words, and elementary principles of syntax. Prerequisite: either RUSS 303 or RUSS 350. Offered: A.

RUSS 452 Structure of Russian (5) VLPA Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations

in popular speech, examination of common roots and productive derivational elements in Russian words, and elementary principles of syntax. Prerequisite: RUSS 451. Offered: W.

RUSS 461 Introduction to Russian Literature in Russian (5) VLPA Analysis of original Russian literary texts representative of different varieties of Russian writing. Vocabulary of Russian literary analysis; typically Russian approaches to literature, some readings of secondary critical texts; discussion in Russian of passages studied. Prerequisite: RUSS 403 or RUSS 450.

RUSS 481 Russian Language in St. Petersburg (15) VLPA Daily work in phonetics, grammar, conversation, translation, analytical reading, stylistics, newspaper analysis, and advanced syntax. Prerequisite: either RUSS 403 or RUSS 450.

RUSS 482 Research Project in St. Petersburg (12) VLPA Supervised research in student's selected area of concentration, combined with language instruction tailored to the student's field. Successful completion of course requires a 15-page term paper in Russian. Prerequisite: either RUSS 403 or RUSS 450.

RUSS 483 Russian Literature in St. Petersburg (5, max. 10) VLPA Selection of courses on specialized topics in Russian literature; specific authors or periods. Prerequisite: either RUSS 403 or RUSS 450.

RUSS 484 Russian History in St. Petersburg (5, max. 10) I&S/VLPA Selection of courses on specialized topics in Russian political, economic, social, cultural, or art history. Prerequisite: either RUSS 403 or RUSS 450.

RUSS 485 Economics in St. Petersburg (5, max. 10) I&S/VLPA Selection of courses on topics relating to economic issues.

RUSS 490 Studies in Russian Literature (3-5, max. 15) VLPA In either Russian or English. Topics vary.

RUSS 499 Directed Study or Research (1-5, max. 15) Individual study of topics to meet specific needs. By arrangement with the instructor and the Department of Slavic Languages and Literatures office. Offered: AWSpS.

Courses for Graduates Only

RUSS 501 Russian Language for Graduate Students (2, max. 10) Develops skills of particular use to graduate students. Emphasis on rapid assimilation of variety of written materials with sophisticated understanding and maximum retention of vocabulary, and ability to discuss in Russian the more theoretical and abstract kinds of material. Prerequisite: RUSS 403 or equivalent and graduate standing in Russian, East European, and Central Asian Studies.

RUSS 502 Russian Translation (3) Introduction to the theory of translation; translation to and from Russian of selected prose passages in a variety of styles, with emphasis on idiomatic accuracy and stylistic compatibility. Prerequisite: two quarters of RUSS 501 or permission of instructor.

RUSS 512 Russian Literary Criticism (3) A study of critical positions, problems, and literary values of major Russian literary critics from Belinsky to the present.

RUSS 520 Topics in Russian Literature and Culture (5, max. 20) Detailed study of a single author or a movement, theme, or short period in Russian literature or culture.

RUSS 521 Russian Literature to 1800 (5) Representative works of East Slavic, Muscovite, and Russian literature from the beginnings to 1800. Studies include a varied selection of primary texts. Intended as an introduction to the study of modern

literature for beginning graduate students in Russian literature. Offered: alternate years.

RUSS 522 Russian Literature of the Nineteenth Century (5) Survey of nineteenth-century Russian poetry and prose. Representative works of Russia's major and minor authors, literary trends, and genres. Offered: alternate years.

RUSS 523 Russian Literature of the Twentieth Century (5) Survey of twentieth-century Russian poetry and prose. Pre-revolutionary, Soviet, and Émigré authors, trends, and genres. Includes survey of twentieth-century Literary Criticism as well, in particular Russian Formalists and Mikhail Bakhtin. Offered: alternate years.

RUSS 526 Modern Russian Literary, Cultural, and Film Studies (5, max. 15) Modern literature and film. Topics include post-colonialism, gender, reflections of social upheavals, artistic experimentation, issues of commercialism in art, search for new cultural expressions and identity. Readings in both Russian and English. Offered: Sp.

RUSS 542 Seminar in Russian Poetry (5, max. 20) One specific problem or theme in Russian poetry, seen in its widest possible dimensions. Students read, in Russian, the literary works involved and become familiar with the social, historical, and philosophical backgrounds that inspire them.

RUSS 543 Seminar in Contemporary Russian Prose (5, max. 20) Analysis of Russian prose fiction. Selected authors and topics.

RUSS 554 History of the Russian Literary Language (5) Russian literary language from the eleventh through the twentieth centuries, with special attention to syntax and lexicon and to the development of notions of literary styles. Offered in Russian. Prerequisite: RUSS 555 or SLAV 565, or permission of instructor. Offered: alternate years.

RUSS 570 Research Seminar in Russian Literature (5) *Diment, Haney, Kramer, West* Working in consultation with a faculty adviser, students formulate a topic and prepare a 30-minute oral presentation to be delivered at the seminar and submit a written paper to be read and critiqued. by all participants.

RUSS 577 Russian Folk Literature (5) Analysis of representative works of the various genres of folk literature, including the byliny, skazki, historical and lyrical songs, and the spiritual stiki.

RUSS 600 Independent Study or Research (*)

Slavic

SLAV 420 The Other Europe: Contemporary East European Fiction (5, max. 15) *VLPA Crnković* Contemporary fiction by Czech, East German, Hungarian, Polish, Baltic, and Balkan writers. Topics include: history of colonization, the imagination of social utopia, socialism and nationalism, everyday life under communism, cultural identity between East and West, experimental writing, new fiction in post-communist Eastern Europe. All readings in English.

SLAV 423 East European Film (5) *VLPA Crnković* Survey of major East European film makers. Compares East European and Western production of those directors who worked partially in the West, e.g., Polanski, Forman, Holland, Makavejev. Topics include film in socialist versus market economy, politics, gender, sexuality.

SLAV 425 Ways of Meaning: Universal and Culture Specific Aspects of Language (5) *I&S/VLPA Dzwirek* Social and cultural conditioning of language use. Language as a mirror of culture and national character. Universal and culture/language specific components in linguistic expression of emotions,

courtesy/politeness and rudeness, prejudice and (in)sensitivities, linguistic expression of gender differences in different cultures. Offered: Sp.

SLAV 470 Special Topics in Slavic Linguistics (3-5, max. 15) *VLPA Augerot, Coats, Dzwirek* Special topics in Slavic linguistics. Course offerings based on instructor's specialty and student demand. Offered: AWP.

SLAV 490 Studies in Slavic Literatures (3-5, max. 15) *VLPA* Topics vary.

SLAV 499 Directed Study or Research (1-5, max. 15) Individual study of topics to meet specific needs. By arrangement with the instructor and the Department of Slavic Languages and Literatures office. Prerequisite: permission of instructor and undergraduate adviser. Offered: AWP.

Courses for Graduates Only

SLAV 501 Using Slavic Resources (2) Introduction to graduate studies in Slavic languages, literatures, and cultures. Discusses field of study and research materials and techniques employed.

SLAV 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/NEAR E 518/SCAND 518.

SLAV 519 Slavic Language Pedagogy (3, max. 6) *Boyle* Introduction to current issues of foreign language pedagogy. Concentrates on the practical classroom application of methodological theory through lectures and micro-teaching presentation. Topics discussed and practiced include testing, proficiency teaching, teaching listening and reading skills, writing, teaching grammar, and computers. Offered: A.

SLAV 520 New Trends in Literary Theory (3) *Crnković* Explores recent theoretical trends which no longer search for a unified theoretical meta-narrative (i.e., post-structuralism or new historicism), but instead explore various literary genres (such as diary or fictional book reviews) and texts as the primary terrain of theory. Bakhtin, Lem, Bruns, Corradi-Fiumara, Crnkovic, and others.

SLAV 550 Synchronic Slavic Linguistics (5) Linguistic analysis of the phonology, morphology, and syntax of Russian and other Slavic languages. Investigation of current theoretical work in these areas.

SLAV 551 The Introduction to the Study of Slavic Languages (5) 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.

SLAV 560 Diachronic Slavic Linguistics (5) Development of the phonological and morphological system of Common Slavic from Indo-European. Evolution of Russian and other modern Slavic languages from Common Slavic. Offered: A.

SLAV 561 History of the East Slavic Languages (5) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the Ukrainian and Byelorussian literary languages. Prerequisite: SLAV 560. Offered: alternate years.

SLAV 562 History of the West Slavic Languages (5) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of literary

Polish, Czech, Slovak, and Upper and Lower Sorbian languages. Prerequisite: SLAV 560. Offered: alternate years.

SLAV 563 History of the South Slavic Languages (5) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the South Slavic languages. Prerequisite: SLAV 560.

SLAV 565 Old Church Slavic (4) Rise and development of earliest Slavic literary language and a descriptive study of its orthography, phonology, morphology, and syntax. Readings from normalized texts. Offered: alternate years.

SLAV 566 Readings in Old Church Slavic (4) Reading and grammatical interpretation of a selected group of canonical texts, as well as some examples of the various later recensions of Old Church Slavonic. Prerequisite: SLAV 555. Offered: alternate years.

SLAV 570 Special Topics in Slavic Linguistics (3-5, max. 15) Investigation and discussion of special topics in Slavic linguistics.

Ukrainian

UKR 401 Elementary Ukrainian (5) Introduction to spoken and written Ukrainian.

UKR 402 Elementary Ukrainian (5) Introduction to spoken and written Ukrainian. Prerequisite: UKR 401, which may be taken concurrently.

UKR 403 Elementary Ukrainian (5) Introduction to spoken and written Ukrainian. Prerequisite: UKR 402, which may be taken concurrently.

Sociology

202 Savery

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/Sociology.html

 *Department Web page:*
www.soc.washington.edu

The Department of Sociology has a strong commitment to research, publication, and training and is dedicated to providing a rich graduate program.

Graduate Program

Graduate Program Coordinator
206 Savery, Box 353340
206-543-5396
asksoc@u.washington.edu

Sociology seeks to explain social structure, social institutions, and social interaction. There are three emphases in the graduate training program at the University of Washington: understanding and critically evaluating social theory and empirical research; doing theoretically guided research that explores, assesses, and further develops explanatory theories; and developing communication skills (with emphasis on teaching and scholarly writing) that will be useful in transmitting sociological knowledge. The department has graduate program specialization in demography and ecology, deviance and social control, race and ethnic relations, family systems, gender studies, institutional analysis, quantitative research methodology, social psychology, sociological theory, and stratification.

Emphasis is on empirical research aimed at developing explanatory theories. Students are trained in

problem formulation, research design, data gathering and analysis, and bringing data to bear on significant questions. Instruction is offered in various methods: statistical, survey, demographic and ecological, field research, and historical. Students learn social research by participating in faculty projects or developing their own studies. Also available is a program training students to teach.

The graduate program aims at completion of the Master of Arts degree in two calendar years and the Doctor of Philosophy degree in three years beyond the M.A. degree, although not all students finish in this time. A thesis is required for the M.A. degree. For the Ph.D. degree, the student must be certified in general methodology and in a major and a minor substantive area, in addition to completing an approved dissertation.

Special Requirements

Applicants for admission to the Master of Arts program are evaluated on undergraduate performance, Graduate Record Examination scores, statement of educational plans, recommendations, and samples of written work. For admission to the Ph.D. program, students are expected to have completed an M.A. degree in sociology in this department or elsewhere. Occasionally, M.A. degrees in other fields are accepted as a basis for admission to the Ph.D. program. The department encourages applications from minority students.

Financial Aid

Fellowships, research assistantships, and teaching assistantships are available to qualified graduate students including those in their first year of training.

Faculty

Chair

Robert D. Crutchfield

Professors

Barth, Ernest A. T. 1955, (Emeritus); PhD, 1955, University of North Carolina.

Borgatta, Edgar F. * 1980, (Emeritus); PhD, 1952, New York University; methodology, social psychology, demography-ecology, aging.

Bridges, George S. * 1982; PhD, 1979, University of Pennsylvania; deviance, social control, law, and legal institutions.

Burstein, Paul * 1985; PhD, 1974, Harvard University; political sociology, social movements, social stratification, public policy, law.

Campbell, Frederick L. * 1966, (Emeritus); PhD, 1967, University of Michigan; population and ecology, social organization.

Chirot, Daniel * 1974; PhD, 1973, Columbia University; comparative ethnic conflict, social change, post-communist societies.

Costner, Herbert L. * 1959, (Emeritus); PhD, 1960, Indiana University; methodology, social change.

Crutchfield, Robert D. * 1979; PhD, 1980, Vanderbilt University; deviance, criminology, stratification, race and ethnic relations.

Gillmore, Mary Louise 1977, (Adjunct); MS, 1970, University of Michigan, MA, 1977, PhD, 1983, University of Washington; adolescent sexuality and substance abuse.

Grembowski, David * 1981, (Adjunct); MA, 1975, Washington State University, PhD, 1982, University

of Washington; health services research, survey research, program evaluation, performance of health care systems.

Gross, Edward * 1965, (Emeritus); PhD, 1949, University of Chicago; formal organizations, industrial sociology, symbolic interaction.

Guest, Avery * 1972; MS, 1964, Columbia University, MA, 1967, PhD, 1970, University of Wisconsin; demography, ecology, stratification.

Hamilton, Gary G. * 1993; PhD, 1975, University of Washington; economic sociology, historical comparative, organizational studies, East Asia.

Handcock, Mark S. * 2000; PhD, 1989, University of Chicago; methodology for the social sciences; spatial, environmental modeling; distributional comparison.

Hechter, Michael N. * 1997; PhD, 1972, Columbia University; rational choice theory, nationalism, intergroup relations, norms and values.

Hirschman, Charles * 1987; PhD, 1972, University of Wisconsin; demography, race and ethnic relations, social stratification, Southeast Asia.

Howard, Judith A. * 1982; PhD, 1982, University of Wisconsin; social psychology, sociology of gender.

Kasaba, Resat * 1985, (Adjunct); PhD, 1985, State University of New York (Binghamton); historical sociology, world systems, social change in the Middle East.

Kiser, Edgar Vance * 1988; PhD, 1987, University of Arizona; political sociology, theory, historical sociology.

Lang, Gladys Engel * 1984, (Emeritus); PhD, 1954, University of Chicago; political effects of mass media, sociology of art, political movements and crowd behavior.

Lang, Kurt * 1984, (Emeritus); PhD, 1953, University of Chicago; political and social effects of the media on mass communication; arts and society; public opinion.

Larsen, Otto * 1958, (Emeritus); PhD, 1955, University of Washington; mass communications, public opinion, collective behavior.

Matsueda, Ross L. * 1998; PhD, 1984, University of California (Santa Barbara); testing sociological theories of crime using quantitative methods and survey data.

Miyamoto, Frank 1941, (Emeritus); MA, 1938, University of Washington, PhD, 1950, University of Chicago; social psychology, collective behavior.

Morris, Wanda Martina 2000; PhD, 1989, University of Chicago; stratification/mobility, social networks, quantitative methodology.

Patrick, Donald L. * 1987, (Adjunct); MS, 1968, PhD, 1972, Columbia University; health status and quality of life, end of life, adolescents.

Raftery, Adrian Elmes * 1985; Doct, 1980, Universite de Paris VI (France); time series, spatial, Bayesian statistics, population estimation, model selection, sociology.

Schmitt, David R. * 1968, (Emeritus); PhD, 1963, Washington University; experimental social psychology, exchange relations.

Schrag, Clarence 1950, (Emeritus); PhD, 1950, University of Washington.

Schwartz, Pepper J. * 1972; PhD, 1974, Yale University; family, gender, human sexuality.

Scott, Joseph W. * 1985; PhD, 1963, Indiana University; political sociology, family sociology, race/ethnic relations.

Stark, Rodney * 1971; PhD, 1971, University of California (Berkeley); scientific methods in theory and research, religion, deviance, prejudice, police.

Tolnay, Stewart E. * 2000; PhD, 1981, University of Washington; social demography, race and ethnicity, marriage and family.

Van Den Berghe, Pierre L. * 1965, (Emeritus); PhD, 1960, Harvard University; comparative sociology, stratification, race and ethnic relations, kinship, sociobiology.

Wager, L. Wesley * 1954, (Emeritus); PhD, 1959, University of Chicago; organizations/occupations, theory, macrosociology.

Weis, Joseph G. * 1974; DCrim, 1974, University of California (Berkeley); crime, delinquency, social control, deviance.

Associate Professors

Beckett, Katherine A. * 2000; PhD, 1994, University of California (Los Angeles); law, politics, culture and society.

Brines, Julie E. * 1993; PhD, 1990, Harvard University; gender, stratification, family, methods.

Herting, Jerald R. * 1996; PhD, 1987, University of Washington; research methodology and at-risk youth.

Kashima, Tetsuden * 1976, (Adjunct); PhD, 1975, University of California (San Diego); sociology.

Lavelly, William R. * 1985; PhD, 1982, University of Michigan; social demography of China.

Minkoff, Debra C. * 2000; PhD, 1991, Harvard University; contemporary American social movements and political advocacy.

Assistant Professors

Kim, Hyojoung * 1998; PhD, 1998, University of North Carolina; social movements, comparative historical analysis, social networks, rational choice.

Kitts, James A. * 2000; PhD, 2001, Cornell University; organizational dynamics, social networks, social exchange, collective action.

Kuo, Hsiang-Hui D. * 1996; PhD, 1995, University of Wisconsin; social stratification, life course and aging, quantitative methods, social demography.

Lepore, Paul C. * 1997; PhD, 1997, University of Wisconsin; social psychology, social structure and personality, sociology of education, adolescence.

Pettit, Elizabeth M. * 1999; PhD, 1999, Princeton University; sociology of the family, social demography, inequality.

Pfaff, Steven J. * 1999; PhD, 1999, New York University; historical and comparative sociology; social movements; sociological theory.

Pitchford, Susan * 1998; PhD, 1994, University of Washington; ethnic images: origins, dissemination through tourism, and social movements to improve them.

Stovel, Katherine W. 1997; MA, 1994, PhD, 1999, University of North Carolina; organizational change and career outcomes; social networks; networks and disease transmission.

Sunindyo, Saraswati * 1993, (Adjunct); PhD, 1993, University of Wisconsin; feminism and nationalism; comparative women's movements; Southeast Asia.

Warren, John R. * 1998; PhD, 1998, University of Wisconsin; social stratification and inequality, sociology of education, research methods.

Senior Lecturer

Black, Albert W. * 1972; MA, 1968, Wayne State University, PhD, 1976, University of California (Berkeley); race and ethnic relations, stratification, social movements, race and poverty.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

SOC 401 Special Topics in Sociology (5, max. 15) I&S Selected topics of contemporary interest taught by a sociologist active in the field. Topics vary and may be substantive, theoretical, or methodological.

SOC 410 History of Sociological Thought (5) I&S Contributions of individual theorists (from Comte to the present); emphasis on cumulative development of concepts and principles, emergence of sociology as a science, probable future developments.

SOC 416 Sociological Theory (5) I&S Kiser Theories of individual action, social order, and institutional change. Cumulative development of solutions rather than on works of given theorists. Theories of social order. How sociological treatments of these issues compare with those offered by economists and other social scientists.

SOC 419- Fieldwork: Observation and Interviewing (5-) I&S Perspective, logic, and techniques of qualitative social research and analysis. Nature and uses of intensive interviewing, participant observation, and analytic ethnography. Application of field research principles. Research project required in addition to reading and analysis of classic studies. Offered: W.

SOC -420 Fieldwork: Observation and Interviewing (-5) I&S Logic and techniques of qualitative social research and analysis. Intensive interviewing, participant observation, qualitative data analysis (including applications of data base technology, problem reformulation, and techniques of visual documentation). Results of student work reported and discussed in class. Offered: Sp.

SOC 424- Applied Social Statistics (3-) I&S Applications of statistics in sociology and related social sciences. Emphasis on problems of analysis with imperfect data. Probability in statistical inference. Analysis of variance; contingency table analysis, nonparametric procedures; regression analysis in social research. Offered: W.

SOC -425 Applied Social Statistics (-3) I&S Applications of statistics in sociology and related social sciences. Emphasis on problems of analysis with imperfect data. Probability in statistical inference. Analysis of variance; contingency table analysis, nonparametric procedures; regression analysis in social research. Offered: Sp.

SOC 426 Methodology: Quantitative Techniques in Sociology (3) I&S Applied regression analysis with emphasis on interactive computer graphics techniques and interpretation. Application to typical

sociological problems. Offered: jointly with CS&SS 426; A.

SOC 428 Principles of Study Design (3) I&S Study design from problem formulation to the analysis and interpretation of data. Offered: Sp.

SOC 429 Practicum in Data Analysis (3) I&S Introduction to selected programs for data analysis and practice in their application. Practice in coordination research problem, data, and mode of analysis into a coherent, interrelated set. Interpretation of results. Offered: A.

SOC 430 Urbanism and Urbanization (3) I&S Human population distribution and migration patterns. Causes and consequences of world urbanization. Spatial and social patterns in the metropolis. Aggregate population movements and selectivity of migrants.

SOC 431 Fertility and Mortality (3) I&S Theories of fertility and mortality, demographic transitions, individual variations. Specific analytic approaches. Familiarity with basic fertility and mortality measures, and with the life table, is assumed.

SOC 433 Research Methods in Demography (3) I&S Hirschman Basic measures and models used in demographic research. Sources and quality of demographic data. Rate construction, standardization, the life table, stable population models, migration models, population estimation and projection, measures of concentration and dispersion, measures of family formation and dissolution.

SOC 434 Demographic Issues in Asia (3-5) I&S Hirschman, Lavelly Contemporary Asian countries face a number of issues with demographic components, including environmental and resource issues, ethnic rivalries, international migration, and public health. This seminar addresses a set of these issues by focusing on the demography of one or more countries in Asia. Offered: jointly with SISEA 434.

SOC 445 Religious Movements: The Sociology of Cults and Sects (5) I&S Investigates the organizational dynamics of new religious movements. Seeks to understand why 'cults' emerge and how they proliferate or decay. Examines conflicts within established churches, counter-movements, and the state. Offered: jointly with RELIG 449.

SOC 447 Social Movements (5) I&S Kim Social movements as collective attempts to change society: why people join; characteristics of successful and unsuccessful movements; consequences of social movement activities.

SOC 450 Political Economy of Women and Family in the Third World (5) I&S Theoretical and empirical aspects of the political economy of women and the family in the Third World during the process of development, with a focus on labor. Main theoretical approaches examined and applied to case studies from Asia and Latin America. Offered: jointly with SIS 450.

SOC 451 Theory and Process of Social Change (5) I&S Hamilton Basic trends in economic and social development; comparative and historical analysis of social and economic changes; the rise of capitalist societies.

SOC 456 Political Sociology (5) I&S Burstein Relationships between social change and political change. Focus on selected issues, including social bases of democracy, political organization, elections, and consequences of public policy.

SOC 457 Sociology of Religion (5) I&S 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 460 Social Differentiation (5) I&S Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race.

SOC 461 Comparative Ethnic Race Relations in the Americas (5) I&S Scott Sketches the ethnocratic systems operating in American society. Studies these systems as systems and examines their institutional and interpersonal dynamics. Compares ethnocratic systems in order to arrive at empirical generalizations about race/ethnorelations in the Americas. Offered: jointly with AES 461.

SOC 462 Comparative Race and Ethnic Relations (5) I&S Race and ethnicity as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa, Asia, and the Americas. Offered: jointly with AES 462.

SOC 463 African-American Political Thought (5) I&S Black Examines the historical and sociological experiences of African-Americans from slavery, emancipation, mobilization, and organization, to present socioeconomic situation. Reviews the political philosophy of Black leaders from the early Black Conventions to today, the Black experience in the American education system, and origins and evolution of the black middle class.

SOC 465 Complex Organizations (5) I&S Hamilton Examination of the structure of complex organizations. Attention 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.

SOC 466 Economic Sociology (5) I&S Hamilton Changing focus of field; cultural variation, work, and the worker; technology, society, and the evolution of industrial forms; types and forms of industrial organizations; industrial organizations as social and technical systems; issues of control, process, and change; the individual in social and technical systems.

SOC 467 Immigration and Ethnicity (5) I&S Hirschman Focus on contemporary American diversity—the multiethnic, multicultural society created by recent immigrants from Latin America, Asia, and by people of European, African, and American Indian origins; its issues and debates, including ethnic conflict, integration, multiculturalism, and assimilation, as viewed through comparisons with the past and with other societies.

SOC 470 Contemporary Southeast Asia (5) I&S Hirschman Sociological survey of Southeast Asia, including development, demographic changes, family structure, and ethnic relations.

SOC 472 Juvenile Delinquency (5) I&S Crutchfield, Weis Factors in delinquency, juvenile courts. Programs of treatment and prevention.

SOC 473 Corrections (5) I&S Analyzes research on diversionary methods and treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution; probation, parole, halfway houses, and other alternatives to incarceration; correctional institutions. Organization of state and federal systems. Problems of administration. Subsidies and governmental control. Planning and public participation. Recommended: SOC 371; SOC 372. Offered: jointly with LSJ 473.

SOC 476 Miscarriages of Justice (5) I&S Examines legal and social factors that shape criminal case out-

comes, analyzing how one type of miscarriage of justice—wrongful conviction—occur. How can cases of wrongful conviction be explained? Why are some people, against whom there is only weak evidence, convicted—and sometimes even executed? Offered: jointly with LSJ 476.

SOC 481 Issues in Analytic Sociology (5, max. 15) I&S Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

SOC 483 Issues in Analytic Sociology (1-3, max. 9) I&S Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

SOC 486 Human Family Systems: Biological and Social Aspects (5) I&S Biological bases for human mating and reproduction, and an examination of the range of cross-cultural variability in human systems of kinship and marriage. Compares wide range of human and nonhuman species, and Western and non-Western human societies. Interplay of biological, ecological, and sociocultural factors in determining the structure and function of human family systems. Offered: jointly with ANTH 486.

SOC 487 Sociology of Gender and Sexuality (5) I&S *Schwartz* Addresses the intersection of gender and sexuality in U.S. society, social institutions and movements, families, and the individual. Topics include the history of sexuality as practiced and politicized since colonial times, major theoretical approaches to sexuality, and how gender and other social status characteristics influence the meanings of sexuality.

SOC 490 The Urban Underclass (5) I&S *Crutchfield* Examines underlying issues which have led to the emergence and perpetuation of an underclass within an affluent society. Explores some of the consequences for these people and for this society. Considers policies that might be used to address problems of the urban underclass.

SOC 492 Sociology of Education (5) I&S *LePore* Emphasizes the ways in which schools and colleges reproduce, reinforce, and challenge prevailing social, economic, and political relationships. Examines the structures, practices, content, and outcomes of schooling and its relationship to the wider society as well as the rise and dynamics of the modern education system.

SOC 495 Honors Senior Thesis (1-5, max. 5) I&S Preparation of senior honors thesis. Sociology majors only.

SOC -497- Honors Senior Seminar (-[3/5]-) I&S Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: W.

SOC -498 Honors Senior Seminar (-[3/5]) I&S Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: Sp.

SOC 499 Undergraduate Independent Study or Research (2-5, max. 10) Credit/no credit only.

Courses for Graduates Only

SOC 500 Teaching Sociology as a Teaching Assistant (1) Techniques of quiz section administration, advising of students, and student evaluation important to successful teaching as a Teaching Assistant. Students develop presentations and classroom materials and develop and grade student

examinations. Credit/no credit only. Prerequisite: admission to graduate program in sociology.

SOC 501 Proseminar (1-3, max. 3) Introduction for first-year graduate students to substantive areas of sociology, research and information resources, and issues in graduate education and professional socialization. Credit/no credit only. Offered: A.

SOC 502 Seminar on Teaching Sociology (3) *Howard* Techniques of lecturing, leading discussion, evaluating student performance, and other pedagogical skills ancillary to successful teaching. Students develop a course and obtain videotaped feedback of presentations. Prerequisite: completion of MA. Offered: W.

SOC 503 Seminar on Writing Social Science (3) *Burstein, Howard* Techniques, skills, and strategies helpful for publishing in the social sciences. Includes writing and revision of own work and evaluation of the writing of other students. Also includes social scientific analysis of writing and other forms of academic communication. Prerequisite: completion of MA. Offered: A.

SOC 510 Seminar in Sociological Theory (3) *Kiser* Macrosociological theories; functionalism and neo-evolutionism; conflict and consensus approach; comparative strategies; models and long-range theories; ideology and sociology. From Marx and de Tocqueville to contemporary literature. Offered: A.

SOC 511 Classical Social Theory (3) *Chirot* Study of classical masters of social theory: Marx, Durkheim, and Weber, their precursors, and their immediate successors.

SOC 513 Demography and Ecology (3) *Hirschman* Theories and research on human fertility, mortality, mobility, migration, and urbanization in social/economic context. Comparative and historical materials on Europe, the United States, and the Third World.

SOC 514 Current Theories in Social Psychology (3) Broad graduate-level introduction to the theories in the field of social psychology.

SOC 516 Organizations (3) *Hamilton* Broad graduate-level introduction to the theory and research on complex organizations.

SOC 517 Deviance and Social Control (3) *Bridges, Crutchfield, Weis* Survey of current research on deviant behavior and mechanisms of social control; definitions and forms of deviant behavior, causal analysis, and legal or other methods of social control.

SOC 518 Social Stratification (3) *Burstein* Intensive preparation in theoretical, methodological, and substantive topics in social stratification.

SOC 526 Causal Approach to Theory Building and Data Analysis (3) Theory construction and testing from a causal models perspective. Path analysis, standardized versus unstandardized measures, feedback models, identification problems, estimation in overidentified models, difference equations, differential equations, stability conditions. Multiplicative models as alternatives to additive ones. Causal approach to measurement error.

SOC 528 Seminar on Selected Statistical Problems in Social Research (3) *Raftery* Prerequisite: SOC 426.

SOC 529 Structural Equation Models for the Social Sciences (3) Structural equation models for the social sciences, including specification, estimation, and testing. Topics include path analysis, confirmatory factor analysis, linear models with latent variables, MIMIC models, non-recursive models, models for nested data. Emphasizes applications to substantive problems in the social sciences.

Prerequisite: SOC 424, SOC 425, SOC 426 or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with CS&SS 526.

SOC 535 Research Issues in Demography and Population Studies (1-2, max. 7) Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Offered: AWSp.

SOC 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3) *Raftery* Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with STAT 536/CS&SS 536.

SOC 539 Selected Topics in Demography and Ecology (3, max. 9) Specialized problems in demography or ecology are covered; for example, migration, fertility, mortality, language, race and ethnic relations, metropolitan community. See quarterly announcement for specific problem to be covered.

SOC 551 Family and Gender Relations (3) *Schwartz* Overview of major research findings on marriage, the family, and gender, including demographic trends, the place of children in society, courtship, the internal management of intimate relationships, divorce, and social policy.

SOC 553 Seminar on Gender and Sexuality (3) Research seminar considering theoretical and empirical approaches to sexuality, with particular attention to the importance of gender. Examines the social control of sexuality by the state and by families, as well as social meanings of sexuality within social movements related to various aspects of sexuality.

SOC 554 Seminar in the Sociology of Religion (3) Survey of significant and active areas of theory and research in contemporary social scientific studies of religion.

SOC 555 Methods in Macro, Comparative, and Historical Sociology (3) Systems of conducting research with qualitative methods brought to bear on broad questions.

SOC 556 The Evolution of the Family (3) Biological evolution of species-specific behaviors and forms of sociality linked to human mating, reproduction, and parenting. Cultural evolution of human systems of kinship and marriage as fitness-maximizing adaptations to a wide range of habitats. Prerequisite: upper-division course in evolutionary theory, population genetics, behavioral ecology, primatology, or animal behavior. Offered: jointly with ANTH 556.

SOC 559 Seminar on Gender Roles (3) *Brines, Howard* Broad graduate-level introduction to theoretical issues concerning gender and society. Current state of empirical knowledge on the sociology of gender and strategies for research. Cross-cultural variations in conception of gender roles and how gender intersects with social institutions and social interactions.

SOC 562 Seminar in Comparative Race Relations (3) Cross-cultural approach to race and ethnic relations, including case studies from Africa and Latin America. Prerequisite: graduate standing in social sciences.

SOC 565 Inequality: Current Trends and Explanations (3) *Morris* Discussion of recent growth in economic inequality in the U.S. and competing explanations for these new trends through examina-

tion of labor market demographics, industrial composition and restructuring, and the broader political context that impacts policies like minimum wage, strength of unions, and foreign trade. Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with CS&SS 565.

SOC 566 Seminar in Complex Organizations (3) Special topic seminars in the field of complex organizations or industrial sociology.

SOC 569 Demographic Studies of Stratification (3) *Hirschman* Overview of development of models of socioeconomic achievement ("status attainment" paradigm) in the field of stratification. Begins with work of Blau and Duncan. Covers elaboration of basic models to include race and ethnicity, social psychological variables, class, school and labor market effects, and other structural variables. Prerequisite: SOC 513, SOC 518.

SOC 574 Seminar in Methods of Criminological Research (3) *Bridges, Weis* 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 Special Topics in Theory and the History of Sociological Thought (3, max. 9) Examination of current topics in theory and the history of sociological thought. Content varies according to recent developments in the field and the interests of the instructor.

SOC 582 Special Topics in Research Methods and Statistical Analysis in Sociology (3, max. 9) Examination of current topics in research methods and statistical analysis in sociology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 583 Special Topics in Demography and Ecology (3, max. 9) Examination of current topics in demography and ecology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 584 Special Topics in Social Psychology (3, max. 9) Examination of current substantive topics in social psychology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 585 Special Topics in Marriage and Family (3, max. 9) Examination of current substantive topics in marriage and the family. Content varies according to recent developments in the field and the interests of the instructor.

SOC 586 Special Topics in Organization and Industrial Sociology (3, max. 9) *Reitman* Examination of current substantive topics in organizational and industrial sociology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 587 Special Topics in Deviance and Social Control (3, max. 9) Examination of current substantive topics in deviance and social control. Content varies according to recent developments in the field and the interests of the instructor.

SOC 588 Special Topics in Stratification and Race Relations (3, max. 9) Examination of current substantive topics in stratification and race relations. Content varies according to recent developments in the field and the interests of the instructor.

SOC 589 Special Topics in Macrosociology (3, max. 9) Examination of current substantive topics in macrosociology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 590 Special Topics in Sociology (1-3, max. 9) Examination of current substantive topics in sociology. Content varies according to recent developments in the field and the interests of the instructor. Topics covered in courses with this number lie outside those covered by other special topics courses numbered 581 through 589.

SOC 591 Political Sociology (3) Introduction to political sociology, considering the rise of the modern state, power, political organization, social movements, and other related topics.

SOC 600 Independent Study or Research (*) Credit/no credit only.

SOC 700 Master's Thesis (*) Credit/no credit only.

SOC 800 Doctoral Dissertation (*) Credit/no credit only.

South Asian Studies

See International Studies.

Southeast Asian Studies

See International Studies.

Speech and Hearing Sciences

210 Eagleson



General Catalog Web page:
www.washington.edu/students/genecat/academic/speech_hearing.html



Department Web page:
depts.washington.edu/spshsc/

The speech and hearing sciences concern the processes and disorders of human communication. The undergraduate programs include the study of normal hearing, speech, and language development, speech acoustics, speech physiology and perception, hearing, the nature of language, speech and hearing disorders in children and adults, social and cultural aspects of communication disorders, and the clinical processes involved in identification, prevention, and remediation of those disorders.

Graduate Program

Graduate Program Coordinator
205 Eagleson, Box 354875
206-685-7402
spshscadv@u.washington.edu

The Department of Speech and Hearing Sciences offers the Master of Science and Doctor of Philosophy degrees. The program consists of a wide range of course work and seminars providing opportunities for the development of scholarly and professional competence in various areas of specialization: speech and language acquisition, phonetics, speech production, hearing, hearing development, psychoacoustics, physiological acoustics, speech perception, and human communication disorders related to language, speech, and hearing. At the master's level, the specific focus is on the clinical procedures involved in the identification, prevention, and remediation of communicative disorders. To complement departmental curricula in various spe-

cialization areas, close interdisciplinary relationships are maintained with other University departments and off-campus centers. Advanced degrees in the speech and hearing sciences equip the student to do research, to teach at the college and university level, and to provide clinical services to the communicatively impaired.

Special Requirements

Prospective candidates for advanced degrees are expected to have earned 50-60 quarter credits in the speech and hearing sciences at the undergraduate level. The M.S. degree is intended primarily for students who desire careers as speech-language pathologists and audiologists, but who may or may not continue study for the Ph.D. degree. Students complete the academic and practical experience requirements for the Certificate of Clinical Competence of the American Speech-Language-Hearing Association. Students must also meet all Graduate School requirements for the master's degree. A thesis is optional. A non-clinical M.S. degree, requiring a thesis, may be designed as well. (Please contact the graduate program coordinator.) For the Ph.D. degree, individually tailored programs of study are developed to focus on specialized areas of interest within speech, language, and hearing science; experimental and clinical audiology; and speech/language pathology.

Financial Aid

A number of teaching and research assistantships are available for qualified graduate students. In addition, the department has traineeships/fellowships supported by the National Institutes of Health and the Department of Veterans Affairs.

Research Facilities

The department's research laboratories, as well as those of the Virginia Merrill Bloedel Hearing Research Center, contain sophisticated equipment for the collection and analysis of data related to the study of human communication and its disorders. The University Speech and Hearing Clinic and the Center on Human Development and Disability also provide laboratories to support basic and applied research in speech, language and hearing development and disorders, across the life span.

Faculty

Chair

Carol Stool-Gammon

Professors

Folsom, Richard C. * 1976; PhD, 1979, University of Washington; pediatric audiology.

Gates, George A. 1993, (Adjunct); MD, 1959, University of Michigan; otology/neurotology, cochlear implantation.

Kuhl, Patricia K. * 1976; MA, 1971, University of Minnesota, PhD, 1973, University of Minnesota; speech perception.

Meltzoff, Andrew N. * 1977, (Adjunct); PhD, 1976, Oxford University (UK); perceptual, cognitive and social development in infants.

Miner, Adah L. 1975, (Emeritus); MA, 1948, University of Washington, PhD, 1962, University of Wisconsin; speech pathology, clinical supervision.

Minifie, Fred D. * 1971, (Emeritus); PhD, 1963, University of Iowa; speech science.

Moore, Christopher A. * 1995; MA, 1981, PhD, 1985, Purdue University; speech production, speech development, speech physiology, acoustics, motor control, coordination.

Norton, Susan J. * 1991, (Adjunct); PhD, 1982, University of Washington; normal and non-normal hearing, specifically cochlear mechanics, in humans and animals.

Olswang, Lesley B. * 1977; PhD, 1978, University of Washington; language development and disorders/clinical processes.

Prins, David * 1969, (Emeritus); PhD, 1961, University of Michigan; stuttering.

Stoel-Gammon, Carol * 1983; PhD, 1974, Stanford University; developmental phonology and phonetics.

Thompson, Gary * 1966, (Emeritus); PhD, 1967, University of Minnesota; pediatric audiology, clinical evaluation.

Thompson, Marie D. * 1979, (Adjunct); PhD, 1970, University of Washington; special education (hearing impaired).

Werner, Lynne A. * 1986; PhD, 1980, Loyola University (Chicago); auditory development, infant psychoacoustics.

Yantis, Phillip A. * 1965, (Emeritus); PhD, 1955, University of Michigan; audiology, clinical evaluation.

Yorkston, Kathryn * 1975, (Adjunct); PhD, 1975, University of Oregon; neurogenic communication disorders in adults.

Associate Professors

Burns, Edward M. * 1984; PhD, 1977, University of Minnesota; psychoacoustics.

Carpenter, Robert L. * 1970; PhD, 1969, Northwestern University; language and language disorders.

Coggins, Truman E. * 1974; PhD, 1976, University of Wisconsin; language disorders in children.

Cooker, Harry S. * 1976, (Emeritus); PhD, 1963, University of Iowa; speech physiology.

Rees, Thomas 1971, (Adjunct); MA, 1969, University of Redlands, PhD, 1972, University of Washington; audiology.

Rogers, Margaret A. * 1992; PhD, 1992, University of Iowa; spoken language production, aphasia and apraxia of speech.

Schwartz, Ilene Sharon * 1991, (Adjunct); PhD, 1989, University of Kansas; early childhood, autism, classroom-based interventions, and applied behavior analysis.

Assistant Professors

Souza, Pamela E. * 1996; MS, 1992, PhD, 1996, Syracuse University; hearing aids, effects of sensorineural hearing loss on speech perception, aging.

Tremblay, Kelly L. 1998; PhD, 1998, Northwestern University; central auditory physiology and aging.

Senior Lecturers

Alarcon, Nancy B. 1988; MS, 1981, University of Wisconsin; speech-language disorders/adult.

Labiak, James M. 1974; MA, 1971, University of Washington; audiologic evaluation/calibration.

Sanborn, E. Sue 1988; MA, 1967, PhD, 1971, University of Washington; clinical audiology/aural rehabilitation.

Lecturer

Miller, Robert M. 1982; PhD, 1976, University of Washington; speech, language pathology, adults, swallowing.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

SPHSC 405 Diagnosis of Speech and Language Disorders (3) NW Principles and procedures for the diagnosis of speech and language disorders. Required for majors. Prerequisite: SPHSC 305. Offered: W.

SPHSC 406 Treatment of Speech and Language Disorders (3) NW Principles and procedures for planning, implementing, and evaluating treatment for speech and language disorders. Required for majors. Prerequisite: SPHSC 405; may not be repeated. Offered: SpS.

SPHSC 425 Speech, Language, and the Brain (5) NW Historical perspectives and current research on speech acoustics, speech perception, and brain processing of speech information; speech development; techniques used in speech analysis; machine recognition of speech; brain imaging techniques, animal communication systems; speech evolution; implications for impaired populations. May not be repeated. Offered: A.

SPHSC 445 Models of Speech Processing (3) NW Examines models and basic issues concerning how spoken language is processed. Presents current issues, theories, and research relative to the levels of processing entailed in producing and comprehending speech. Required for majors; open to nonmajors. Recommended: SPHSC 302; SPHSC 303; SPHSC 320; SPHSC 425. Offered: SpS.

SPHSC 449 Special Studies in Speech Pathology and Audiology (*, max. 30) Selected special problems in speech pathology and audiology. Offered: S.

SPHSC 453 Augmentative and Alternative Communication: Implementation Strategies (2-3) NW Communication needs of nonspeaking individuals. Interdisciplinary approaches to the evaluation, selection, and implementation of aided and unaided communication augmentation systems. Recommended: basic course work in either SPHSC, OT, PT, or ENGR. Offered: jointly with REHAB 458; S.

SPHSC 454 Augmentative and Alternative Communication: Access for Technology (3) NW Communication technology and motor evaluation of augmentative and alternative users. Issues related to hardware, software, switch placement and access, with opportunities for clinical trials. Recommended: SPHSC 453 or REHAB 458. Offered: jointly with REHAB 459.

SPHSC 461 Introduction to Hearing Science (5) NW Basic aspects of hearing and the ear and auditory nervous system. How the auditory system constructs an image of the acoustic environment. How attention and memory influence hearing. Effects of damage to the auditory system. Prerequisite: either SPHSC 261 or PSYCH 333. Offered: A.

SPHSC 462 Hearing Development (3) NW Description of the changes that occur in human hearing during development. Consideration of the possible explanations for early immaturity. Prerequisite: SPHSC 461; may not be repeated. Offered: even years; A.

SPHSC 471 Basic Audiometry (5) NW Theory and practice of the assessment of hearing function, including standard pure-tone audiometry, speech audiometry, and basic impedance audiometry. Required for majors. Prerequisite: SPHSC 371; SPHSC 461; may not be repeated. Offered: AWS.

SPHSC 481 Management of Hearing Loss (4) NW Introduction to methods of communicative rehabilitation of person with hearing loss. Remediation principles of auditory and visual perception, amplification, communication strategies, and information counseling. Required for majors. Prerequisite: SPHSC 471; may not be repeated. Offered: WSp.

SPHSC 491 Audiology Practicum in Schools (2) Special projects in clinical audiology practicum, offered only in the school setting. Provides an opportunity for students to extend audiology practicum experiences into the school environment. Prerequisite: SPHSC 471. Offered: AS.

SPHSC 499 Undergraduate Research (1-5, max. 15) Offered: AWSpS.

Courses for Graduates Only

SPHSC 500 Clinical Methodology for Documenting Change (4) Introduction to clinical methodology for examining efficacy of treatments for individuals with communication problems. Students consider nature of intervention designed to alter communication disorders and types of accountability questions that need to be raised. They learn methodology for collecting and analyzing data to document effectiveness, effects, and efficiency of treatments.

SPHSC 501 Neural Bases of Speech, Language, and Hearing (4) Neuroanatomical and neurophysiological bases of language, hearing, sensory, and motor function. Special emphasis given to brain behavior correlates and behavioral consequences to speech, language, and hearing as a result of neurologic injury or disease.

SPHSC 503 Current Issues in Speech and Hearing Sciences (3) Application of experimental methods to research in speech and hearing sciences.

SPHSC 504 Research Methods in Speech and Hearing Sciences (3) Introduction to empirical methods in the speech and hearing sciences.

SPHSC 505 Clinical Research in Communication Disorders (3) Introduction to clinical research. Methodological issues concerning the evaluation of treatment for speech, hearing, and language disorders. Primary emphasis on time series designs. Prerequisite: SPHSC 504 or permission of instructor.

SPHSC 510 Physiological Acoustics (3) Study of pertinent literature and experimental techniques incident to the physiology of the normal and abnormal auditory system. Prerequisite: SPHSC 461.

SPHSC 511 Psychoacoustics (3) Review of significant literature and theory pertinent to normal auditory sensitivity, pitch, loudness, and other attributes of auditory sensation. Prerequisite: SPHSC 461, SPHSC 510.

SPHSC 514 Speech Physiology (3) Study of the physiological parameters of acoustic speech production. Prerequisite: SPHSC 320, SPHSC 461.

SPHSC 515 Speech Acoustics (3) Study of the acoustical correlates of the distinctive parameters of

speech. Prerequisite: SPHSC 320, SPHSC 461, SPHSC 514.

SPHSC 516 Speech Perception (3) Study of the perceptual and linguistic parameters of speech perception. Prerequisite: SPHSC 320, SPHSC 461, SPHSC 515.

SPHSC 519 Seminar in Speech Science (2, max. 6)

SPHSC 521 Instrumentation for Audiology (4) Introduction to basic instrumentation used in audiology and hearing science; detailed instruction in audiometer calibration including a review of current national and international standards pertinent to audiology; emphasis on use rather than theory. Prerequisite: permission of instructor.

SPHSC 530 Language Disorders in Children (4) Consideration of the nature of language impairment in children, the types of children in whom language impairment is an important dimension, and approaches to treatment. Prerequisite: SPHSC 303 and SPHSC 304, or equivalent

SPHSC 531 Neurogenic Motor Speech Disorders (4) The nature of apraxia of speech and dysarthria and the assessment and treatment of those disorders. Prerequisite: SPHSC 501 or permission of instructor.

SPHSC 532 Neurogenic Language Disorders (4) Nature of aphasia and other neurogenic language disorders; evaluation and treatment of those disorders. Prerequisite: SPHSC 501 or permission of instructor.

SPHSC 533 Medical Speech Pathology (3) Nature of speech pathology practiced in medical settings. Prerequisite: SPHSC 501, SPHSC 531, and SPHSC 532, or permission of instructor.

SPHSC 534 Special Topics in Dysphagia and Associated Disorders (2, max. 4) Anatomophysiological bases of function and dysfunction associated with speech-language disorders. Mastication and swallowing problems, their causes, assessments, and management. Prerequisite: SPHSC 501 or permission of instructor.

SPHSC 535 Voice and Resonance Disorders (4) Physiology, acoustics, and perception of voice quality and speech resonance. Etiology, evaluation, and treatment of voice and resonance disorders.

SPHSC 536 Assessment of Language Impairment in Children (4) Principles and procedures used in the assessment of speech- and language-disordered children and adolescents.

SPHSC 537 Fluency Disorders (4) Characteristics of fluent speech and the nature and treatment of stuttering in children and adults are studied in relation to normal speech production processes, human learning, principal explanations of stuttering, and treatment systems.

SPHSC 538 Management of Acquired Cognitive Disorders (2) Epidemiology, neuropathology, assessment, and management of acquired cognitive disorders. Focus on traumatic brain injury in adults and children, dementia, and right brain injury. Prerequisite: SPHSC 501 and SPHSC 532 or permission of instructor.

SPHSC 539 Articulation and Phonological Disorders (4) Patterns of normal phonological development. Nature, assessment, and treatment of phonological disorders.

SPHSC 542 Counseling and Interactive Skills for Speech-Language Pathologists and Audiologists (2-3) Introduction to counseling theory and practice in speech-language pathology, audiology, and relat-

ed fields. Provides opportunities for learning and practicing counseling skills. Addresses key counseling issues, including professional boundaries, intense emotions, and counselor's feelings and reactions. Prerequisite: graduate standing or permission of instructor.

SPHSC 551 Advanced Practicum in Speech Pathology Evaluation (1-10, max. 10) Laboratory experience in the evaluation of speech and language disorders. Credit/no credit only. Prerequisite: SPHSC 536 and permission of instructor.

SPHSC 552 Advanced Practicum in Speech Pathology Management (1-10, max. 10) Laboratory experience in the management of speech and language disorders. Credit/no credit only. Prerequisite: permission of instructor.

SPHSC 555 Preinternship in Speech and Hearing Sciences (1-10, max. 10) Practicum in speech pathology or audiology designed to teach the clinical regimen of a participating professional center prior to assuming a full internship assignment. Credit/no credit only.

SPHSC 560 Studies in Speech Science and Disorders (3) Examines contemporary models and research paradigms in speech science and disorders. Topics include respiratory physiology, laryngeal physiology, aerodynamics of speech production, articulatory dynamics, speech acoustics, and speech perception.

SPHSC 561 Studies in Hearing Sciences and Disorders (3) Examines contemporary models and research paradigms in the area of hear science and disorders. Topics include psychoacoustics; amplification; electrophysiological evaluation; physiological acoustics; and perceptual consequences of hearing loss.

SPHSC 562 Studies in Language Science and Disorders (3) Examines research in the area of language science and disorders including word recognition and production; storage of retrieval of word form and meaning; comprehension and production of sentences and discourse; and language in social context. Topics examined relative to development, language impairments, and normal language processing.

SPHSC 563 Proseminar: Instructional Development Forum (1, max. 3) *Olswang* Emphasizes instructional techniques and issues as they relate to teaching in the discipline of communication sciences and its disorders. Topics include course development, grading, student-faculty relations, teaching methods, and diversity. Credit/no credit only. Prerequisite: graduate standing in Speech and Hearing Sciences.

SPHSC 564 Teaching Practicum (1-5, max. 5) Provides experience in preparing and giving lectures, leading discussions, preparing and grading assignments and tests, and working directly with undergraduate and graduate students. Prerequisite: doctoral student standing and permission of instructor. Credit/no credit only. Offered: AWPpS.

SPHSC 565 Speech and Language Pathology Proseminar (1, max. 6) Consideration of professional issues and student and faculty research. Credit/no credit only.

SPHSC 567 Research Seminar in Speech and Hearing Sciences (1) A platform for the presentation and exchange of scientific information (research data, new hardware and hardware development, scientific papers) resulting from ongoing research projects by graduate students and faculty within the Speech and Hearing Sciences department. Credit/no credit only.

SPHSC 568 Grant Writing in Hearing, Language, and Speech Science (3) Design and writing of grant proposals in speech, language, and hearing sciences and disorders. Explanation of the funding process at various agencies, particularly the National Institutes of Health. Students prepare a proposal and review the proposals of their peers. Prerequisite: upper-level doctoral standing and permission of instructor.

SPHSC 569 Seminar in Speech-Language Pathology (2, max. 6)

SPHSC 570- Assessment of Auditory Dysfunction I (-4) Strategies and procedures in the auditory evaluation of hearing-impaired adults. Use of diagnostic tests in the evaluation of auditory pathologies. Laboratory required. Prerequisite: SPHSC 471.

SPHSC -571 Assessment of Auditory Dysfunction II (-4) Strategies and procedures in the auditory evaluation of hearing-impaired adults. Use of diagnostic tests in the evaluation of auditory pathologies. Laboratory required. Prerequisite: SPHSC 471.

SPHSC 572 Pediatric Audiology (3) Assessment of auditory disorders in infants and young children. Emphasis on behavioral and electrophysiologic techniques and on the role of the audiologist in the clinical management of the young hearing-impaired child. Prerequisite: SPHSC 471 or equivalent.

SPHSC 573 Physiologic Assessment of Auditory Function (4) Consideration of physiologic techniques that may be used to evaluate the normal and disordered auditory system. Outside laboratory required. Prerequisite: SPHSC 461, SPHSC 571.

SPHSC 574 Assessment of Balance Function (4) Examines normal anatomy and physiology of the peripheral and central vestibular system. Reviews peripheral and central vestibular disorders and treatment protocols. Major focus of assessment on electronystagmography with associated lab. Provides overview of rotational and posturography measures of balance function. Prerequisite: permission of instructor.

SPHSC 575 Medical Backgrounds in Audiology (3) Diseases and injuries of the ear resulting in reduced audition. Prerequisite: SPHSC 571 or permission of instructor.

SPHSC 580 Rehabilitative Audiology (3) Explores technology to enhance communication effectiveness of hearing impaired persons. Selection and training in the use of assistive systems and cochlear implants. Advanced perception assessment and training methodology. Prerequisite: SPHSC 571 and SPHSC 583.

SPHSC 581 Management of Hearing-Impaired Children (2) Management of hearing-impaired children, including identification of target behaviors and methods for modification such as individualized therapy programs and parent and teacher involvement.

SPHSC 582 Hearing Aid Amplification (4) Acoustic amplification and methods of determining electroacoustic characteristics. Includes earmold technology. Prerequisite: SPHSC 471 and SPHSC 570 or permission of instructor.

SPHSC 583 Hearing Aid Selection (4) Consideration of strategies utilized in selecting acoustic amplification for the hearing impaired, including review of pertinent research literature. Prerequisite: SPHSC 582 or permission of instructor.

SPHSC 588 Audiology Proseminar (1, max. 3) Consideration of professional issues and student/faculty research in specific areas of interest. Credit/no credit only.

SPHSC 589 Seminar in Audiology (2, max. 6)
Prerequisite: permission of instructor.

SPHSC 591 Advanced Practicum in Audiology (1-10, max. 10) Credit/no credit only. Prerequisite: permission of instructor.

SPHSC 599 Research Practicum (*, max. 12)
Supervised laboratory experience in experimental approach to problems in speech and hearing sciences. Prerequisite: permission of instructor.

SPHSC 600 Independent Study or Research (*, max. 10) Prerequisite: permission of instructor.

SPHSC 601 Internship (1-10, max. 10) Supervised field experiences in settings other than public schools. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

SPHSC 602 Internship in the Schools (3-10, max. 10) Supervised field experience in a public school setting. Credit/no credit only. Prerequisite: permission of instructor.

SPHSC 700 Master's Thesis (*, max. 10)

SPHSC 800 Doctoral Dissertation (*, max. 10)

Speech Communication

See Communication.

Statistics

B313 Padelford



General Catalog Web page:
www.washington.edu/students/gencat/academic/statistics.html



Department Web page:
www.stat.washington.edu

Probability provides the conceptual foundation and mathematical language for the logic of uncertainty and induction. Statistics is concerned with procedures for the acquisition, management, exploration, and use of information in order to learn from experience in situations of uncertainty and to make decisions under risk. Statistical practice includes design of experiments and of sampling surveys; exploration, summarization, and display of observational data; drawing inferences, and assessing their uncertainty; and building mathematical models for systems with stochastic components.

By means of joint faculty appointments and joint research projects, courses, and seminars, the Department of Statistics maintains active academic contacts with the School of Business Administration; the College of Engineering; the departments of Applied Mathematics, Atmospheric Sciences, Cardiology, Computer Science, Earth and Space Sciences, Economics, Genetics, Mathematics, Psychology, Radiology, Sociology, and Zoology; the National Research Center for Statistics and the Environment; the Quantitative Ecology and Resource Management program; the Center for Statistics and the Social Sciences; the Applied Physics Laboratory; the Applied Statistics Division of the Boeing Company; Microsoft Research; and Insightful Corporation. The department has an especially close relationship with the Department of Biostatistics; for example, the two departments are jointly developing new curricula in statistical genetics.

Graduate Programs

Graduate Program Coordinator
B309 Padelford, Box 354322
206-543-8296

The graduate programs emphasize both the theory and application of statistics, including probability theory, mathematical statistics, data analysis, statistical computing, and scientific applications. Computing facilities in the Department of Statistics rank among the best of any statistics programs in the country and reflect the department's expertise in the field of statistical computing. An ongoing statistical consulting program provides the students with practical experience in using statistics and in communicating with clients. Under faculty supervision, participants in the program assist members of the University community in applying statistical methodology. The department offers Master of Science and Doctor of Philosophy degrees.

Admission Requirements

Background in mathematics, statistics, or a quantitative field, with 30 or more quarter credits in mathematics and statistics, to include a year of advanced (second-year) calculus, one course in linear algebra, and one course in probability theory; Graduate Record Examination scores (the Advanced Mathematics subject test is encouraged but not required); and three letters of recommendation from appropriate former or current faculty.

Master of Science

Graduation Requirements: In addition to Graduate School requirements, at least twelve approved courses numbered 400 or above with a value of 36 credits or more; of these, at least six courses must be numbered in the 500 series (exclusive of STAT 512, 513) with a value of 18 credits or more, and with a coherent theme. Approved proficiency in statistical computing. Satisfactory participation in statistical consulting and the departmental seminar. Passage of an appropriate final master's examination or successful completion of a master's thesis which can count as up to three courses worth 9 credits but cannot replace any of the six courses in the 500 series mentioned above. All programs must be approved in advance by the departmental graduate program coordinator.

Doctor of Philosophy

Graduation Requirements: In addition to Graduate School requirements, appropriate training in statistics and related sciences. Appropriate General Examinations of basic graduate-level knowledge in statistics and probability (including two preliminary examinations). Satisfactory performance in MATH 574, 575, 576. Satisfactory performance in three approved core-course sequences chosen from STAT 570, 571, 572; 581, 582, 583; 521, 522, 523; 534, 535, 538; and 516, 517, 518. (In some circumstances, other graduate-level mathematical science courses may be used as a substitute.) Approved performance in statistical consulting (typically STAT 598 and 599). Demonstration of proficiency in computing. 1 credit of STAT 590 per quarter. Final Examination.

The graduation requirements for the Ph.D. tracks in statistical genetics and statistics in the social sciences may replace or be in addition to some of the requirements listed above.

Financial Aid

The department annually awards a limited number of teaching and research assistantships and fellowships for the support of new and continuing graduate students on the basis of academic promise.

Faculty

Chair

Werner Stuetzle

Professors

Besag, Julian E. * 1989; BS, 1963, University of Birmingham (UK); spatial statistics, with applications to epidemiology, image analysis; Bayesian inference; MCMC.

Burdzy, Krzysztof * 1988, (Adjunct); PhD, 1984, University of California (Berkeley); probability theory.

Burke, James V. * 1985, (Adjunct); PhD, 1983, University of Illinois; optimization, nonsmooth analysis.

Felsenstein, Joseph * 1968, (Adjunct); PhD, 1968, University of Chicago; estimation of evolutionary trees, models of long-term evolutionary processes.

Fleming, Thomas Richard * 1984; MA, 1974, PhD, 1976, University of Maryland; survival analysis, cancer clinical trials, AIDS research, sequential analysis.

Ford, E. David * 1985, (Adjunct); PhD, 1968, University College, London (UK); quantitative science, ecosystem analysis, forest productivity.

Groeneboom, Petrus 1998, (Affiliate); PhD, 1979, University of Amsterdam (Netherlands); statistical inverse problems.

Guttorp, Peter * 1980; PhD, 1980, University of California (Berkeley); point processes, stochastic models, applications to hydrology, environmental and atmospheric science.

Handcock, Mark S. * 2000; PhD, 1989, University of Chicago; methodology for the social sciences; spatial, environmental modeling; distributional comparison.

Haynor, David R. * 1979, (Adjunct); PhD, 1971, University of California (Berkeley), MD, 1979, Harvard University; medical image processing and segmentation; image deformation; functional MRI; expression arrays.

Kronmal, Richard A. *; PhD, 1964, University of California (Los Angeles); nonparametric density estimation, computer algorithm.

Lunneborg, Clifford E. * 1962, (Emeritus); PhD, 1959, University of Washington; psychometrics, individual differences, multivariate analysis, statistical computing.

Martin, R. Douglas * 1974; PhD, 1969, Princeton University; finance, including portfolio optimization and risk management, options and derivatives, data mining.

Mason, David 1989, (Affiliate); PhD, 1977, University of Washington; nonparametric, order statistics; extreme value theory, limit theorems; empirical, quantile processes.

Morris, Wanda Martina 2000; PhD, 1989, University of Chicago; stratification/mobility, social networks, quantitative methodology.

Nelson, Charles R. * 1975, (Adjunct); PhD, 1969, University of Wisconsin; time series analysis, economic statistical analysis, advanced macroeconomic theory.

Perlman, Michael D. * 1979; PhD, 1967, Stanford University; multivariate analysis, graphical Markov models, decision theory, probability inequalities, convexity.

Raftery, Adrian Elmes * 1985; Doct, 1980, Université de Paris VI (France); time series, spatial, Bayesian statistics, population estimation, model selection, sociology.

Sampson, Paul D. * 1981; PhD, 1979, University of Michigan; spatial statistics, environmetrics; morphometrics, multivariate analysis; statistical consulting.

Scholz, Friedrich-Wilhelm * 1982, (Affiliate); PhD, 1971, University of California (Berkeley); estimation and large sample theories; nonparametric statistics; risk and tolerance analysis; bootstrap.

Shorack, Galen * 1965; PhD, 1965, Stanford University; empirical and quantile processes, limit theorems, L-statistics, bootstrapping, reliability.

Siegel, Andrew F. * 1983, (Adjunct); MS, 1975, PhD, 1977, Stanford University.

Stuetzle, Werner * 1984; PhD, 1977, Swiss Federal Institute of Technology; nonparametric methods in multivariate analysis, statistical applications of computer graphics.

Thompson, Elizabeth A. * 1985; PhD, 1974, Cambridge University (UK); statistical analysis of human genetic data, population genetics, conservation and computational biology.

Wellner, Jon A. * 1983; PhD, 1975, University of Washington; large-sample theory, asymptotic efficiency, empirical processes, semiparametric models.

Zeh, Judith * 1982; PhD, 1979, University of Washington; estimation of population size and dynamics; robust methods, computing in infectious disease research.

Associate Professors

Altschul, Roberto 1985, (Affiliate); PhD, 1973, Case Western Reserve University; reliability models, fault trees for phased missions, stochastic models for fault tolerant systems.

Morita, June G. 1982, (Adjunct); MA, 1978, PhD, 1984, University of California (Berkeley); sample surveys, quality control, survival analysis, statistical data analysis, statistics education.

Percival, Donald B. * 1979, (Affiliate); PhD, 1983, University of Washington; time series and signal analysis, computational environments, statistics of clocks.

Richardson, Thomas S. * 1996; PhD, 1996, Carnegie Mellon University; graphical models; algorithmic model selection; Bayesian inference; causal models; economics problems.

Wakefield, Jonathan Clive * 1999; PhD, 1992, University of Nottingham (UK); Bayesian data analysis, statistics in epidemiology, spatial epidemiology pharmacodynamic models.

Assistant Professors

Gneiting, Tilmann J. * 1997; PhD, 1997, Bayreuth University (Germany); spatial and environmental statistics, positive definite functions.

Hoff, Peter D. * 2000; PhD, 2000, University of Wisconsin; constrained estimation, nonparametric Bayesian methods, two-sided matching models, cancer research.

Meila-Predovicu, Marina * 2000; PhD, 1999, Massachusetts Institute of Technology; graphical probability models, machine learning, algorithms, data mining.

Murua, Alejandro E. * 1998, (Affiliate); PhD, 1994, Brown University; statistics and probability applied

to machine learning, object recognition, signal processing.

Reynolds, Joel Howard 1989, (Affiliate); PhD, 1989, University of Washington; model assessment, statistical consulting, applications to ecology, wildlife studies.

Stephens, Matthew * 2000; PhD, 1997, Oxford University (UK); Bayesian inference, classification and clustering, Markov chain Monte Carlo, statistical genetics.

Lecturer

Courbois, Jean-Yves Pip 1999; PhD, 2000, Oregon State University; environmental statistics, monitoring network design, stochastic optimization.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

STAT 400 Mathematical Communication for Undergraduates (2) NW Techniques of effective writing and oral presentations in the mathematical sciences. Offered: jointly with AMATH 400/MATH 400. Prerequisite: at least 15 credits in MATH, STAT, AMATH, or CSCI at the 300 or 400 level, including MATH 307 or AMATH 351 and MATH 308 or AMATH 352.

STAT 403 Introduction to Resampling Inference (4) NW Introduction to computer-intensive data analysis for experimental and observational studies in empirical sciences. Students design, program, carry out, and report applications of bootstrap resampling, rerandomization, and subsampling of cases. Credit allowed for 403 or 503 but not both. Prerequisite: either STAT 220, STAT 301, STAT/ECON 311, STAT 341, STAT 361, STAT/MATH 390, or STAT/ECON 481. Offered: Sp.

STAT 421 Applied Statistics and Experimental Design (4) NW Computer-aided data analyses using comparisons between batches, analysis of variance and regression. Evaluation of assumptions, data transformation, reliability of statistical measures (jackknife, bootstrap). Fisher-Gosset controversy. Prerequisite: either STAT 342, STAT/MATH 390, or STAT/ECON 481; recommended: MATH 308. Offered: A.

STAT 423 Applied Regression and Analysis of Variance (4) NW Regression analysis. Problems in interpreting regression coefficients. Estimation, including two-stage least squares. Guided regression: building linear models, selecting carriers. Regression residuals. Analysis of variance. Nonparametric regression. Factorial designs, response surface methods. Prerequisite: either STAT 342, STAT/MATH 390, STAT 421, or STAT/ECON 481; recommended: MATH 308. Offered: W.

STAT 427 Introduction to Analysis of Categorical Data (4) NW Techniques for analysis of count data. Log-linear models, logistic regression, and analysis of ordered response categories. Illustrations from the behavioral and biological sciences. Computational procedures. Prerequisite: either STAT 342, STAT 362, or STAT 421. Offered: alternate years.

STAT 428 Multivariate Analysis for the Social Sciences (4) NW Multivariate techniques commonly used in the social and behavioral sciences. Linear models for dependence analysis (multivariate regression, MANOVA, and discriminant analysis) and

for interdependence analysis (principal components and factor analysis). Techniques applied to social science data using computer statistical packages. Prerequisite: either STAT 342, STAT 362, or STAT 421. Offered: alternate years.

STAT 480 Sampling Theory for Biologists (3) NW *Gallucci, Rustagi* Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling, sample size determinations, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with Q SCI 480; even years.

STAT 481 Introduction to Mathematical Statistics (5) NW Probability, generating functions; the d -method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and ECON 580.) Prerequisite: STAT/ECON 311; either MATH 136 or MATH 126 with either MATH 308 or MATH 309. Offered: jointly with ECON 481; A.

STAT 486 Experimental Design (3) NW Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency, power, sample size, pseudoreplication, factor structure. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with Q SCI 486.

STAT 491 Introduction to Stochastic Processes (3) NW Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 396. Offered: jointly with MATH 491; A.

STAT 492 Introduction to Stochastic Processes (3) NW Random walks, Markov chains, branching processes, Poisson process, point processes, birth and death processes, queuing theory, stationary processes. Prerequisite: 2.0 in MATH/STAT 491. Offered: jointly with MATH 492; W.

STAT 498 Special Topics (1-5, max. 15) NW Reading and lecture course intended for special needs of students. Offered: when demand is sufficient.

STAT 499 Undergraduate Research (1-5, max. 15) Offered: AWSpS.

Courses for Graduates Only

STAT 500 Mathematical Communication for Graduates (2) Analysis and practice of mathematical writing. Oral and poster conference presentations. Academic job interview skills. Mathematics on the web. Offered: jointly with AMATH 580/MATH 500.

STAT 502 Design and Analysis of Experiments (4) Design of experiments covering concepts such as randomization, blocking, and confounding. Analysis of experiments using randomization tests, analysis of variance, and analysis of covariance. Prerequisite: either STAT 342, MATH/STAT 390, ECON/STAT 481, ECON 580 or equivalent; MATH 308 or equivalent. Offered: A.

STAT 504 Applied Regression (4) Least squares estimation. Hypothesis testing. Interpretation of regression coefficients. Categorical independent variables. Interactions. Assumption violations: outliers, residuals, robust regression; nonlinearity, transformations, ACE, CART; nonconstant variance. Variable selection and model averaging. Prerequisite: either STAT 342, STAT/MATH 390, STAT

421, STAT/ECON 481, or SOC 425; recommended: MATH 308. Offered jointly with CS&SS 504.

STAT 506 Applied Probability and Statistics (4) Discrete and continuous random variables, independence and conditional probability, central limit theorem, elementary statistical estimation and inference, linear regression. Emphasis on physical applications. Prerequisite: some advanced calculus and linear algebra. Offered: jointly with AMATH 506.

STAT 512 Statistical Inference (4) Review of random variables; transformations, conditional expectation, moment generating functions, convergence, limit theorems, estimation; Cramer-Rao lower bound, maximum likelihood estimation, sufficiency, ancillarity, completeness. Rao-Blackwell theorem. Hypothesis testing: Neyman-Pearson lemma, monotone likelihood ratio, likelihood-ratio tests, large-sample theory. Contingency tables, confidence intervals, invariance. Introduction to decision theory. Prerequisite: STAT 395 and STAT 421, STAT 423, STAT 504, or BIOST 512 (concurrent registration permitted for these three). Offered: A.

STAT 513 Statistical Inference (4) Review of random variables; transformations, conditional expectation, moment generating functions, convergence, limit theorems, estimation; Cramer-Rao lower bound, maximum likelihood estimation, sufficiency, ancillarity, completeness. Rao-Blackwell theorem. Hypothesis testing: Neyman-Pearson lemma, monotone likelihood ratio, likelihood-ratio tests, large-sample theory. Contingency tables, confidence intervals, invariance. Introduction to decision theory. Prerequisite: STAT 512. Offered: W.

STAT 516- Stochastic Modeling of Scientific Data (4-) Markovian and semi-Markovian models, point processes, cluster models, queuing models, likelihood methods, estimating equations. Prerequisite: STAT 511 or STAT 396. Offered: A.

STAT -517 Stochastic Modeling of Scientific Data (4-) Markovian and semi-Markovian models, point processes, cluster models, queuing models, likelihood methods, estimating equations. Prerequisite: STAT 516. Offered: W.

STAT 518 Stochastic Modeling Project (4) Supervised, applied project based on stochastic modeling of scientific data. Prerequisite: STAT 517. Offered: Sp.

STAT 519 Time Series Analysis (3) Descriptive techniques. Stationary and nonstationary processes, including ARIMA processes. Estimation of process mean and autocovariance function. Fitting ARIMA models to data. Statistical tests for white noise. Forecasting. State space models and the Kalman filter. Robust time series analysis. Regression analysis with correlated errors. Statistical properties of long memory processes. Prerequisite: STAT 513. Offered: A.

STAT 520 Spectral Analysis of Time Series (4) Estimation of spectral densities for single and multiple time series. Nonparametric estimation of spectral density, cross-spectral density, and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes and for randomly sampled processes. Techniques of robust spectral analysis. Prerequisite: one of STAT 342, STAT 390, STAT 481, or permission of instructor. Offered: jointly with E E 520; W.

STAT 521 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit

problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with MATH 521; A.

STAT 522 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with MATH 522; W.

STAT 523 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with MATH 523; Sp.

STAT 524 Design of Medical Studies (3) Emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations, stratification, and ethics. Suitable for students in biostatistics and other scientific fields. Prerequisite: BIOST 511 or equivalent, and one of STAT 421, STAT 423, BIOST 513, BIOST 518, or EPI 512; or permission of instructor. Offered: jointly with BIOST 524; even years.

STAT 529 Sample Survey Techniques (3) Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: either STAT 421, STAT 423, STAT 504, QMETH 500, BIOST 511, or BIOST 517, or equivalent; or permission of instructor. Offered: jointly with BIOST 529/CS&SS 529.

STAT 530 Wavelets: Data Analysis, Algorithms, and Theory (3) Review of spectral analysis. Theory of continuous and discrete wavelets. Multiresolution analysis. Computation of discrete wavelet transform. Time-scale analysis. Wavelet packets. Statistical properties of wavelet signal extraction and smoothers. Estimation of wavelet variance. Prerequisite: some Fourier theory and linear algebra; STAT 390, STAT 481, or STAT 513; or permission of instructor. Offered: Sp.

STAT 533 Classical Theory of Linear Models (3) Introduction to one-, two-way analysis of variance; randomized blocks; fixed, random effects, multiple comparisons. Statistical distribution theory for quadratic forms of normal variables. Fitting of the general linear model by least squares. Prerequisite: STAT 421 or STAT 423; and STAT 513, BIOST 515, and a course in matrix algebra. Offered: jointly with BIOST 533; Sp.

STAT 534 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 534; Sp.

STAT 535 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 535; A.

STAT 538 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modulariza-

tion, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 538; W.

STAT 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3) Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 536/CS&SS 536.

STAT 542 Multivariate Analysis (3) Multivariate normal distribution; partial and multiple correlation; Hotelling's T^2 ; Bartlett's decomposition; various likelihood ratio tests; discriminant analysis; principal components; graphical Markov models. Prerequisite: STAT 582 or permission of instructor. Offered: alternate years.

STAT 544 Bayesian Statistical Methods (3) Statistical methods based on the idea of a probability distribution over the parameter space. Coherence and utility. Subjective probability. Likelihood principle. Conjugate families. Structure of Bayesian inference. Limit theory for posterior distributions. Sequential experiments. Exchangeability. Bayesian nonparametrics. Empirical Bayes methods. Prerequisite: STAT 513 or permission of instructor. Offered: alternate years.

STAT 550 Statistical Genetics I: Mendelian Traits (3) *Thompson* Mendelian genetic traits. Population genetics; Hardy-Weinberg, allelic variation, subdivision. Likelihood inference, information and power; latent variables and EM algorithm. Pedigree relationships and gene identity. Meiosis and recombination. Linkage detection. Multipoint linkage analysis. Prerequisite: STAT 390 and STAT 394, or permission of instructor. Offered: jointly with BIOST 550; A.

STAT 551 Statistical Genetics II: Quantitative Traits (3) *Manks* Statistical basis for describing variation in quantitative traits. Decomposition of trait variation into components representing genes, environment and gene-environment interaction. Methods of mapping and characterizing quantitative trait loci. Prerequisite: STAT/BIOST 550; STAT 423 or BIOST 515; or permission of instructor. Offered: jointly with BIOST 551; W.

STAT 552 Statistical Genetics III: Medical Genetics Studies (3) *Wijman* Overview of probability models, inheritance models, penetrance. Association and linkage. The lod score method. Affected sib method. Fitting complex inheritance models. Design mapping studies; multipoint, disequilibrium, and fine-scale mapping. Ascertainment. Prerequisite: STAT/BIOST 551; GENET 371; or permission of instructor. Offered: jointly with BIOST 552; Sp.

STAT 560 Hierarchical Modeling for the Social Sciences (4) Explores ways in which data are hierarchically organized, such as voters nested within electoral districts that are in turn nested within states. Provides a basic theoretical understanding and practical knowledge of models for clustered data and a set of tools to help make accurate inferences. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505-506 or equivalent. Offered: jointly with CS&SS 560/POL S 560.

STAT 564 Bayesian Statistics for the Social Sciences (4) Statistical methods based on the idea of probability as a measure of uncertainty. Topics covered include subjective notion of probability, Bayes' Theorem, prior and posterior distributions, and data analysis techniques for statistical models. SOC 424-425-426 or equivalent; recommended:

CS&SS 505; CS&SS 506. Offered: jointly with CS&SS 564.

STAT 566 Causal Modeling (4) Construction of causal hypotheses. Theories of causation, counterfactuals, intervention vs. passive observation. Contexts for causal inference: randomized experiments; sequential randomization; partial compliance; natural experiments, passive observation. Path diagrams, conditional independence and d-separation. Model equivalence and causal under-determination. Prerequisite: course in statistics, SOC 424-425-426 or equivalent; recommended: CS&SS 505-506 or equivalent. Offered: jointly with CS&SS 566.

STAT 567 Statistical Analysis of Social Networks (4) Statistical and mathematical descriptions of social networks. Topics include graphical and matrix representations of social networks, sampling methods, statistical analysis of network data, and applications. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505; CS&SS 506. Offered: jointly with CS&SS 567.

STAT 570 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 513; STAT 533 or STAT 421 and STAT 423, and a course in matrix algebra for STAT 570. Offered: jointly with BOST 570; A.

STAT 571 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 570. Offered: jointly with BOST 571; W.

STAT 572 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 571. Offered: jointly with BOST 572; Sp.

STAT 573 Statistical Methods for Categorical Data (3) Advanced topics in generalized linear models and the analysis of categorical data: overdispersion, quasilielihood, parameters in link and variance functions, exact conditional inference, random effects, saddlepoint approximations. Credit/no credit only. Prerequisite: STAT 571 and STAT 582. Offered: jointly with BOST 573; alternate years.

STAT 574 Multivariate Statistical Methods (3) Use of multivariate normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisite: STAT 570 or permission of instructor. Offered: jointly with BOST 574; alternate years.

STAT 576 Statistical Methods for Survival Data (3) Statistical methods for censored survival data. Covers parametric and nonparametric methods, Kaplan-Meier survival curve estimator, comparison of survival curves, log-rank test, regression models including the Cox proportional hazards model, competing risks. Prerequisite: STAT 581 and either STAT 423, BOST 515, or Q SCI 483, or equivalent. Offered: jointly with BOST 576; alternate years.

STAT 577 Advanced Design and Analysis of Experiments (3) Concepts important in experimen-

tal design: randomization, blocking, confounding. Application and analysis of data from randomized blocks designs, Latin and Graeco-Latin squares, incomplete blocks designs, split-plot and repeated measures, factorial and fractional replicates, response surface experiments. Prerequisite: STAT 570 or STAT 421 (minimum grade 3.0), or permission of instructor. Offered: jointly with BOST 577.

STAT 578 Special Topics in Advanced Biostatistics (*, max. 3) Advanced-level topics in biostatistics offered by regular and visiting faculty members. Prerequisite: permission of instructor. Offered: jointly with BOST 578.

STAT 581 Advanced Theory of Statistical Inference (3) Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jackknife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 513; either MATH 426 or MATH 576. Offered: A.

STAT 582 Advanced Theory of Statistical Inference (3) Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jackknife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 581. Offered: W.

STAT 583 Advanced Theory of Statistical Inference (3) Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jackknife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 582. Offered: Sp.

STAT 586 Martingales: Survival Analysis (3) Theory of counting processes and martingales to provide unified study of survival analysis methods. Focus on survival distribution estimators, censored data rank statistics, regression methods with censored survival data. Development of small samples moments, asymptotic distributions, and efficiencies. Prerequisite: STAT 521 or STAT 583 or permission of instructor; recommended: STAT 576. Offered: jointly with BOST 586; W.

STAT 590 Statistics Seminar (*, max. 15) Credit/no credit only. Prerequisite: permission of graduate program coordinator. Offered: AWSp.

STAT 591 Special Topics in Statistics (1-5, max. 15) Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: A.

STAT 592 Special Topics in Statistics (1-5, max. 15) Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: W.

STAT 593 Special Topics in Statistics (1-5, max. 15) Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: Sp.

STAT 598 Techniques of Statistical Consulting (1) Seminar series covering technical and non-technical aspects of statistical consulting, including skills for effective communication with clients, report writing, statistical tips and rules of thumb, issues in survey sampling, and issues in working as a statistical consultant in academic, industrial, and private-practice settings. Prerequisite: entry code. Offered: jointly with BOST 598; ASP.

STAT 599 Statistical Consulting (*, max. 12) Consulting experience in data analysis, applied statistics. Student required to provide consulting services to students and faculty three hours per week. Credit/no credit only. Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

STAT 600 Independent Study or Research (*) Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

STAT 700 Master's Thesis (*) Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

STAT 800 Doctoral Dissertation (*) Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

Center for Statistics and Social Sciences

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CS&SS 426 Methodology: Quantitative Techniques in Sociology (3) I&S Raftery Applied regression analysis with emphasis on interactive computer graphics techniques and interpretation. Application to typical sociological problems. Offered: jointly with SOC 426; A.

CS&SS 494 Advanced Quantitative Political Methodology (5) Quinn, Ward Theory and practice of likelihood inference. Topics covered include probability modeling, maximum likelihood estimation, models for binary responses, count models, sample selection, and basis time series analysis. Prerequisite: POL S 491; POL S 492. Offered: jointly with POL S 494.

Courses for Graduates Only

CS&SS 504 Applied Regression (4) Least squares estimation. Hypothesis testing. Interpretation of regression coefficients. Categorical independent variables. Interactions. Assumption violations: outliers, residuals, robust regression; nonlinearity, transformations, ACE, CART; nonconstant variance. Variable selection and model averaging. Prerequisite: either STAT 342, STAT/MATH 390, STAT 421, STAT/ECON 481, or SOC 425; recommended: MATH 308. Offered: jointly with STAT 504.

CS&SS 505 Review of Mathematics for Social Scientists (1) Reviews basic mathematical skills needed for a meaningful understanding of elementary statistics, data analysis, and social science methodology. Overview of core knowledge required for graduate courses in quantitative methods in social sciences. Topics include discrete mathematics, differential and integral calculus, review of matrix

algebra, and basic probabilistic and statistical concepts. Offered: Sp.

CS&SS 506 Computer Environments for the Social Sciences (1) Familiarizes graduate students in the social sciences with modern environments for statistical computing. Provides an overview of available resources and a description of fundamental tools used in quantitative courses and doctoral research. Topics include interfaces to Web-based resources, UNIX-based computing, and major statistical packages (R, SPLUS, SAS, and SPLUS). Offered: W.

CS&SS 526 Structural Equation Models for the Social Sciences (3) Structural equation models for the social sciences, including specification, estimation, and testing. Topics include path analysis, confirmatory factor analysis, linear models with latent variables, MIMIC models, non-recursive models, models for nested data. Emphasizes applications to substantive problems in the social sciences. Prerequisite: SOC 424, SOC 425, SOC 426 or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 529.

CS&SS 529 Sample Survey Techniques (3) Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: either STAT 421, STAT 423, STAT 504, QMETH 500, BIOST 511, or BIOST 517, or equivalent; or permission of instructor. Offered: jointly with BIOST 529/STAT 529.

CS&SS 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3) Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 536/STAT 536.

CS&SS 544 Event History Analysis of Social and Spatial Change (5) *Withers* Examines life course research using event-history analysis with applications to the substantive areas of household dynamics, family formation and dissolution, marriage, cohabitation, and divorce, migration histories, residential mobility, and housing careers. Examines continuous- and discrete-time longitudinal models during practical laboratory sessions. Offered: jointly with GEOG 544.

CS&SS 560 Hierarchical Modeling for the Social Sciences (4) Explores ways in which data are hierarchically organized, such as voters nested within electoral districts that are in turn nested within states. Provides a basic theoretical understanding and practical knowledge of models for clustered data and a set of tools to help make accurate inferences. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505-506 or equivalent. Offered: jointly with POL S 560/STAT 560.

CS&SS 564 Bayesian Statistics for the Social Sciences (4) Statistical methods based on the idea of probability as a measure of uncertainty. Topics covered include subjective notion of probability, Bayes' Theorem, prior and posterior distributions, and data analysis techniques for statistical models. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505; CS&SS 506. Offered: jointly with STAT 564.

CS&SS 565 Inequality: Current Trends and Explanations (3) *Morris* Discussion of recent growth in economic inequality in the U.S. and competing explanations for these new trends through examina-

tion of labor market demographics, industrial composition and restructuring, and the broader political context that impacts policies like minimum wage, strength of unions, and foreign trade. Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 565.

CS&SS 566 Causal Modeling (4) Construction of causal hypotheses. Theories of causation, counterfactuals, intervention vs. passive observation. Contexts for causal inference: randomized experiments; sequential randomization; partial compliance; natural experiments, passive observation. Path diagrams, conditional independence and d-separation. Model equivalence and causal under-determination. Prerequisite: course in statistics, SOC 424-425-426 or equivalent; recommended: CS&SS 505-506 or equivalent. Offered: jointly with STAT 566.

CS&SS 567 Statistical Analysis of Social Networks (4) Statistical and mathematical descriptions of social networks. Topics include graphical and matrix representations of social networks, sampling methods, statistical analysis of network data, and applications. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505; CS&SS 506. Offered: jointly with STAT 567.

CS&SS 590 CSSS Seminar (1, max. 20) Presentations of ongoing social science research involving cutting edge statistical methods. Credit/no credit only. Offered: AWWSp.

Women Studies

B110 Padelford



General Catalog Web page:
www.washington.edu/students/genecat/academic/women_studies.html



Department Web page:
depts.washington.edu/webwomen/

Women Studies is an interdisciplinary department that offers students a cohesive framework for the study of women's and men's lives within historical and contemporary contexts, and from multi-disciplinary, multi-cultural, and international perspectives. As a field of inquiry, Women Studies challenges traditional scholarship about human societies and fosters the construction of new theoretical and methodological approaches to understanding diverse experiences and realities.

Graduate Program

Graduate Program Coordinator
B110C Padelford, Box 354345
206-543-6900
womenst@u.washington.edu

The Department of Women Studies offers graduate training leading to the Master of Arts and Doctor of Philosophy degrees in interdisciplinary women studies as well as in a chosen discipline. The core faculty represent the following disciplines: anthropology, American Indian studies, economics and development, history, international studies, English, sociology, and psychology. Although students are required to work primarily with a core faculty member in Women Studies, they have the opportunity to study with more than 60 faculty members from a wide range of disciplines who are adjunct faculty to Women Studies. M.A. students must complete a thesis or practicum. Ph.D. students must complete a dissertation.

Admission Requirements

Applicants are admitted to begin study during autumn quarter only and are required to have their application materials completed by the beginning of the prior January. A complete application file includes the Graduate School application, one copy of official transcripts, three recommendations, a statement of purpose, and scores from the Graduate Record Examination (GRE).

Program Requirements

All students are required to complete 15 credits of the core seminars: History of Feminism (WOMEN 501), Problems in Feminist Theory (WOMEN 502), and Feminist Research and Methods of Inquiry (WOMEN 503). Under the guidance of a core faculty mentor and advisory committee, the student shapes an individual program of study. The master's program usually requires two years of graduate study; the doctoral program usually requires three years of study beyond the master's level, including independent field research and preparation of a dissertation. Ph.D. students must exhibit proficiency in a language relevant to their theoretical and regional areas of specialization. Students are urged to establish foreign language competency as undergraduates before entering the graduate program or as early as possible in their graduate careers.

Financial Aid

A limited number of teaching and research assistantships are offered to Ph.D. students.

Faculty

Chair

Judith A. Howard

Professors

Allen, Carolyn * 1972, (Adjunct); MA, 1966, Claremont Graduate School, PhD, 1972, University of Minnesota; twentieth-century literature, women writers, contemporary critical theory.

Allen, David G. * 1988, (Adjunct); PhD, 1975, University of Iowa; philosophy of science, critical and feminist theory, psychosocial nursing theory.

Baldasty, Gerald J. * 1974, (Adjunct); MA, 1974, University of Wisconsin, PhD, 1978, University of Washington; communications history and law, government-press relations, First Amendment philosophy and theory.

Barlow, Tani E. * 1994; MA, 1979, PhD, 1985, University of California (Davis); modern Chinese history, feminist studies, East Asia/Asian American studies.

Bereano, Philip L. * 1975, (Adjunct); JD, 1965, Columbia University, MRP, 1971, Cornell University; technology assessment, biotech policies, policy and technology, social values, citizen participation.

Blake, Kathleen * 1971, (Adjunct); PhD, 1971, University of California (San Diego); Victorian literature, children's literature, women's studies.

Boersma, P. Dee * 1974, (Adjunct); PhD, 1974, Ohio State University; population, ecology.

Butler, Johnnella E. * 1987, (Adjunct); EdD, 1979, University of Massachusetts; Afro-American literature, American ethnic women's literature, Afro-Caribbean literature, pedagogy.

Cauce, Ana Mari * 1986, (Adjunct); PhD, 1984, Yale University; at-risk children, adolescents, and families; normative development in ethnic minority youth.

Clatterbaugh, Kenneth C. * 1966, (Adjunct); PhD, 1966, Indiana University; modern philosophy, social and political philosophy, gender studies.

Glenn, Susan A. * 1993, (Adjunct); PhD, 1983, University of California (Berkeley); twentieth-century U.S. social history including women's history, immigration, labor, popular culture.

Goldsmith, Layne * 1983, (Adjunct); MA, 1975, San Jose State College, MFA, 1979, Cranbrook Academy of Art; fiber arts and related historic and contemporary textile structures and processes.

Gorbman, Claudia L. * 1990, (Adjunct); PhD, 1978, University of Washington; film studies—history, theory, criticism; film sound and music.

Gordon, Margaret T. * 1988, (Adjunct); PhD, 1972, Northwestern University; news media and public policy; urban policy; women's issues.

Hartsock, Nancy C.M. * 1984, (Adjunct); PhD, 1972, University of Chicago; feminist theory, Marxism, contemporary political theory.

Howard, Judith A. * 1982, (Adjunct); PhD, 1982, University of Wisconsin; social psychology, sociology of gender.

Jacobs, Sue-Ellen * 1974; PhD, 1970, University of Colorado (Boulder); women studies, socio-cultural and applied anthropology, anthropological studies of women.

Jeffords, Susan E. * 1985; MA, 1977, PhD, 1981, University of Pennsylvania; feminist theory, American popular culture, and the representation of Vietnam.

Kaplan, Sydney J. * 1971, (Adjunct); PhD, 1971, University of California (Los Angeles); twentieth-century literature, women writers, feminist criticism.

Killien, Marcia G. * 1973, (Adjunct); PhD, 1982, University of Washington; women's health, reproductive decision making, work and family.

Lawson, Victoria A. * 1986, (Adjunct); PhD, 1986, Ohio State University; Latin America, political economy of development, feminist theory in development.

McElroy, Colleen J. * 1972, (Adjunct); PhD, 1973, University of Washington; Black literature, women writers, poetry writing.

Richey, Cheryl A. * 1973, (Adjunct); DSW, 1974, University of California (Berkeley); cultural and gender issues, intervention design and research.

Schwartz, Pepper J. * 1972, (Adjunct); PhD, 1974, Yale University; family, gender, human sexuality.

Sears, Laurie J. * 1989, (Adjunct); PhD, 1986, University of Wisconsin; Southeast Asian social and cultural history.

Silberstein, Sandra V. * 1982, (Adjunct); PhD, 1982, University of Michigan; applied/critical linguistics. TESOL, ethnicity and gender.

Sokoloff, Naomi B. * 1985, (Adjunct); PhD, 1980, Princeton University; Hebrew language and literature.

Woods, Nancy * 1978, (Adjunct); PhD, 1978, University of North Carolina; women's health.

Associate Professors

Anagnost, Ann S. * 1990, (Adjunct); PhD, 1985, University of Michigan; ethnography of the state, ideology and popular culture, peasant society; China.

Brainard, Suzanne Gage 1987, (Affiliate); PhD, 1989, Ohio State University; educational evaluation,

methodology and gender and ethnic issues in science and engineering.

Brines, Julie E. * 1993, (Adjunct); PhD, 1990, Harvard University; gender, stratification, family, methods.

Cabeen, Louise * 1993, (Adjunct); MFA, 1989, The School of Art Institute of Chicago; socially critical art with research specialties in textile history and techniques.

Cummings, Katherine * 1985, (Adjunct); PhD, 1985, University of Wisconsin; cultural studies, critical theory, queer studies, twentieth-century Americanist.

Di Stefano, Christine * 1985, (Adjunct); PhD, 1984, University of Massachusetts; political theory (modern and contemporary), feminist theory, political culture.

Dong, Yue 1996, (Adjunct); MA, 1991, University of Oregon, PhD, 1996, University of California (San Diego); modern Chinese history, urban history, gender studies.

Dubrow, Gail Lee * 1989, (Adjunct); MA, 1979, University of Oregon, PhD, 1991, University of California (Los Angeles); the social history of the built environment; historic preservation; issues of race, class and gender.

England, Kim V. L. 1999, (Adjunct); MA, 1984, PhD, 1988, Ohio State University; employment studies (especially women), families, child care, feminist theory and methodology.

Ensign, B. Josephine * 1994, (Adjunct); MS, 1986, Virginia College of Medicine, MPH, 1992, DPH, 1994, Johns Hopkins University; health care program planning and evaluation for marginalized populations and high-risk youth.

Friedman, Kathie * 1987, (Adjunct); MA, 1979, PhD, 1991, State University of New York (Binghamton); sociology of gender, immigration, race, and ethnicity in the United States.

Gavel Adams, Ann-Charlotte * 1986, (Adjunct); PhD, 1990, University of Washington; August Strindberg, Scandinavian women's literature, Scandinavian turn-of-the-century drama and art.

Ginorio, Angela B. * 1981; PhD, 1979, Fordham University; women and science, violence against women, sexual harassment, racial identity among Latino/as.

Heuvig, Jeanne D. * 1990, (Adjunct); PhD, 1988, University of Washington; 20th century American poetry, modern literature, critical theory (especially poststructuralist).

Ingebritsen, Christine * 1992, (Adjunct); PhD, 1993, Cornell University; Scandinavian domestic and foreign policies, European community integration and Scandinavia.

Jarosz, Lucy A. * 1990, (Adjunct); PhD, 1990, University of California (Berkeley); critical development studies, food and agriculture, rural poverty and inequality, political ecology.

Kenney, Nancy J. * 1976; PhD, 1974, University of Virginia; neural and endocrine controls of food and fluid intake, physiological basis of motivation.

Klawitter, Marieka * 1990, (Adjunct); MPP, 1982, University of Michigan, PhD, 1992, University of Wisconsin; family and employment policy, women's studies, sexual orientation discrimination.

Magyary, Diane L. * 1981, (Adjunct); PhD, 1981, University of Washington; family centered health care of children at risk, disabled or handicapped.

Mitchell, Katharyne 1993, (Adjunct); PhD, 1993, University of California (Berkeley); urban economic and cultural geography, with focus on social theory, the Pacific Rim.

Moody, Joycelyn K. * 1991, (Adjunct); MA, 1980, University of Wisconsin, PhD, 1993, University of Kansas; 19th-century American literature; African-American autobiography; women's literature.

Noble, Kathleen D. * 1984; PhD, 1984, University of Washington; the psychology of talent development, spiritual intelligence, feminist psychological theory.

Poiger, Uta G. * 1995, (Adjunct); MA, 1990, PhD, 1995, Brown University; modern German history, gender history, cultural studies.

Rhodes, Lorna A. * 1983, (Adjunct); PhD, 1973, Cornell University; medical anthropology, symbolic anthropology, South Asia, religion, psychiatry.

Roberts, Jean Valerie * 1991, (Adjunct); PhD, 1982, University of Pittsburgh; ancient Greek philosophy, ethics, philosophy of feminism.

Rose, Elaine 1993, (Adjunct); PhD, 1993, University of Pennsylvania; economics of the household in developed and developing countries.

Ross, Luana K. 1999; MSW, 1981, Portland State University, PhD, 1992, University of Oregon; criminology/deviance, race/ethnic relations and gender, documentary film.

Salas, Elizabeth 1987, (Adjunct); MA, 1977, California State University, Los Angeles, PhD, 1987, University of California (Los Angeles); New Mexican history and politics, Chicana, Mexicana and Chicano history, minorities in the military.

Schroeder, Carole A. * 1993, (Adjunct); MSN, 1985, University of Nevada, PhD, 1993, University of Colorado (Denver); women's health experiences, critical approaches to knowledge development, and developing partnership.

Simpson, Caroline Chung * 1994, (Adjunct); MA, 1989, University of Houston, PhD, 1994, University of Texas (Austin); Asian American studies and postwar American culture.

Stacey, Robin C. * 1988, (Adjunct); PhD, 1986, Yale University; early and high medieval history, tribal law, Celtic/Anglo-Saxon literature, heresy.

Stecher Hansen, Marianne T. * 1988, (Adjunct); MA, 1981, University of Washington, PhD, 1990, University of California (Berkeley); Danish language and literature, Scandinavian novel, Isak Dinesen (Karen Blixen), H.C. Anderson.

Stygall, Gail * 1990, (Adjunct); PhD, 1989, Indiana University; discourse analysis, rhetoric and composition, English language linguistics, forensic linguistics.

Ward, Deborah * 1987, (Adjunct); PhD, 1987, Boston University; health policy and politics, women's paid and unpaid caregiving work.

Yee, Shirley J. * 1988; PhD, 1987, Ohio State University; U.S. women's history, African-American history, nineteenth-century U.S. social history.

Assistant Professors

Camp, Stephanie M. H. 1998, (Adjunct); PhD, 1998, University of Pennsylvania; African American history.

Ramamurthy, Priti * 1997; PhD, 1995, Syracuse University; political economy of development; third world feminism; agro-food systems; South Asia.

Sunindyo, Saraswati * 1993; PhD, 1993, University of Wisconsin; feminism and nationalism; comparative women's movements; Southeast Asia.

Taylor, Janelle S. * 1999, (Adjunct); PhD, 1999, University of Chicago; anthropology of medicine, science and technology, reproduction, gender, and consumption.

Thomas, Lynn M. * 1997, (Adjunct); MA, 1989, Johns Hopkins University, MA, 1993, Northwestern University, PhD, 1997, University of Michigan; 20th c. Kenyan history; gender, social, and cultural history.

Weinbaum, Alys E. * 1998, (Adjunct); PhD, 1998, Columbia University; feminist theory; representations of race and reproduction in modern literature.

West, Carolyn M. 1997, (Adjunct); PhD, 1994, University of Missouri; intimate partner violence and stereotypes of Black women.

Woody, Andrea I. * 1997, (Adjunct); PhD, 1996, University of Pittsburgh; philosophy of science, history of science, philosophy of feminism.

Senior Lecturer

Tupper, Kari Lynn 1988; PhD, 1997, University of Washington; literature and law, American studies, women writers.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

WOMEN 405 Comparative Women's Movements and Activism (5) I&S *Sunindyo* Comparative cultural, national, and historical study of women's movements and activism. Critically analyzes multiple arenas of women's movements and resistance. Topics include feminist anti-racism, pre-nationalism and nationalism, economics, electoral politics, women's and human rights, and international/transnational feminisms. Prerequisite: either WOMEN 205, WOMEN 305, or SOC 364.

WOMEN 410 Feminist Legal Studies: Theory and Practice (5) I&S Examines feminist theoretical analyses of the law. Engages in current debate on the study of critical race, gender, and class theory. Includes: women in prison, public assistance, the sex industry, women and health care, and immigration law. Recommended: WOMEN 200 or WOMEN 310. Offered: jointly with LSJ 466/POL S 466.

WOMEN 415 Gender and Education (5) I&S Gender bias, discrimination, and gender-equity efforts in education. Includes curriculum instruction, instructional materials, testing, counseling, athletics, teacher education, educational employment issues, and sexual harassment. Relevant federal and state laws, court decisions, and strategies for promoting gender equity also addressed. Recommended: WOMEN 200 or SOC 110. Offered: jointly with EDC&I 440; S.

WOMEN 423 Feminism, the State, and Democracy in Indonesia (5) I&S Questions how women's issues and interests are affected by the history of Indonesia and by changes in the global political economy. Celebrates ways in which Indonesian women, feminists, and feminisms negotiate their subject positions. Analyzes issues of gender and human rights in national political arenas, and of democratic reform. Offered: AWPSP.

WOMEN 424 Women in Midlife (5) I&S Explores women's lives, experiences, and concerns in the middle years. Topics include physical and physiological changes; psychological development; representations and treatment of midlife women in literature, media, and other institutions; economics of aging; crosscultural and subcultural differences in the aging process; the synergistic effects of sexism and ageism on women.

WOMEN 425 Femininity, Feminism, and Antifeminism in Popular Culture (5) I&S/VLPA *Twine* Explores shifting meanings and reconfigurations of femininity, feminism, and antifeminism in United States popular culture. Analyzes the incorporation and transformation of feminist critiques of dominant ideologies into popular culture. Popular forms examined may include television serials, music videos, advertisements, films, and novels. Prerequisite: WOMEN 200.

WOMEN 427 Women and Violence (5) I&S *Ginorio* Multi-disciplinary explorations of the continuum of violence which affects women's lives, ranging from experience in personal settings (family violence) to cultural or state policies (prisons, wars). Violence against women explored in the context of societal, political, and state violence. Recommended: WOMEN 200.

WOMEN 429 Scandinavian Women Writers in English Translation (5) VLPA *Gavel-Adams* Selected works by major Scandinavian women writers from mid-nineteenth-century bourgeois realism to the present with focus on feminist issues in literary criticism. Offered: jointly with SCAND 427.

WOMEN 438 Jewish Women in Contemporary America (5) I&S Examines how Jewish women's identities are socially constructed and transformed in contemporary America, using social histories, memoirs, and ethnographies to analyze scholars' approaches to Jewish women's lives. Topics include the role of social class, religion, migration, the Holocaust, and race relations in Jewish women's lives. Offered: jointly with SISJE 438.

WOMEN 440 Reading Native American Women's Lives (5) I&S *Jacobs, Ross* Seminar based on social science writings, autobiographies, biographies, and fiction written by, with, or about indigenous women of the United States and Canada. Prerequisite: either WOMEN 342, WOMEN 423, AIS 201, AIS 330, or AIS 423. Offered: jointly with AIS 440.

WOMEN 442 Images of Natives in the Cinema and Popular Cultures (5) I&S/VLPA *Ross* Cultural examination of images of native people in cinema and popular culture based on social science writings and films by or about natives in the United States and Canada. Prerequisite: AIS 330; WOMEN 200. Offered: jointly with AIS 442.

WOMEN 447 Economics of Gender (5) I&S *Rose* Microeconomic analysis of the sources of gender differences in earnings, labor force participation, occupational choice, education, and consumption. Economic theories of discrimination, human capital, fertility and intrahousehold resource allocation. Economics of the family in developed and developing countries. Prerequisite: ECON 300. Offered: jointly with ECON 447.

WOMEN 450 Language and Gender (5) I&S, VLPA *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis and other aspects of identity such as sexuality, class, and age. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with ANTH 450/LING 458.

WOMEN 454 Women, Words, Music, and Change (5) I&S/VLPA *Jacobs* Comparative analysis of use of myths, tales, music, and other forms of expressive culture to account for, reinforce, and change women's status and roles. Recommended: WOMEN 353. Offered: jointly with ANTH 454.

WOMEN 455 Contemporary Feminist Theory (5) I&S *Barlow* Raises the question of how political contexts condition the way some ideas become theory. Emphasizes the present crises in thinking about a transnational feminism.

WOMEN 456 Feminism, Racism, and Anti-Racism (5) I&S Examines meaning of racism and feminism in women's lives in an international context. Building upon an analysis of racial hierarchies and institutionalized racism, explores strategies used by women engaged in feminist and anti-racist activism. Prerequisite: WOMEN 200.

WOMEN 457 Women in China to 1800 (5) I&S *Ebrey* Gender in Chinese culture, women's situations in the patrilineal family system, and the ways women's situations changed as other dimensions of China's political system, economy, and culture changed from early times through the nineteenth century. Offered: jointly with HSTAS 457.

WOMEN 458 Ideologies and Technologies of Motherhood (5) I&S Examines how motherhood is culturally constituted, regulated, and managed within various ideological and technological milieus. Uses ethnographies from anthropology and case studies from feminist legal theory. Topics include slave mothers, surrogate mothers, lesbian mothers, transracial mothers, co-mothers, teen mothers. Prerequisite: WOMEN 200. Offered: jointly with ANTH 484.

WOMEN 459 Gender Histories of Modern China, 18th to 20th Centuries (5) I&S *Barlow* Emergence of modernist social, political, intellectual gender formations in social activism, revolutionary writing, scientific ideologies, economic globalization. Stresses gender difference in colonial modernity, revolutionary movement, communism, post-socialist market society. Relates modern Chinese women to global flows, new division of labor, local and regional experience. Offered: jointly with HSTAS 459.

WOMEN 462 Isak Dinesen and Karen Blixen (5) VLPA *Stecher-Hansen* The fiction of Isak Dinesen (pseudonym for Karen Blixen) reevaluated in light of current issues in literary criticism, particularly feminist criticism. Close readings of selected tales, essays, and criticism. Offered: jointly with SCAND 462.

WOMEN 476 Women and the City (5) I&S *England* Explores the reciprocal relations between gender relations, the layout of cities, and the activities of urban residents. Topics include feminist theory and geography (women, gender, and the organization of space); women and urban poverty, housing and homelessness; gender roles and labor patterns; geographies of childcare; and women and urban politics. Offered: jointly with GEOG 476.

WOMEN 483 Topics in U.S. Women's History (5, max. 10) VLPA *Yee* Selected topics in United States women's history from the nineteenth and twentieth centuries. Prerequisite: either WOMEN 200, WOMEN 283, or WOMEN 383.

WOMEN 485 Issues for Ethnic Minorities and Women In Science and Engineering (3/5) I&S Addresses issues faced by women and ethnic minorities in physical sciences and engineering. Focuses on participation, barriers to participation, and solutions to those issues for women and ethnic minorities in physical sciences and engineering. Offered: jointly with PHYS 451.

WOMEN 488 Women and/in Science (5) I&S *Ginorio*

Explores science as a method of inquiry and as a profession while also expanding knowledge about women through the use of biographies of women scientists, discipline-based and feminist critiques, and the psycho-social concept of socially defined identities. Recommended: one Women Studies course and one college-level science course.

WOMEN 489 Ethnicity, Gender, and Communication (5) I&S *Baldasty* Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with COM 489/AES 489.

WOMEN 490 Special Topics in Women Studies (2-5, max. 15) I&S Exploration of specific problems and issues relevant to the study of women. Offered by visiting or resident faculty members. Primarily for upper-division and graduate students.

WOMEN 491 Senior Thesis I (3) I&S Introductory course of the senior thesis sequence required of all majors. Students attend a weekly seminar, select a thesis topic, and contract with an appropriate faculty adviser. Successful completion of the course is contingent on submission of an acceptable thesis proposal. Majors and senior standing only. Offered: A.

WOMEN 492 Senior Thesis II (3) I&S Second course in senior thesis sequence required of majors. Majors and seniors only. Prerequisite: WOMEN 491. Offered: W.

WOMEN 493 Senior Thesis III (4) I&S Research and writing of thesis under supervision of a faculty member. Required of all majors. Prerequisite: WOMEN 492. Offered: AWSpS.

WOMEN 495 Tutoring Women Studies (5) Students train to serve as tutors in designated courses. Facilitate weekly group discussions, assist with writing assignments, explain course materials. Credit/no credit only.

WOMEN 497 Fieldwork in Women Studies (1-15, max. 15) Internships in local agencies. Allows development of specific skills in area of specialization. Credit/no credit only. Offered: AWSpS.

WOMEN 499 Undergraduate Research (1-5, max. 10) Independent study and research supervised by a faculty member with appropriate academic interest. Offered: AWSpS.

Courses for Graduates Only

WOMEN 501 History of Feminism (5) *Barlow, Yee* Study of feminism from the 18th through the 20th centuries in the national, international, and intranational world system, with a focus on imperialism, colonialism, nationalism, and modernity. Surveys the literature in a global context, supplemented by critical essays and historiographic reviews.

WOMEN 502 Cross Disciplinary Feminist Theory (5) *Barlow* Raises questions about how feminism becomes theory and what the relation of feminist theory is to conventional disciplines. Readings exemplify current crises in feminism (e.g., the emergence of neo-materialism; critical race theory; citizenship; identity; transnational and migrancy and questions of post-colonialism) to consider disciplinization.

WOMEN 503 Feminist Research and Methods of Inquiry (5) *Allen* Explores appropriate research methodologies for interdisciplinary work. Asks how scholarship is related to feminism as a social movement and to the institutions in which we work. Focuses on how similar objects of study are constituted in different disciplines for feminist scholars. Offered: Sp.

WOMEN 512 Critical and Interdisciplinary Approaches to Women's Health (3) *Ensign, Schroeder*

Critical examination of the historical, socio-political, and scientific influences on women's health. Issues of sexism, racism, and heterosexism discussed from the perspective of different disciplines. Offered: jointly with NURS 512; W.

WOMEN 513 Seminar in Contemporary Women's Health Issues (3) Critical analysis of contemporary and historical literature relevant to health care for women across the life span. Synthesis of a holistic view of women's health to guide research and practice. Offered: jointly with NURS 513.

WOMEN 534 Feminism and History of Women in China (5) Explores historical question of gendered subjects in modern China and feminist stories of emancipation of Chinese women asking how these render invisible other kinds of history. Prerequisite: background in China studies or ability to handle Chinese primary sources.

WOMEN 544 Criminality and "Deviance" in Native Communities (5) Seminar based on social science writings and biographies written by and about incarcerated natives and "deviance" in Native communities in the United States and Canada. Prerequisite: AIS 330; WOMEN 200; WOMEN 310.

WOMEN 546 Gender and Colonialism in Eastern Asia (5) *d* Economic-political colonialization, post colonialism, and statist-gendered citizenship; intra-Asian subimperialism structuring domestic production, family, and gendered subjectivities; humanism and the New Woman; modern contests over new masculinity and new femininity; and the effect of war, imperialist occupation and colonial modernity on interregional flows of ideas, labor, capital, and jurisprudence. Offered: jointly with HSTAS 546; AWSpS.

WOMEN 553 Discourses in Feminist Anthropology Seminar (5) *Jacobs* Exploration of feminist anthropological theories and the works of their critics. Ways of using feminist anthropology in preparation for and conducting fieldwork. Topics include foundations in feminist anthropology, grand theories, variation in feminist theoretical foci within the "four fields," responses to critics. Prerequisite: graduate standing. Offered: jointly with ANTH 555; W.

WOMEN 589 Gender, Race, and Communication (5) Analysis of the role of media in the construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with COM 567.

WOMEN 590 Special Topics (1-5, max. 15) Offered by visitors or resident faculty as a one-time in-depth study of special interest.

WOMEN 598 Directed Readings in Women Studies (*, max. 35) Selected topics for individualized or small group study.

WOMEN 600 Independent Study or Research (*) Offered: AWSpS.

WOMEN 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

WOMEN 701 Master's Practicum (*) Offered: AWSpS.

WOMEN 800 Doctoral Dissertation (*)

Zoology

106 Kincaid



General Catalog Web page:
www.washington.edu/students/genecat/academic/zoology.html



Department Web page:
depts.washington.edu/zooweb/

Zoology is a natural science concerned primarily with animals: their development, structure, and function, and their relationship with their environments.

Zoology field courses are offered both at the main campus and at the Friday Harbor Laboratories. See individual course listings for location.

Graduate Program

Graduate Program Coordinator
106 Kincaid, Box 351800
206-685-8240

Programs of study leading to the degree of Doctor of Philosophy are available in the areas of cell biology, molecular biology, developmental biology, developmental genetics, ecology, evolution, behavior, invertebrate and vertebrate morphology, organismic and comparative physiology, endocrinology, and neurobiology, as well as mathematical approaches to the above topics. Interdisciplinary programs are offered in developmental biology, cell and molecular biology, and neurobiology.

Research Facilities

Modern instruments (TEM, confocal microscopy) and special facilities (radioisotope, neurophysiology, and sea-water rooms) needed for instructional and research purposes are available in Kincaid Hall. The department maintains a network of workstations, including both Macintosh and Windows machines. Programs include systems for mathematical and statistical analysis, visualization, image processing and reconstruction, drafting, illustration, desktop publishing, and symbolic mathematics. Extensive natural-history collections are housed at the Burke Museum. The facilities of the Friday Harbor Laboratories on San Juan Island are available for research. The department is within 100 yards of the Magnuson Health Sciences Center, one of the top medical-research institutions in the country. Several researchers at the Fred Hutchinson Cancer Research Center are appointed as affiliate faculty in the department.

Special Requirements

Completed applications for entry in autumn quarter must be received by January 15.

Entering students should have preparation in several of the areas listed above, organic chemistry, physical chemistry in some cases, two quarters of college physics, and mathematics through calculus.

All students are required to acquire at least three quarters of teaching experience regardless of their source of support.

Financial Aid

Normally all prospective candidates for the Ph.D. degree are supported by teaching or research assistantships or by fellowships or traineeships from national or private agencies. Summer appointments are available both on the Seattle campus and at the Friday Harbor Laboratories on San Juan Island.

Faculty

Chair

Wingfield, John C.

Professors

Beecher, Michael D. * 1978, (Adjunct); MA, 1965, PhD, 1970, Boston University; animal behavior, animal communication, sensory processes.

Boersma, P. Dee * 1974; PhD, 1974, Ohio State University; population, ecology.

Brenowitz, Eliot A. * 1987; PhD, 1982, Cornell University; animal behavior, neuroethology, neuroendocrinology, animal communication.

Cloney, Richard A. * 1961, (Emeritus); PhD, 1959, University of Washington; invertebrate embryology, histology, morphogenic movements, metamorphosis, biology of ascidians.

Daniel, Thomas L. * 1984; PhD, 1982, Duke University; functional morphology, biomechanics, mechanics and energetics of animal locomotion.

Deyrup-Olsen, Ingrith J. * 1964, (Emeritus); PhD, 1944, Columbia University; general physiology cell-membrane phenomena.

Edwards, John S. * 1967, (Emeritus); PhD, 1960, Cambridge University (UK); arthropod neurobiology, insect physiology and development, tundra and alpine biology.

Felsenstein, Joseph * 1968, (Adjunct); PhD, 1968, University of Chicago; estimation of evolutionary trees, models of long-term evolutionary processes.

Gorbman, Aubrey * 1963, (Emeritus); PhD, 1940, University of California (Berkeley); endocrinology and neuroendocrinology, mechanisms of actions of hormones.

Graubard, Katherine * 1979; PhD, 1973, University of Washington; cellular neurophysiology, neural basis of behavior.

Hauschka, Stephen D. * 1967, (Adjunct); PhD, 1966, Johns Hopkins University; regulation of skeletal muscle differentiation, growth factor-receptor signaling mechanisms.

Herring, Susan W. * 1990, (Adjunct); PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

Hille, Merrill B. * 1976; PhD, 1965, Rockefeller University; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis.

Huey, Raymond B. * 1977; PhD, 1975, Harvard University; evolutionary and physiological ecology, herpetology, behavior.

Karr, James * 1991; PhD, 1970, University of Illinois; stream and watershed ecology, tropical forest ecology, conservation biology, environmental policy.

Kenagy, George James * 1976; PhD, 1972, University of California (Los Angeles); ecophysiology and behavior, reproduction and life history, population biology, evolution, mammalogy.

Kimelman, David * 1989, (Adjunct); PhD, 1985, Harvard University; molecular biology of early development in the frog, *Xenopus laevis*, and the fish, *Danio rerio*.

Kingsolver, Joel * 1986, (Affiliate); PhD, 1981, Stanford University; physiological ecology and evolutionary morphology of insects.

Kohn, Alan J. * 1961, (Emeritus); PhD, 1957, Yale University; invertebrate zoology, ecology and functional morphology of marine invertebrates, especially mollusks.

Kozloff, Eugene N. * 1964, (Emeritus); PhD, 1950, University of California (Berkeley); biology of lower invertebrates, ciliates, orthonectids, turbellarians and kinorhynches.

Laird, Charles D. * 1971; PhD, 1966, Stanford University; cell and developmental biology, human genetics.

Moody, William J. * 1982; PhD, 1977, Stanford University; single cell electrophysiology, development of electrical properties in embryos.

Morse, M. Patricia 1992; PhD, 2000, University of New Hampshire; invertebrates, interstitial molluscs, functional ultrastructure of bivalve heart-kidney and blood.

Murray, James D. * 1988, (Adjunct); PhD, 1956, DSc, 1968, Oxford University (UK); mathematical biology, biological pattern formation, wound healing, spread of epidemics.

Odell, Garrett M. * 1985; PhD, 1972, Johns Hopkins University; mathematical biology, ecology, models in cell and developmental biology.

Orians, Gordon H. * 1960, (Emeritus); PhD, 1960, University of California (Berkeley); ecology and ethology, vertebrate social systems, community structure, plant-herbivore interactions.

Paine, Robert T. * 1962, (Emeritus); PhD, 1961, University of Michigan; experimental ecology, organization and structure of marine communities.

Palka, John M. * 1969; PhD, 1965, University of California (Los Angeles); neurophysiology, sensory physiology, developmental neurobiology.

Pietsch, Theodore W. * 1978, (Adjunct); PhD, 1973, University of Southern California; ichthyology.

Riddiford, Lynn M. * 1973; PhD, 1961, Cornell University; insect development and physiology, invertebrate endocrinology.

Rohwer, Sievert A. * 1973; PhD, 1971, University of Kansas; ecology and evolution of social behavior, deception and evolution of status-signaling systems, avian.

Schubiger, Gerold A. * 1972; PhD, 1968, University of Zurich (Switzerland); developmental biology of insects, embryonic determination in *Drosophila*.

Steiner, Robert A. * 1977, (Adjunct); PhD, 1975, University of Oregon; neuroendocrinology, neuroscience, endocrinology.

Truman, James W. * 1973; PhD, 1970, Harvard University; hormones and invertebrate behavior, insect physiology, circadian rhythms.

Wakimoto, Barbara T. * 1984; PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.

Ward, Peter D. * 1984, (Adjunct); PhD, 1976, McMaster University (Canada); paleontology, paleobiology, regional coastal stratigraphy.

Whiteley, Arthur H. * 1947 (Emeritus); PhD, 1945, Princeton University; comparative development and physiology of invertebrates, genetic control of development.

Willows, A. O. Dennis * 1969; PhD, 1967, University of Oregon; invertebrate neurophysiology, neural mechanisms underlying behavior.

Wingfield, John C. * 1985; PhD, 1973, University College of North Wales (UK); hormone-behavior interactions; environmental and hormonal control of life history cycles of vertebrate.

Yao, Meng Chao * 1988, (Affiliate); PhD, 1975, University of Rochester; regulation of gene amplification and chromosome rearrangements in *Tetrahymena*.

Associate Professors

Bakken, Aimee * 1973; PhD, 1970, University of Iowa; developmental and cell biology, chromosome structure and function in oogenesis and embryogenesis.

Cooper, Mark S. * 1990; PhD, 1985, University of California (Berkeley); cellular physiology and cell motility in developing tissues.

Edwards, Scott V. 1994; PhD, 1992, University of California (Berkeley); molecular evolution and population genetics; evolutionary history of birds.

Griffiths, W. Mary 1971, (Emeritus); MA, 1942, PhD, 1953, University of California (Berkeley); zoology.

Naeem, Shahid * 1998; PhD, 1988, University of California (Berkeley); ecosystem consequences of declining plant, animal and microbial biodiversity.

Ostrander, Elaine A. * 1994, (Affiliate); PhD, 1987, Oregon Health Sciences University; genetic mapping of simple and complex traits.

Priess, James R. * 1993, (Affiliate); PhD, 1983, University of Colorado (Boulder); reliability models, fault trees.

Raible, David W. * 1995, (Adjunct); PhD, 1989, University of Pennsylvania; zebrafish neural development.

Swalla, Billie J. 1999; PhD, 1988, University of Iowa; how developmental and evolutionary processes influence animal body plans.

Wasser, Samuel K. * 1982; PhD, 1981, University of Washington; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

Wright, Robin L. * 1990; PhD, 1985, Carnegie Mellon University; membrane dynamics and regulation of sterol biosynthesis in yeast.

Assistant Professors

Bergstrom, Carl T. 2001; PhD, 1998, Stanford University; game-theoretic models of signaling among relatives.

Bosma, Martha * 1987; PhD, 1986, University of California (Los Angeles); electrophysiological and secretory development of central nervous system neurons.

Groom, Martha 1989, (Adjunct); PhD, 1995, University of Washington; ecology and conservation of patchy populations; restoration ecology; conservation biology.

Grunbaum, Daniel * 1991, (Adjunct); PhD, 1991, Cornell University; zooplankton ecology, population biology, behavioral ecology, mathematical biology, and biomechanics.

Moens, Cecilia B. * 1998, (Affiliate); PhD, 1993, University of Toronto; development of segmentation and segment identity in the vertebrate hindbrain.

Parrish, Julia * 1990; PhD, 1988, Duke University; organismal biology, aggregation of animals: schooling in fish and colonial nesting in seabirds.

Perkel, David J. 2000; PhD, 1992, University of California (San Francisco); neural mechanisms of learning; focus on vocal learning in songbirds.

Ruesink, Jennifer 1990; PhD, 1996, University of Washington; marine intertidal ecology, especially community dynamics, food webs, introduced species.

Schindler, Daniel E. * 1997; PhD, 1995, University of Wisconsin; ecosystem and community ecology - especially of aquatic systems.

Secord, David L. 1989, (Adjunct); PhD, 1995, University of Washington; host specificity and animal-algal symbiosis.

Von Der Emde, Gerhard 2000, (Adjunct); PhD, 1997, University of Erlangen (Germany); neurobiology, behavioral science, sensory physiology, sensory-motor integration, electroreception.

Senior Lecturer

Wenderoth, Mary Pat 1988; PhD, 1987, Rush Medical College; animal physiology and anatomy, muscle development, science education.

Lecturer

Rudkin, Alison H. 1974; MS, 1973, University of Washington; physiology and development.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ZOOL 403 Comparative Vertebrate Histology (5) NW Microscopic and submicroscopic anatomy of vertebrates. Emphasis on mammals. Light microscopy and interpretation of ultrastructure. Functions of basic tissue types and organs as related to structure. Prerequisite: either BIOL 202, BIOL 220, or BIOL 355.

ZOOL 408 Mechanisms of Animal Behavior (4) NW *Beecher, Brenowitz* Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior. Prerequisite: either BIOL 102, BIOL 203, BIOL 220, or PSYCH 200. Offered: jointly with PSYCH 408; W.

ZOOL 409 Sociobiology (5) NW *Rohwer* Biological bases of social behavior, emphasizing evolution as a paradigm. Emphasizes how to think like evolutionary biologist, especially with regard to interest conflict. Topics are individual versus group selection, kin selection, altruism, mating systems, sexual conflict, alternate reproductive strategies, and parent/offspring conflict. Prerequisite: either PSYCH 200, BIOL 220, or both BIOL 202 and BIOL 203. Offered: jointly with PSYCH 409.

ZOOL 410 Ethology and Ecology Laboratory (4) NW *Boersma* Field projects examining ecological and behavioral topics such as foraging and social behavior, species interactions, and structure of terrestrial and aquatic communities. Two weekend fieldtrips required. Prerequisite: BIOL 472. Offered: Sp.

ZOOL 414 Molecular Evolution (5) NW *S. Edwards* Survey of empirical approaches to the study of molecular evolution and ecology, drawing on examples from a variety of taxa and the recent literature. Topics include DNA sequencing and systematics, fingerprinting approaches in behavioral ecology, and adaptive evolution at the molecular level.

ZOOL 430 Marine Zoology (8) NW *Strathmann* Survey of groups of invertebrate animals represented in the San Juan Archipelago; natural history, functional morphology, ecology, distribution, habitat, adaptation, trophic interrelationships, and evolution. Permission of Director, Friday Harbor Laboratories required for registration. Recommended: 20 credits in biological sciences; co-requisite: BOTANY 445, Offered: at Friday Harbor Laboratories; Sp.

ZOOL 432 Marine Invertebrate Zoology (9) NW Comparative morphology and biology of marine invertebrates with emphasis on field and laboratory studies. Representatives of all major and most minor phyla are collected, observed alive, and studied in detail. Not open for credit to students who have taken 433 or 434. Recommended: 20 credits in biological sciences. Offered: at Friday Harbor Laboratories; S.

ZOOL 433 Invertebrate Zoology (5) NW Comparative biology and morphology of invertebrates. Laboratory work emphasizes structures and functions. Deals with principles of animal organization, Protista, simpler multicellular animals, echinoderms, and chordates. Not open to students who have taken 430 or 432. Prerequisite: either BIOL 102, BIOL 202, or BIOL 220. Offered: A.

ZOOL 434 Invertebrate Zoology (5) NW Comparative biology and morphology of invertebrates. Laboratory work emphasizes structures and functions. Emphasizes annelids and related worms, mollusks, and arthropods. Not open to students who have taken 430 or 432. Prerequisite: either BIOL 102, BIOL 202, or BIOL 220. Offered: W.

ZOOL 436 Invertebrate Endocrinology (3) NW Survey of endocrine mechanisms used by invertebrate groups to regulate homeostasis, growth, reproduction, and behavior. Special emphasis given to invertebrate model systems that provide unique insights into basic biological processes. Prerequisite: either BIOL 202, BIOL 220, ZOO 301, or ZOO 315; either CHEM 220, CHEM 224, CHEM 239, or CHEM 337; either PHYS 115 or PHYS 122.

ZOOL 438 Comparative Endocrinology (3) NW *Wingfield* Hormonal integration of living processes at all levels in animals: molecules, cells, organs, organisms, populations. Prerequisite: either BIOL 202 or BIOL 220 or BIOL 102 with either ZOO 301 or ZOO 315; recommended: a 400-level course in physiology and biochemistry.

ZOOL 439 Comparative Endocrinology Laboratory (2) NW *Wingfield* A broad introduction to endocrine techniques with appropriate experiments to accompany and enlarge on material presented in 438. Prerequisite: ZOO 438 which may be taken concurrently.

ZOOL 440 Biomechanics (4) NW *Daniel* Physical biology emphasizing a mechanical approach to ecological, evolutionary, and physiological questions. Basic principles underlying fluid and solid mechanics to explore responses of animals to flows, loads, and motions. Recommended: either BIOL 102, BIOL 202; either MATH 125 or Q SCI 292; either PHYS 114 or PHYS 121.

ZOOL 444 Entomology (3) NW Biology of terrestrial arthropods, with emphasis on insects. Structure, classification, physiology, and ecology of insects. Interrelationships of insects and man. Prerequisite: either BIOL 102 or both BIOL 202 and BIOL 203. Offered: Sp.

ZOOL 445 Entomology Laboratory (2) NW 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. Prerequisite: ZOO 444 which may be taken concurrently. Offered: Sp.

ZOOL 448 Concepts of Nervous System Function (3) NW *Bosma, Perkel* 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. Prerequisite: either BIOL 202 or BIOL 220.

ZOOL 451 Vertebrate Zoology (5) NW *Kenagy* The biology of vertebrate animals, emphasizing their diversity, adaptations, and evolutionary history. Introduces aspects of behavior, physiology, morphology, and ecology that emerge from the comparative study of vertebrates. Laboratory includes local field trips, films, and introduction to regional vertebrate fauna. Prerequisite: either BIOL 102, BIOL 180, or both BIOL 202 and BIOL 203.

ZOOL 453 Comparative Anatomy of Vertebrates (5) NW Comparison of the structure of vertebrate organ systems: integument, skeletal, muscle, digestive, respiratory, cardiovascular, urinary, and reproductive, with an emphasis on evolutionary trends. Prerequisite: BIOL 220; recommended: B STR 301; ZOO 451. Offered: W.

ZOOL 455 Developmental Biology of Animals (4) NW *Schubiger* Embryology and subsequent development of vertebrate and invertebrate animals, including Xenopus, mammals, chicks, *Drosophila*, echinoderms. Morphological changes in developing animals; experimental analysis of developing systems; underlying genetic and biochemical regulation of development. Prerequisite: either BIOC 405, BIOC 440, BIOL 200, BIOL 202, BIOL 355, BIOL 401, or ZOO 301 with either GENET 371 or GENET 372.

ZOOL 456 Developmental Biology of Animals Laboratory (3) NW Normal development of living embryos (frog, chick, insect, echinoderm). Internal anatomy of embryos on prepared slides. Comparisons between vertebrate and invertebrate animals. Scientific style reports on experiments.

ZOOL 457 Methods and Problems in Development (3) NW *Schubiger* Special topics in development. Integrating classical and current approaches. Developmental genetics, experimental embryology, molecular mechanisms of developmental regulation, and gene function in cell determination and cell differentiation in animal systems. Prerequisite: either ZOO 455 or either BIOL 200 or BIOL 202 with BIOL 401 and either GENET 371 or GENET 372.

ZOOL 459 Developmental Neurobiology (3) NW *Bosma* Invertebrate and vertebrate examples illustrate the mechanisms used in constructing nervous systems. Focus on the cellular and molecular mechanisms that underlie questions about the basis of neuronal diversity, axonal pathfinding and target recognition, synaptogenesis, and activity-dependent plasticity. Prerequisite: either BIOL 220, BIOL 355, or ZOO 301; either BIOL 401 or ZOO 455.

ZOOL 464 Natural History of Birds (5) NW *S. Edwards, Wingfield* Field, lecture, and laboratory study of birds framed in biological theory rather than taxonomy. Breeding systems, brood parasitism, appearance, molt, migration, orientation, social behavior, song, and flight are emphasized. Includes Saturday and weekend field trips for which students are required to share a portion of transportation costs. Prerequisite: either BIOL 102, BIOL 220, or both BIOL 202 and BIOL 203. Offered: Sp.

ZOOL 465 Natural History of Mammals (5) NW *Kenagy* Field, lecture, and laboratory course introducing mammals in a general biological context, emphasizing ecology, evolution, behavior, morphology, and adaptation to the environment. Includes weekend field trips, for which students may be required to share a portion of transportation costs. either BIOL 102, BIOL 180 or both BIOL 202 and BIOL 203; recommended: ZOOL 451.

ZOOL 467 Comparative Animal Reproduction (3) NW *Ramenofsky, Wingfield* Reproductive mechanisms, environmental influences on reproductive endocrinology, physiology, behavior, ecology of vertebrates. Discussions extend from organismal to cellular level, and focus on diversity of reproductive patterns among vertebrates. Prerequisite: BIOL 102, BIOL 220, or both BIOL 202 and BIOL 203; recommended: biochemistry and physiology.

ZOOL 468 Comparative Animal Reproduction Laboratory (2) NW *Ramenofsky, Wingfield* Laboratory and field studies on animal reproduction involving endocrinology, anatomy, behavior, and ecology. Accompanies, supplements, and extends material presented in 467. Prerequisite: ZOOL 467 which may be taken concurrently.

ZOOL 470 Techniques for Mathematical Biology (3) NW *Odell* Equips students to use, rather than prove, many applied mathematics techniques essential in mathematical biology. Includes instruction to use symbolic computation software (Mathematica, Macsyma) to do by computer the kind of mathematical formula manipulation that mathematicians formerly performed by hand. Recommended: calculus, linear algebra.

ZOOL 471 Models in Biology (4) NW *Odell* Explores use of models in biology in a wide range of topics, including morphogenesis, nerve signals, ecological interactions, population biology, and evolutionary theory. Emphasis on the biological insights models can provide rather than mathematical techniques. Prerequisite: either ZOOL 470, MATH 125, MATH 128, MATH 134, MATH 145, or Q SCI 292.

ZOOL 484 Animal Physiology (3) NW *Huey, Wenderoth* Physiology at levels of organisms and behavior, organ systems, and cells—an evolutionary and integrative perspective. Organismal physiology: metabolism, temperature, locomotion, osmoregulation, respiration, circulation, digestion. Prerequisite: either BIOL 202, BIOL 220, ZOOL 301, ZOOL 315, or BIOL 355; either CHEM 155, CHEM 160, CHEM 162, CHEM 164, CHEM 165, or CHEM 220; either PHYS 114 or PHYS 121.

ZOOL 485 Animal Physiology (3) NW *Riddiford, Truman* Physiology at levels of organisms and behavior, organ systems, and cells—an evolutionary and integrative perspective. Integrative physiology: neurons, muscles, and hormones. Prerequisite: either BIOL 202, BIOL 220, ZOOL 301, ZOOL 315, or BIOL 355; either CHEM 160, CHEM 162, CHEM 164, CHEM 165, or CHEM 220; either PHYS 114 or PHYS 121.

ZOOL 486 Animal Physiology Lab (2) NW *Huey, Riddiford, Truman* Experimental design and techniques, data analysis, written research paper. Original project labs in organismal-level physiology. Prerequisite: ZOOL 484 which may be taken concurrently.

ZOOL 487 Animal Physiology Lab (2) NW *Riddiford, Truman* Experimental design and techniques, data analysis, written reports. Experiments in integrative physiology. Prerequisite: ZOOL 485 which may be taken concurrently.

ZOOL 490 Undergraduate Seminar (3, max. 6) NW Supervised reading and group discussion on select-

ed concepts of zoology. Recommended: one upper-division zoology course.

ZOOL 491 Topics in Zoological Research (1, max. 3) NW 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. Credit/no credit only. Recommended: one upper-division zoology course.

ZOOL 492 Animal Migration (3) NW Undergraduate seminar on evolution, ecology, behavior, and physiology of migration. Student presents a seminar and leads class discussion on a selected topic. Prerequisite: either BIOL 102, BIOL 203, or BIOL 220; recommended: course in physiology, ecology, or animal behavior.

ZOOL 498 Special Problems in Zoology (1-5, max. 15) Recommended: one upper-division zoology course. Offered: AWSpS.

Courses for Graduates Only

ZOOL 506 Topics in Developmental Biology (1-2, max. 15) Seminars and discussions of aspects of growth of special current interest.

ZOOL 520 Seminar (1) Credit/no credit only. Offered: A.

ZOOL 521 Seminar (1) Credit/no credit only. Offered: W.

ZOOL 522 Seminar (1) Credit/no credit only. Offered: Sp.

ZOOL 523 Foresight in Science and Technology: Choices and Consequences (3) Examination of the foresight (or lack of it) with which we practice science and use technology. Contrasts potential risks of various choices with potential benefits. Credit/no credit only. Offered: jointly with PHYS 535/PHIL 501/ENVIR 535.

ZOOL 525 Seminar in Mathematical Biology (2, max. 12) *Bergstrom, Daniel, Grunbaum, Kot, Odell, Thompson* Examines mathematical models in a broad range of topics in biology, from cellular and subcellular to organismal and population phenomena. Participants present research topics, supplemented with selected readings from the primary literature, showing how mathematical methods and experimental or field biology are merged to predict observable phenomena. Credit/no credit only.

ZOOL 526 Graduate Topics in Sustainable Fisheries (2, max. 6) *Parrish* Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Post-seminar discussion section led by speaker on topics covered in lecture. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with FISH 578; odd years; W.

ZOOL 528 Advanced Topics in Physiology (1-3, max. 15) Recent developments. Prerequisite: one 400-level course in physiology.

ZOOL 529 Advanced Topics in Physiology (1-3, max. 15) Recent developments. Credit/no credit only. Prerequisite: one 400-level course in physiology.

ZOOL 530 Science and Environmental Policy (3) Role of science and scientists in formulating public policy related to conservation and the environment. Conceptualizes policy processes as a means of understanding opportunities for, and limits of, science in development and implementation of public policy. Prerequisite: concurrent registration in ZOOL 531. Offered: Sp.

ZOOL 533 Advanced Invertebrate Zoology (9) Invertebrate fauna of the San Juan Archipelago. Topic changes from year to year. Individual research projects are emphasized. Prerequisite: course in invertebrate zoology and permission of Director of Friday Harbor Laboratories. Offered: at Friday Harbor Laboratories; SpS.

ZOOL 536 Comparative Invertebrate Embryology (9) Diversity in developmental patterns in major marine taxa. Analysis of evolutionary changes in development. Emphasis on observation of live embryos and larvae. Prerequisite: permission of Director of Friday Harbor Laboratories; recommended: courses in invertebrate zoology and developmental biology. Offered: at Friday Harbor Laboratories; SpS.

ZOOL 538 Advanced Invertebrate Physiology (9) General and comparative aspects of nerve and muscle physiology with particular emphasis upon neuronal control of behavior, neuronal interactions, and other advanced topics determined by visiting faculty. Extensive laboratory experience, including intracellular and extracellular stimulating and recording techniques. Offered: at Friday Harbor Laboratories; Sp.

ZOOL 540 Topics in Cellular Developmental Biology (1, max. 16) *Bakken, Cooper, Hille, Moody* Seminar on current topics dealing with cellular aspects of developmental biology. Variable topics on both vertebrate and invertebrate development. Credit/no credit only.

ZOOL 541 Experimental Design in Cell Biology (1.5) *Wakimoto, Wright, Hille, Cooper* Focuses on experimental design in cell biology. A topic of current research interest covered in depth in order to follow a line of investigation and critically evaluate the strengths and limitations of various experimental strategies. Offered: jointly with CONJ 536.

ZOOL 543 Morphogenesis and Gene Networks (1, max. 12) *Odell* Seminar on current topics in genetic networks and the mechanics of morphogenesis. Topics vary.

ZOOL 556 Insect Development (3) 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. Prerequisite: either ZOOL 444 or ZOOL 455, or equivalent; either BIOL 202 or BIOL 220, or equivalent.

ZOOL 557 Topics in Molecular Insect Endocrinology (1, max. 12) *Riddiford* Assigned reading and discussion of current topics in molecular insect endocrinology. Prerequisite: ZOOL 438 or ZOOL 485 or equivalent.

ZOOL 560 Population Biology I: Evolution and Systematics (3) Rigorous overview of historical foundations and current perspectives in the fields of evolutionary biology and systematics. Offered: jointly with BOTANY 560/GENET 572.

ZOOL 561 Population Biology II: Ecology and Conservation Biology (3) Rigorous overview of historical foundations and current perspectives in the fields of ecology, population biology, and conservation biology. Offered: jointly with BOTANY 561/GENET 573.

ZOOL 568 Chemical Integration (2, max. 6) *Wingfield* Graduate seminar dealing with current problems in endocrinology and neuroendocrinology. Credit/no credit only.

ZOOL 570 Evolutionary Physiological Ecology (2, max. 16) *Huey* Assigned reading, discussion, and student presentations on issues in physiological and

ecological aspects of evolution. Topics variable. Credit/no credit only. Prerequisite: BIOL 454 and BIOL 472 or equivalent.

ZOOL 571 Current Topics in Evolution (1, max. 16)
Huey Assigned reading and discussion of current topics in evolution. Topics variable. Credit/no credit only. Prerequisite: BIOL 454 or equivalent.

ZOOL 572 Topics in Ecology (1-3, max. 15)
Graduate seminar on modern problems in ecology. Prerequisite: BIOL 472 or equivalent.

ZOOL 573 Physiological Ecology (1-3, max. 15)
Huey, Kenagy Perspectives and principles of research in the physiology and behavior of animals

in an ecological and evolutionary context, emphasizing whole animals and integration with diverse levels of biological organization.

ZOOL 575 Topics in Historical Ecology (2, max. 14)
Assigned reading and discussion of the history of conceptual issues or significant individuals. Topics variable. Credit/no credit only. Prerequisite: BIOL 472 or equivalent.

ZOOL 579 Criticism in Evolutionary Ecology and Behavior (2, max. 16)
Rohwer Critical analysis of manuscripts under preparation that treat evolutionary ecology, morphology, and behavior. Topics variable. Credit/no credit only. Prerequisite: ZOOL 409 or equivalent introduction to evolutionary thinking.

ZOOL 580 Environmental Physiology and Behavior (2, max. 14)
Kenagy, Wingfield Current conceptual issues and research results. Topics vary. Credit/no credit only. Prerequisite: two upper-division courses in physiology or behavior or equivalent.

ZOOL 600 Independent Study or Research (*)
Credit/no credit only. Offered: AWSpS.

ZOOL 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

ZOOL 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.



School of Business Administration



General Catalog Web page:
www.washington.edu/students/genecat/academic/School_BusinessAdmin.html



School Web page:
depts.washington.edu/bschool/

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Men and women embarking on business careers will have the opportunity to influence many of the social, political, and economic forces in today's world. The School of Business Administration prepares students for professional careers in management and related disciplines in both the private and public sectors.

The School of Business Administration offers an undergraduate program leading to the degree of Bachelor of Arts (BA) in Business Administration and graduate programs leading to the degrees of Master of Business Administration (MBA), Executive Master of Business Administration (EMBA), Technology Management Master of Business Administration (TMMBA), Master of Professional Accounting (MPAcc), and Doctor of Philosophy (PhD). Evening BA and MBA programs are also offered. Additionally, the School of Business Administration offers a Master of Science degree in Information Systems (MSIS).

Business Administration became an independent unit within the University system in 1917. It has been accredited by the American Assembly of Collegiate Schools of Business (now known as the International Association for Management Education) since 1921.

Facilities and Services

Most Business School classes and activities are in four buildings. Balmer Hall, named for Thomas Balmer, former president of the University Board of Regents, contains classrooms and computer labs. There are four computer labs in Balmer Hall that are available to Business School students. Mackenzie Hall, named in memory of Prof. Donald Mackenzie, Chair of the Department of Accounting from 1949 to 1955, contains the Dean's Office, the Undergraduate Program Office, the Graduate Program Office, the PhD Program Office, Business Administration Computer Services (BACS), Office of Development and External Relations, faculty offices, five department offices, and other business administration program offices. Nearby Lewis Hall contains the Business Career Center and other faculty and administrative offices. A fourth building, on the north side of Balmer, has three distinct components: the Bank of America Executive Education Center (which includes the James B. Douglas Executive Forum), the Boeing Auditorium, and the Albert O. and Evelyn Foster Business Library.

To serve the continuing education needs of middle- and senior-level managers, the School of Business Administration offers a number of certificate programs, either University-initiated or co-sponsored with various community and industry organizations. The Management Program, a nine-month, one night per week program, strengthens understanding and skills in all areas of management and provides an opportunity for successful managers to learn from a distinguished faculty and each other. Short courses and seminars are offered throughout the year in all areas of management, including marketing strategy, finance and accounting for non-financial executives, negotiation skills, and many others. In addition, the School develops and runs custom programs under contract with individual companies and organizations. Information on continuing education programs may be obtained from the Office of Executive Programs, 206-543-8560, fax 206-685-9236, uwexp@u.washington.edu.

International Business Programs

International business programs are coordinated and developed by the School's Center for International Business Education and Research (CIBER). These activities include special graduate and undergraduate certificate programs, the Global Business Program, seminars, internships, business foreign-language programs, special guest-speaker programs, and study tours. In addition, the MBA program coordinates sixteen foreign-exchange programs around the world. Although the Marketing and International Business Department offers a general curriculum in international business, each of the five academic departments within the School maintains faculty with special international teaching and research expertise. Internationally oriented courses are offered by each department.

The Education for the Global Entrepreneur (EDGE) program teams undergraduate and graduate students with local businesses to provide information and assistance necessary to compete successfully in the international arena. This is accomplished through student consulting teams, overseas research projects which involve Business School students on exchange programs, and student interns.

At the MBA level, the Business School offers the Global Business Program (GBP) that provides opportunities for MBA students to build on the international business foundation that every MBA develops through the first year of the program. In addition to international business electives, the GBP includes overseas travel through study tours, quarter-long exchange programs, and international internships. GBP students also participate in the weekly Global Business Forum, which brings top international business leaders to campus to discuss important issues facing their companies and industries.

Questions regarding these programs may be directed to the Program Assistant, CIBER, 303 Lewis, 206-685-3432, fax 206-685-4079, uwicber@u.washington.edu.

Entrepreneurship Programs

The focus of the Business School's Center for Technology Entrepreneurship is on nurturing skills that generate creative ideas, innovative processes, and new business growth. These skills are developed through special academic certificate programs, a high-tech entrepreneurship speaker series, internships, a business plan competition, club activities, and consulting opportunities with area businesses.

The Center for Technology Entrepreneurship (CTE) is open to both undergraduate and graduate students from the Business School as well as other schools and colleges of the University. Graduate students who wish to complete this specialization must participate in the CTE consulting club, attend the High-Tech

Entrepreneurship Speaker Series, complete several CTE core classes, and participate in the Business Plan Competition. Contact CTE for more information at 206-685-9868, cte@u.washington.edu.

The Business and Economic Development Program (BEDP) matches undergraduate and graduate student consulting teams with small-business owners in Seattle's inner city to implement business development projects. Through courses, independent study options, summer internships, and hands-on projects with inner-city entrepreneurs, students explore the challenges faced by central city businesses, while also providing valuable assistance. Questions about the Business and Economic Development Program can be directed to the program office at 206-543-9327.

Business Career Center

The Business Career Center coordinates all MBA and MPAcc career services. These include career counseling and career management workshops, the administration of special career events such as career fairs, company presentations, on-campus MBA and MPAcc recruitment, and a job-listing service. The Business Career Center also administers executive mentoring programs. Questions regarding these programs and services may be directed to the center's office, 202 Lewis, 206-685-2410, bcc@u.washington.edu.

Instructional Resources Office

The Instructional Resources Office promotes excellence in teaching by providing resources in current practice and research in teaching and learning. The office serves faculty and teaching assistants with individual consultations, coordinates a teaching preparation program for doctoral students, and offers assistance with instructional innovations. Questions can be directed to the Instructional Resources Office, 317 Lewis, 206-685-9608.

Honor Societies

Beta Gamma Sigma is the national scholastic honor society in the field of business. Election to membership is available to both undergraduate and graduate students in business. Selection is based on outstanding scholastic achievement.

Beta Alpha Psi is the accounting honor society. Membership is based primarily on scholastic achievement, but some community service is also required. Beta Alpha Psi provides a mechanism for students, professionals, and educators to meet on both formal and informal bases.

Student Organizations

The goals and interests of graduate students are served by the MBA Association, the Association of Black Business Students, Challenge for Charity, Graduate Consulting Club, MBA Finance Club, Global Business Association, Graduate Accounting Club, Environmental Business Alliance, Graduate and Professional Student Senate, MBA Marketing Club, Program in Entrepreneurship and Innovation Club, PEI Consulting Network, Net Impact, High-Tech Club, MBA Speakeasy, Women in Business, and the Doctoral Association.

Graduate Programs

Associate Dean for Masters Programs

Gary Sundem

Admission

Qualified students who are graduates of the University of Washington or other accredited colleges or universities may be admitted to graduate degree programs. GPA, Graduate Management Admission Test score, work experience, educational and professional objectives, and other factors are considered in the admission process. Inquiries concerning the details of admission should be made to the specific degree program of interest, University of Washington, Graduate School of Business Administration, Mackenzie Hall, Box 353200, Seattle, WA 98195.

Application Procedure

Applications to the MBA, EMBA, and Ph.D. programs are considered for entry in autumn quarter only. Applications to the Technology Management MBA and Master of Science in Information Systems program are considered for entry in winter quarter only. The formal deadlines for application are February 1 for the PhD program; December 1, January 1, February 1, and March 1 for domestic applicants for the MBA; February 1 for international applicants for the MBA; April 1 for Evening MBA; and April 15 for the Executive MBA and MPAcc programs. Students are encouraged to apply as early as possible for the programs.

The Graduate School of Business Administration offers programs of study leading to the advanced degrees of Master of Business Administration, Master of Professional Accounting, Master of Science in Information Systems, and Doctor of Philosophy. Four programs can lead to an MBA degree: the full-time program, the evening program, the Technology Management (TMMBA) program, and the Executive MBA program.

Master of Business Administration

Executive Director
Dan Poston
110 Mackenzie Hall, Box 353200
206-543-4661
mba@u.washington.edu

The full-time Master of Business Administration degree program has been designed for students who are preparing for a professional career in management. A period of two academic years, or 96 academic credits, is required for most students to complete the MBA program. The program consists of 48 credits of required first-year courses and 48 elective credits. The student may take no more than 24 credits in any one elective area.

The evening MBA program is targeted toward fully employed college graduates who seek a management degree that can be earned outside their regular working hours. Instruction takes place two evenings per week and students typically take two courses per quarter. The program consists of 80 academic credits, with normal completion of degree requirements in ten quarters.

Special Programs

Within the MBA program, there are options for special study: Global Business Program; E-Business Program, and the Program in Entrepreneurship and Innovation. The following concurrent degree pro-

grams are also available: MBA/JD with the School of Law, MBA/MAIS with the Henry M. Jackson School of International Studies, MBA/MSE with the College of Engineering's Program in Engineering and Manufacturing Management, and MBA/MHA with the School of Public Health and Community Medicine.

Executive Master of Business Administration

Assistant Dean
Jill Bowman
206-685-1333
emba@u.washington.edu

Since the autumn of 1983, the Executive MBA Program has provided an additional pathway to the Master of Business Administration degree. The EMBA program provides an intensive executive-development experience to a select group of mid-career managers who continue to work full-time while pursuing the MBA degree. Candidates for this two-year program should have seven or more years of increasingly successful work experience including three to four years in management, and currently hold mid- or top-level management positions. They are typically sponsored by their organizations and have been identified as employees with high potential to advance as general managers. Students are selected to ensure diversity of industry, functional areas and organizational size.

The Executive MBA degree program is offered in two scheduling options. Both run for two academic years, September through June. (1) The Puget Sound Option meets on campus for a full day once a week, on alternating Fridays and Saturdays. In addition, students attend spring and fall residence sessions each year. (2) The Northwest and Beyond Option meets on campus once a month, generally for three consecutive days, Thursday through Saturday. Between monthly sessions, students continue to interact with faculty and classmates online via the Internet and interactive groupware. This format is designed for individuals from the greater Northwest as well as those from the Puget Sound area whose schedules preclude weekly attendance.

While the scope of the curriculum is comparable to that of the regular MBA program, the pace is more intense and the perspective is that of a general manager. There are 21 required courses and no electives.

Applications are accepted throughout the year, with an application deadline of April 15 for the class beginning each autumn. Late applications are handled on a space-available basis.

Technology Management Master of Business Administration

Director
Sherri Anderson
206-221-6995
tmmba@u.washington.edu

The Technology Management MBA Program is designed for professionals who are employed in technology companies or who work in technology jobs in more traditional businesses. The curriculum combines the essential components of management education with a specialized focus on high-tech industries. It is structured for individuals who want to play a broader role in management and are seeking the necessary management skills and business knowledge. The program is focused on real-world projects and analyses, collaborative learning in study groups and extensive participant interaction in the

classroom. Candidates for this 18 month program have technology experience and upward career progression.

The Technology Management MBA Program provides an intensive educational experience to professionals who will continue to work full-time while pursuing their MBA degree. The TMMBA Program runs six consecutive quarters of instruction, beginning every January and ending the next year in June. Three-hour sessions are held once a week on a mid-week evening and six-hour sessions are scheduled two Saturdays per month. There are 68 required credits of which 6 are electives. Additionally, two residential sessions are offered one at the beginning of the program and one at the end. Candidates may be sponsored by their organizations or apply on their own.

Each year approximately 50 students are accepted into the TMMBA Program. Applications are accepted throughout the year. Please contact the TMMBA office to find out the applications deadlines for the upcoming class.

Master of Science in Information Systems

Director
Sherri Anderson
206-543-2446
msis@u.washington.edu

The Master of Science in Information Systems Program is designed for business and technology professionals who want to develop expertise in using information systems to solve critical business problems. The MSIS is a professional degree that integrates the use of information systems and organizational practices. It is designed for business and technology professionals who would like to enhance their information systems abilities or who desire a career change into the technology field. A graduate of this program would be prepared for positions such as Business Analyst, Functional Analyst, IS Liaison, Project Manager, or IS consultant.

Technology plays a central role in both the content and delivery of the MSIS Program. It provides students with exposure to state-of-the-art information technologies. Virtually all program courses require hands-on student work with a wide variety of IT-based systems and applications. Additionally, the curriculum focuses on key managerial issues such as project/team management, collaboration, and the ability to justify information systems investments using financial, strategic, as well as organizational arguments. The four main components of the curriculum are foundation courses, IS core, career tracks and the career track practicum. The program requires 68 credits based on a student's educational background and prior experience.

The program does not require specific undergraduate majors or work experience, just a strong desire to build a career around the development of IT-based solutions. Students continue to work full-time while pursuing their MSIS degree. The MSIS Program runs for a consecutive 6 quarters, spanning 18 months. It begins in January each year and ends the following year in June. Classes are held once a week on a mid-week evening for three hours and sessions are scheduled two Saturdays per month. Candidates may be sponsored by their organizations or apply on their own.

This new program will admit its first class in January 2003 with approximately 50 students. Applications are accepted throughout the year. Please contact the MSIS office for more information.

Master of Professional Accounting

Managing Director
Francine Shafer
231 Mackenzie
206-616-4964

The Master of Professional Accounting (MPAcc) prepares students for high-level careers with major accounting and consulting firms, governmental agencies, and industry. Students with undergraduate degrees in accounting may complete the program in three quarters. Students with no prior business background must take an expanded version of the program. Enrollment is limited to 25 to 30 students in each of two tracks—Accounting and Assurance (A&A) and Taxation. MBA students with a strong interest in accounting and taxation may earn a joint MBA/MPAcc degree.

Doctor of Philosophy

Program Coordinator
Jaime Banaag
102 Mackenzie
206-543-4111
baphd@u.washington.edu

The Ph.D. program in business administration is a research-based program designed to train scholars interested in academic careers, although this training is also useful for individuals seeking research positions in business and government, as well as in consulting firms.

With the guidance of faculty members who have similar interests, Ph.D. students complete a program of formal coursework (a minimum of 18 courses) and participate in doctoral seminars, independent study, and research. A faculty supervisory committee is appointed early in the program to assist each student in constructing a course of study that fits that individual's background and interests. Students select one major area of specialization and complete requirements in two or three additional minor areas that support their major area of specialization (including areas outside the Business School, such as economics, psychology, and mathematics). Throughout the program, doctoral students receive support and training that hone their skills as teachers and course developers.

Major areas of concentration include accounting, finance, human resource management and organizational behavior, marketing, information systems, operations management, operations research, and strategic management. All doctoral students are required to have research methods as one of their minor areas.

Doctoral study is full-time and year-round, and students are admitted autumn quarter only. Most candidates will require four to five years to complete the program. The School's goal is to make financial aid available, in the form of research and teaching assistantships, to all of its doctoral students. In addition to service appointments, fellowships are available on a competitive basis to support students engaged in their dissertation research during the final part of their programs.

Special Requirements

Applicants to graduate business programs are required to submit scores on the Graduate Management Admission Test. Those admitted to the MBA program must demonstrate understanding of the fundamental concepts of calculus.

Accounting



Department Web page:
depts.washington.edu/acctgweb/

Accounting involves development and communication of financial and operational information for business and nonprofit economic entities. The curriculum includes understanding accounting information systems, using accounting information in managerial decision making, preparing and auditing financial statements under generally accepted accounting and auditing standards, and understanding the fundamental aspects of personal and corporate taxation. Elective courses provide in-depth instruction in managerial and financial accounting, not-for-profit accounting, and taxation. Courses provide a foundation for careers in accounting (public, industrial, private, or governmental), for a general business career, or for other professions such as law.

Faculty

Chair

Stephan E. Sefcik

Professors

Berg, Kenneth B. * 1950, (Emeritus); MS, 1941, PhD, 1952, University of Illinois; financial and managerial accounting.

Bowen, Robert M. * 1978; PhD, 1978, Stanford University; financial and managerial accounting. Hubert O. Whitten Endowed Professorship in Accounting.

Burgstahler, David C. * 1980; PhD, 1981, University of Iowa; financial and managerial accounting, statistical methods.

Dukes, Roland E. * 1979; PhD, 1974, Stanford University; financial and managerial accounting.

Jiambalvo, James * 1977; PhD, 1977, Ohio State University; managerial accounting, auditing.

Mueller, Fred J. * 1953, (Emeritus); PhD, 1956, Ohio State University; auditing, not-for-profit, tax accounting.

Noreen, Eric W. * 1976, (Emeritus); PhD, 1976, Stanford University; managerial accounting.

Ramanathan, K V. * 1972; PhD, 1970, Northwestern University; managerial accounting.

Sefcik, Stephan E. * 1986; PhD, 1983, University of Illinois; financial reporting and environmental accounting issues.

Shevlin, Terrence J. * 1985; PhD, 1986, Stanford University; financial accounting, capital markets, taxation.

Sundem, Gary L. * 1971; PhD, 1971, Stanford University; managerial accounting.

Associate Professors

Kennedy, S. Jane 1991; MBA, 1977, University of Alberta (Canada), PhD, 1992, Duke University; professional judgment/decision making in accounting, auditing, or business contexts.

Shores, Donna J. * 1986; MS, 1980, University of Wisconsin, PhD, 1986, Stanford University; financial accounting, corporate reporting, role of accounting choices in equity valuation and contra.

Assistant Professors

Hodge, Frank D. 2000; MBA, 1996, Indiana State University, PhD, 2000, University of Indiana; financial reporting, investor judgment and decision making, decision theory.

Kadous, Kathryn K. 1998; PhD, 1996, University of Illinois; auditing, financial accounting.

Matsumoto, Dawn A. 1998; PhD, 1998, University of Washington; financial reporting and disclosure, the role of intermediaries on disclosure decisions.

Rajgopal, Shivaram 1998; PhD, 1998, University of Iowa; reverse recognition accounting.

Senior Lecturers

Gillick, James V. 1986; BBA, 1957, University of Louisville.

Resler, William M. 1982; JD, 1972, University of Washington, LLM, 1973, New York University; tax accounting.

Rice, Steven J. 1985; MS, 1971, Oklahoma State University, PhD, 1974, University of Texas (Austin); tax accounting.

Wells, William L. 1988; MPAcc, 1989, University of Washington; financial reporting, not-for-profit accounting.

Lecturers

Adams, Helen D. 1992; PhD, 1986, University of Washington.

Angell, Patricia L. 1998; MPAcc, 1999, University of Washington.

Britzmann, Jeannie R. 1994; MPAcc, 1994, University of Washington; tax accounting.

Du Charme, Larry L. 1994; PhD, 1994, University of Washington.

Medlar, Deborah L. 1999; JD, 1978, University of Washington, LLM, 1984, New York University.

Scott, Bert G. 1997; MBA, 1976, University of Montana, DBA, 1985, Mississippi State University.

Widdison, Elizabeth 1999; BS, 1992, City University.

Finance and Business Economics



Department Web page:
depts.washington.edu/finance/

Finance and Business Economics address the financial and economic aspects of business decision making. The Finance curriculum focuses on financial management and the financial markets within which firms and individual investors operate. Business Economics courses concern the economic behavior of firms, including factors that determine costs and prices, and real and monetary forces (such as government policies) that affect the national and international economic environment.

Faculty

Chair

Avraham Kamara

Professors

Alberts, William * 1967, (Emeritus); PhD, 1961, University of Chicago; capital investment planning, business strategy, economics of industrial organization.

Bourque, Philip J. * 1957, (Emeritus); PhD, 1956, University of Pennsylvania; business economics.

Bradford, William D. 1994; PhD, 1972, Ohio State University; corporate finance and financial institutions.

Conrad, Douglas A. * 1977, (Adjunct); MHA, 1973, University of Washington, MBA, 1977, PhD, 1978, University of Chicago; alternative vertical and horizontal market structures in health care.

D'ambrosio, Charles A. * 1960, (Emeritus); PhD, 1962, University of Illinois; finance.

Frost, Peter A. * 1969; PhD, 1966, University of California (Los Angeles); econometrics and stock market behavior.

Haley, Charles * 1966; PhD, 1968, Stanford University; financial management and banking.

Hanson, Kermit O. 1948, (Emeritus); MS, 1940, PhD, 1950, Iowa State University; accounting and statistics.

Hess, Alan C. * 1967; PhD, 1969, Carnegie Mellon University; banking, financial markets, interest rates and risk management.

Higgins, Robert C. * 1967; PhD, 1969, Stanford University; financial management.

Johnson, Dudley * 1960, (Emeritus); PhD, 1957, Northwestern University; business economics.

Kamara, Avraham * 1984; PhD, 1986, Columbia University; financial economics, investments, futures and options.

Karpoff, Jonathan M. * 1983; PhD, 1982, University of California (Los Angeles); corporate finance, law and economics, microeconomics, natural resources.

Malatesta, Paul H. * 1980; PhD, 1982, University of Rochester; corporate finance, security and capital markets, corporate mergers, and empirical methods in finance.

Roley, V. Vance * 1983; PhD, 1977, Harvard University; financial markets, monetary theory, monetary policy.

Schall, Lawrence D. * 1968; PhD, 1969, University of Chicago; corporate finance.

Siegel, Andrew F. * 1983; MS, 1975, PhD, 1977, Stanford University.

Associate Professors

Dewenter, Kathryn L. * 1992; MBA, 1985, Stanford University, PhD, 1993, University of Chicago; empirical analysis of finance models in an international context.

Koski, Jennifer Lynch * 1991; MBA, 1987, Harvard University, PhD, 1991, Stanford University; dividend policy, market microstructure, stock splits, mutual funds.

Pigott, William 1954, (Emeritus); MA, 1955, PhD, 1957, University of Washington; finance and business economics.

Rice, Edward M. * 1979; PhD, 1978, University of California (Los Angeles); corporate finance, microeconomics, industrial organization.

Assistant Professors

Duarte, Jefferson 2002; PhD, 2000, University of Chicago; empirical asset pricing, derivatives, term structure of interest rates.

Lin, Pansy C. 2000; PhD, 2000, University of California (Los Angeles); investments, behavioral finance and empirical asset pricing.

Senior Lecturers

Glassman, Debra A. 1989; PhD, 1980, University of Wisconsin; international finance, international economic policy, macroeconomics.

Hadjimichalakis, Karma G. 1970; PhD, 1974, University of Rochester; monetary policy, banking, financial markets, domestic and international macroeconomics.

Tarhouni, Ali A. 1985; PhD, 1983, Michigan State University; economic theory, international trade and finance, financial markets.

Lecturer

Maloy, Frances 1986; PhD, 1999, University of Washington; finance and business economics.

Management and Organization

 *Department Web page:*
depts.washington.edu/bschool/mo/

Management and Organization provides an understanding of the processes and structures of organizations through three distinct programs. The Human Resource Management and Organizational Behavior (HRMOB) courses address personnel and industrial-relations topics such as selection, performance appraisal, compensation, and negotiations, as well as behavioral topics such as leadership, motivation, and group dynamics. They prepare students for managing an organization's human resources effectively. The Organization and Environment (O E) courses examine organization theory, organization design, and management of technology and innovation, as well as the social, political, legal, and ethical environments in which organizations operate. They give students the knowledge, perspective, and analytical tools to deal effectively with organization-environment interactions. The Business Policy (B POL) courses focus on organizational effectiveness from the viewpoint of top management. Emphasis is placed on an integrated view through strategic management and control, planning, decision making, and entrepreneurship.

Faculty

Chair

Thomas M. Jones

Professors

Fenn, Margaret P. * 1950, (Emeritus); DBA, 1963, University of Washington; organizational behavior and administrative theory.

French, Wendell L. * 1983, (Emeritus); EdD, 1956, Harvard University; organizational behavior, human resources management, organization development.

Gist, Marilyn Elaine * 1987; PhD, 1985, University of Maryland; cognitive processes involved in motivation training and work task performance.

Henning, Dale A. * 1955, (Emeritus); PhD, 1954, University of Illinois; administrative theory and organizational behavior.

Hill, Charles William L. * 1988; PhD, 1983, University of Manchester (UK); business policy, corporate strategy, multinational enterprise.

Huber, Vandra Lee * 1987; DBA, 1982, Indiana University; human resource decision making, compensation, and performance appraisal.

Johnson, Richard A. * 1969, (Emeritus); DBA, 1958, University of Washington; business policy.

Jones, Thomas M. * 1977; PhD, 1977, University of California (Berkeley); corporate governance, shareholder litigation, corporate social responsibility, business and society.

Kast, Fremont E. * 1978, (Emeritus); DBA, 1956, University of Washington; administrative theory and organizational behavior.

Lee, Thomas W. * 1983; PhD, 1984, University of Oregon; administrative theory and organizational behavior, human resources management.

Mitchell, Terence R. * 1969; PhD, 1969, University of Illinois; leadership, group processes, motivation, turnover.

Moxon, Richard W. * 1971, (Emeritus); DBA, 1973, Harvard University; international business.

Newell, William T. * 1963, (Emeritus); PhD, 1962, University of Texas (Austin).

Peterson, Richard B. * 1971, (Emeritus); PhD, 1966, University of Wisconsin; human resources management.

Rosenzweig, Jim E. * 1956, (Emeritus); PhD, 1956, University of Illinois; administrative theory and organizational behavior.

Saxberg, Borje O. * 1957; PhD, 1958, University of Illinois; administrative theory and organizational behavior.

Scott, William George * 1966, (Emeritus); DBA, 1957, Indiana University; administrative theory and organizational behavior.

Sutermeyer, Robert A. 1949, (Emeritus); MA, 1942, University of Washington; personnel and organizational behavior.

Vesper, Karl H. * 1969; PhD, 1969, Stanford University; business policy, mechanical engineering, marine studies.

Wheeler, Bayard O. 1972, (Emeritus); MA, 1930, University of Washington, PhD, 1942, University of California (Berkeley); urban economics.

Woodworth, Robert T. * 1966, (Emeritus); PhD, 1963, Northwestern University; administrative theory and organizational behavior, human resources management.

Associate Professors

Boeker, Warren * 1998; PhD, 1987, University of California (Berkeley); business strategy, the management of technology and innovation, and entrepreneurship.

Chen, Xiao-Ping 1999; PhD, 1998, University of Illinois; cross-cultural management, organizational behavior.

Hansen, Gary S. * 1984; PhD, 1987, University of Michigan; business and corporate strategy, innovation and entrepreneurship.

Kienast, Philip K. * 1970; PhD, 1972, Michigan State University; human resources management.

Kotha, Suresh * 1996; MBA, 1983, MArch, 1985, MS, 1986, PhD, 1988, Rensselaer Polytechnic Institute; competitive strategy, competing on the Internet and e-commerce, and international management.

Strong, Dennis Fulton * 1967, (Emeritus); PhD, 1959, University of Washington; business history.

Wickman, James A. * 1983, (Emeritus); DBA, 1961, University of Washington; risk control and insurance.

Wicks, Andrew C. * 1992; PhD, 1992, University of Virginia; normative business ethics including stakeholder theory, trust and managed care.

Assistant Professors

Bigley, Gregory 2000; PhD, 1995, University of California (Irvine); organizational behavior.

Higgins, Chad 2000; PhD, 2000, University of Iowa; human relations management, organizational behavior.

Sarasvathy, Saras D. 1998; PhD, 1998, Carnegie Mellon University; entrepreneurship and finance.

Steensma, Harvey K. 2000; PhD, 1996, Indiana University; business policy.

Lecturers

Berger, Robert H. 1985; JD, 1967, MBA, 1983, University of California (Berkeley); law.

Castle, John R. 2000; ScD, 1964, Massachusetts Institute of Technology; entrepreneurship.

George-Falvy, Jane 1989; PhD, 1995, University of Washington; organizational behavior and human resource management.

Huwe, Ruth A. 1990; PhD, 1999, University of Washington; speech communication, negotiation.

Management Science



Department Web page:
depts.washington.edu/mgtsci/

The Department of Management Science consists of three subareas: Information Systems (I S), Operations Management (OPMGT), and Quantitative Methods (QMETH). The Information Systems area focuses on the management of computer-based information systems. The IS curriculum is designed to give students a basic understanding of IS technology and its impact on all phases of an organization. Specific areas of study include telecommunications and network design, systems analysis and design, database management, expert systems, and applications programming. The Operations Management (OPMGT) area of study refers to the functional area of management which produces goods or services in an organization. Specifically, the OPMGT curriculum focuses on the many changes which have occurred in the past ten years in the way that managers think, plan, and operate manufacturing and service facilities. The area includes courses in logistics, quality, inventory and supply-chain management, project management, and waiting lines, among others. The Quantitative Methods (QMETH) area focuses on the theory and application

of mathematical and statistical tools in the modeling and analysis of business problems. The QMETH curriculum includes courses in statistics and data analysis as well as courses in operations research (e.g., linear programming, forecasting, using spread-sheets to construct decision support models).

Faculty

Chair

Bruce H. Faaland

Professors

Chiu, John S. Y. * 1960, (Emeritus); PhD, 1960, University of Illinois; quantitative methods.

Faaland, Bruce H. * 1971; PhD, 1971, Stanford University; quantitative methods.

Gupta, Yash P. 1999; MS, 1974, University of Brunel (England), PhD, 1976, University of Bradford (England); management and administration.

Klasterin, Theodore * 1974; PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.

Moinzadeh, Kamran * 1984; MS, 1982, PhD, 1984, Stanford University; operations management, production management, inventory, quality and supply chain management.

Siegel, Andrew F. * 1983; MS, 1975, PhD, 1977, Stanford University.

Tamura, Hirokuni * 1967; MS, 1961, PhD, 1967, University of Michigan; quantitative methods.

Associate Professors

Dey, Debabrata * 1997; MS, 1989, Syracuse University, MS, 1992, PhD, 1994, University of Rochester; heterogeneous and distributed systems; database theory, design and performance.

Hillier, Mark S. * 1993; MS, 1991, PhD, 1994, Stanford University; operations management, inventory, commonality, mathematical programming applications.

Schmitt, Thomas G. * 1979; MBA, 1974, University of Cincinnati, DBA, 1979, Indiana University; management of service and manufacturing operations.

Assistant Professors

Jain, Apurva 1999; PhD, 1999, Purdue University; supply chains, Web retailing, logistics, inventory.

Tan, Yong 1987; MS, 1988, PhD, 1993, PhD, 2000, University of Washington.

Zhou, Yongpin 2000; MA, 1995, Johns Hopkins University, MA, 1997, PhD, 2000, University of Pennsylvania.

Senior Lecturers

Burrows, William E. 1968; MA, 1972, University of Washington; systems analysis/design methodologies and data/file structures.

Pilcher, Martha G. * 1987; MS, 1978, PhD, 1985, Georgia Institute of Technology; operations research/operations management, health care applications and logistics.

Lecturer

McKay, Mark 1992; MS, 1989, Clemson University, PhD, 1999, University of Washington.

Marketing and International Business



Department Web page:
depts.washington.edu/mibdept/

Marketing (MKTG) provides knowledge of concepts and relationships in the areas of consumer behavior, channels of distribution, measurement and analysis of markets, pricing, physical movement of goods, product development, promotion, and sales administration. Marketing careers may involve specialization in Internet marketing, product or brand management, advertising, selling, sales management, marketing research, retailing, wholesaling, and international marketing for a wide spectrum of firms and industries. International Business (I BUS) 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 (B CMU) stress writing in organizations to accomplish goals, oral reporting, business plan presentation, and the use of computer graphics in communication.

Faculty

Chair

Gary Erickson

Professors

Erickson, Gary * 1980; MBA, 1973, PhD, 1978, Stanford University; quantitative models of marketing and analysis of competitive strategies.

Gordon, Guy G. 1957, (Emeritus); MBA, 1950, University of Washington, PhD, 1957, University of California (Berkeley); marketing.

Harder, Virgil E. * 1955, (Emeritus); PhD, 1958, University of Illinois; business communications.

Jacobson, Robert L. * 1984; PhD, 1981, University of California (Berkeley); marketing strategy.

Kolde, Endel-Jakob * 1951, (Emeritus); DBA, 1954, University of Washington; international business and marketing.

MacLachlan, Douglas * 1970; MBA, 1965, MA, 1970, PhD, 1971, University of California (Berkeley); marketing, data analysis, and marketing research.

Moinpour, Reza * 1966; MBA, 1966, PhD, 1970, Ohio State University; consumer behavior and marketing research.

Narver, John C. * 1966, (Emeritus); MBA, 1960, PhD, 1965, University of California (Berkeley); market strategy, market-driven organization, pricing policies, marketing management.

Song, Michael 2000; MS, 1986, Cornell University, MBA, 1990, PhD, 1991, University of Virginia; new product management, new venture evaluation, technology risk, value assessment.

Spratlen, Thaddeus H. * 1972; MA, 1957, PhD, 1962, Ohio State University; marketing.

Sullivan, Jeremiah J. * 1975; MA, 1967, PhD, 1970, New York University, MBA, 1975, University of Washington; international business, Japanese management, multinational business management.

Wheatley, John J. * 1960, (Emeritus); MBA, 1954, PhD, 1959, State University of New York (Buffalo); marketing.

Yalch, Richard F. * 1971; MS, 1970, Carnegie Mellon University, PhD, 1974, Northwestern University; advertising management and consumer behavior, marketing management, marketing research.

Associate Professors

Grathwohl, Harrison L. * 1983, (Emeritus); DBA, 1957, Indiana University; marketing.

Louie, Therese A. * 1993; PhD, 1992, University of California (Los Angeles); behavioral biases that influence the perception of self and others.

Assistant Professors

Forehand, Mark Robeck 1997; PhD, 1997, Stanford University; consumer decision making and attitude development.

Okada, Erica Mina 1999; MBA, 1992, Dartmouth College, PhD, 1999, University of Pennsylvania; decision theory, entrepreneurial marketing, and marketing strategy.

Schlosser, Ann E. 2000; MA, 1995, PhD, 1997, University of Illinois; Internet marketing.

Turner, Daniel J. 1999; MBA, 1993, Washington University, PhD, 2001, Northwestern University; retailing, pricing, and marketing models.

Senior Lecturer

Stearns, Elizabeth P. 1995; MBA, 1978, New York University; strategic planning, customer loyalty, advertising, direct marketing.

Lecturers

Giambattista, Michele D. 1995; MBA, 1969, Harvard University; marketing, international business, technology.

Kalitzki, Judith Ann 1974; PhD, 1979, University of Washington; business communications.

Odegaard, Mary Ann 1995; MBA, 1971, PhD, 1980, Stanford University; retailing and retail management.

Stone, Jessica 1991; MA, 1979, University of Denver, PhD, 1984, University of Washington; advertising, consumer behavior, gender-based communication.

Whelan, John F. 1985; MA, 1977, Yale University; business communications.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Accounting

ACCTG 401 Federal Income Tax Factors in Business Decisions (3) Service course in taxation recommended for the junior year for non-accounting majors. May also be taken by MBA students for graduate credit. Not open to accounting majors. Prerequisite: either 2.0 in ACCTG 225 or 2.0 in ACCTG 230; may not be repeated.

ACCTG 411 Auditing Standards and Principles (3) Intensive introduction to the attest function in society today. The environment, the process, and the report of the public auditor are analyzed. Potential extensions of the attest function are examined. Prerequisite: 2.0 in ACCTG 302; 2.0 in ACCTG 311; 2.0 in either ACCTG 320 or ACCTG 330; may not be repeated.

ACCTG 420 Database Management for Accounting (3) Continuation of ACCTG 320, covering database and processing architectures, database reliability, database recovery, database security, database administration, internets and intranets, and network security. Not available for credit to information systems majors or to students who have completed I S 470 and 480. Prerequisite: 2.0 in ACCTG 320; may not be repeated.

ACCTG 421 Tax Effects of Business Decisions (3) Issues in taxation, including tax considerations in business decision making, tax effects of business transactions, taxation of compensation, fringe benefits, capital gains, fixed asset transactions, disposition of business distribution from corporations. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 440 Accounting and Financial Management Decisions (3) Business financial planning with an emphasis of the role of accounting information in financial decisions. Topics include the accounting and finance aspects of business valuation, short and long term financing, short and long term investments, alternative types of debt and equity financing, and related topics. Prerequisite: 2.0 in ACCTG 311; 2.0 in ACCTG 311; FIN 350; may not be repeated.

ACCTG 450 Business Taxation (3) Issues of taxation for entities other than individuals, including corporations, subchapter S corporations, partnerships, estates, and trusts. Includes corporate distributions, liquidations, and reorganizations. Prerequisite: 2.0 in ACCTG 421; may not be repeated.

ACCTG 451 Individual Income Taxation (3) Political, economic, and social forces influencing federal income taxation, role of taxation in personal decisions. Coverage of individual income tax matters, including business and investment income, business and personal deductions, property transactions, and tax issues of employees. Prerequisite: 2.0 in ACCTG 421; may not be repeated.

ACCTG 460 Advanced Cost Accounting (3) Advanced analysis of cost and management accounting problems; special applications of cost accounting techniques for management planning and control; current developments in cost accounting. Prerequisite: 2.0 in ACCTG 311; may not be repeated.

ACCTG 470 Strategic Overview of Accounting (3) Provides a strategic overview of accounting functions in industry, government, and public accounting. Includes comprehensive exam covering all required courses in the accounting major. Prerequisite: ACCTG 321; ACCTG 421 which may be taken concurrently; ACCTG 440 which may be taken concurrently; may not be repeated.

ACCTG 480 Accounting for Not-for-Profit Organizations (3) Fund and budgetary accounting as applied to public sector organizations, such as governments, foundations, hospitals, and colleges. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 485 Advanced Financial Accounting (3) Accounting for partnerships, accounting for business combinations, parent-subsidiary and branch relationships, foreign exchange. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 490 Special Topics in Accounting (1-6, max. 6) Special topics of current concern to faculty and students. Offered only when faculty is available and student interest is sufficient. Class is announced in advance of scheduled offerings.

ACCTG 495 Accounting Internship (1-4, max. 4) One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Credit/no credit only. Prerequisite: ACCTG 301.

ACCTG 499 Undergraduate Research (1-6, max. 9) Arranged and supervised by individual members of the faculty.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

ACCTG 500 Financial Accounting (4) Introduction to concepts and procedures underlying determination and presentation of information for financial decisions by investors and other decision makers outside the business enterprise. Study of problems of valuation, income determination, and financial reporting.

ACCTG 501 Managerial Accounting (4) Study of the generation and the use of accounting information within the firm for purposes of planning and controlling operations. Topics covered include cost concepts, responsibility accounting systems, cost control, and the use of accounting information in short- and long-term management decision problems. Prerequisite: ACCTG 500.

ACCTG 503 Introduction to Accounting for Managers (4) *Noreen, Sundem* Provides potential managers with a basic knowledge of financial and managerial accounting. Focuses on the use, not the preparation, of accounting information. Examples presented for a variety of for-profit and nonprofit organizations.

ACCTG 505 Intensive Analysis of Accounting Principles and Practices (18) Covers the subjects in the required core for undergraduate accounting majors: intermediate accounting, advanced accounting, cost accounting, auditing, and tax accounting. Credits will not count toward MBA degree. Prerequisite: ACCTG 215 and ACCTG 225 or equivalent, or permission of instructor.

ACCTG 510 Problems in Financial Reporting (4) Extension of 500 emphasizing financial reporting from a user's perspective. Alternative approaches to recognition, valuation, and measurement of assets, equities, and income considered. Choice of accounting methods and effects on the firm of accounting policy regulation also examined. Prerequisite: B A 502 or permission of instructor.

ACCTG 511 Problems in Managerial and Cost Accounting (4) Discussion and analysis of costing techniques, use of accounting data in planning and evaluating managerial performance, and use of accounting data in short-run and long-run decisions. Special attention directed to issues in human behavior involved in cost allocation, budgeting, and performance evaluation. Prerequisite: B A 502 or permission of instructor.

ACCTG 513 Tax Effects of Business Decisions (4) Importance of tax considerations in making business decisions. Relationship of taxable income to accounting and economic concepts of income, and the economic, political, and social background of important tax provisions. Prerequisite: B A 502 or permission of instructor.

ACCTG 515 Seminar in Financial Statement Analysis (4) Emphasizes use of published financial reports by decision makers external to the firm (e.g., investors, creditors). Within each decision context,

traditional models and recent empirical research in accounting and finance are discussed. Project required as an application of course subject matter. Prerequisite: B A 502 or permission of instructor.

ACCTG 517 Seminar in International Accounting (4) Introduction to the conceptual, managerial, professional, and institutional issues of international accounting. Comparative and empirical studies receive special attention. Current interest topics (e.g., standard setting and transnational financial reporting) are explored. A research paper required. Prerequisite: B A 502 or permission of instructor.

ACCTG 519 Seminar in Financial Control Systems (4) Design and administration of formal information systems to aid the planning and control process in large organizations; formulation of divisional financial goals and control criteria; measurement of divisional performance and problems of goal congruence; administration of new investment programs. Prerequisite: B A 502 or permission of graduate office.

ACCTG 520 Information Quality and Assurance Services (4) Introduction to assurance services with a focus on financial statement audits. Auditing concepts and procedures, and the role of audits in financial markets.

ACCTG 521 Cases and Issues in Information Quality and Assurance Services (4) Analysis of cases and discussions of current issues dealing with assurance services. Prerequisite: ACCTG 520.

ACCTG 522 Advanced Financial Reporting (4) Advanced problems related to the measurement of enterprise income and asset and liability valuation.

ACCTG 523 Advanced Financial Analysis (4) Explores the use of published financial reports by decision makers external to the firm (e.g. investors and creditors). Emphasis is on traditional and statistical analyses of financial statements for the purposes of making economic decisions. Prerequisite: ACCTG 522.

ACCTG 524 Individual Taxation (4) Political, economic, and social forces influencing federal income taxation, role of taxation in personal decisions. Coverage of individual tax matters, including business and investment income, business and personal deductions, property transactions, and tax issues of employees.

ACCTG 525 Business and International Taxation (4) Issues of taxation for entities other than individuals, including corporations, subchapter S corporations, partnerships, estates, and trusts. Included corporate distributions, liquidations, and reorganizations. International dimensions of business taxation are introduced. Prerequisite: ACCTG 524.

ACCTG 526 Preparation for IPOs and SEC Reporting (4) Introduces legal issues pertaining to the accounting profession. Discusses the role of operations of the SEC with an emphasis on its functions in regulating information disclosure. Prerequisite: ACCTG 522.

ACCTG 527 Communications in Professional Accounting (4) Introduction to the communications practices of professional accountants. Development of effective written and oral skills employed in accounting presentations such as audit reports. Study of results of organizational communications research applicable to accounting firms and units within firms.

ACCTG 530 Tax Issues in Property Ownership (4) Analysis of gain and loss realization, recognition, and characterization of such. Detailed exploration of statutory and case law regarding acquisition, ownership, and disposition of assets. Treatment of capital

and ordinary gains and losses. Timing issues regarding deferral transactions and installment reporting are analyzed. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 531 Timing and Periods of Taxation (3) Analysis of the cash and accrual methods of accounting, choice of taxable period and multi-period transaction analysis. Consideration of statute of limitations and mitigation thereof. Details of passive activity losses. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 533 Procedural and Policy Issues (3) Analysis of the procedures of Federal taxation: assessment, collection, and refund claims. Detailed exploration of the rules governing the statute of limitations and the mitigation thereof. An introduction to tax policy considerations is given. Tax penalties are explored. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 534 Fundamentals of Corporate Taxation (3) Detailed analysis of contribution of assets to corporations. Calculation of recognized gains and basic effects of asset contributions. Treatment of income and deduction items of corporate operations. Analysis of distribution of assets to shareholders with respect to their stock. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 535 Advanced Issues in Corporate Taxation (3) A continuation of 534. Fundamentals of moving assets out of and within corporate solution. Basics of corporate reorganizations: acquisitive and divisive. The details of the election to obtain (or avoid) the Section 338 election are explored in detail. Prerequisite: undergraduate accounting concentration or equivalent; ACCTG 534 or permission of instructor.

ACCTG 536 Advanced Issues in Corporate Taxation (3) Continuation of 534 and 535. Study of complex issues in corporate taxation planning. Substantial portion of course involves resolving case studies to improve analytic skills and to interrelate disparate corporate planning opportunities. Corporate reorganizations are analyzed in detail. Prerequisite: undergraduate accounting concentration or equivalent; ACCTG 535 or permission of instructor.

ACCTG 537 Income Taxation of Conduits I (3) Tax consequences to owners and entity from formation, operation, distributions from, and liquidation of partnerships and S corporations. Study of taxable and tax-free formations, nature of "bottom line" income and separately stated items, changes to owners' tax basis, basics of non-liquidating and liquidating distributions. Prerequisite: undergraduate accounting concentration or equivalent. Offered: W.

ACCTG 538 Income Taxation of Conduits II (3) A continuation of 537. Study of complex issues in partnership and S corporation taxation. Substantial portion involves resolving case studies to improve analytic skills and interrelate partnership and S corporation planning issues. Sections 751(b) and 736 examined in detail. Prerequisite: undergraduate accounting concentration or equivalent; 537 or permission of instructor.

ACCTG 539 Tax Research and Decision Making (4) Decision-making processes in relation to problems of taxation. Tools of tax analysis and research and the communication of conclusions flowing from professional tax work. Role of the professional accountant in client business transactions and in negotiations with taxing authorities is highlighted and simulated on the basis of actual case histories. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 540 Communications for Taxation Professionals (4) Introduction to the communications forms and to practices professional accountants and accounting managers. Development of effective written and oral skills employed in accounting presentations, such as audit reports and consultants' reports. Study of results of organizational communications research applicable to accounting firms and/or units within firms. Prerequisite: undergraduate accounting concentration or permission of instructor.

ACCTG 543 Income Taxation of Trusts and Estates (3) Development of fundamental skills regarding income taxation of trusts and estates. Calculation of distributable net income and the distribution deduction for the fiduciary entity. Basic analysis of the throw-back rules. Case studies. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 547 Estate and Gift Taxation (3) Development of fundamental knowledge of the unified transfer tax on the transfer of property from one person to another. Calculation of gross estate, adjusted gross estate, and taxable estate. Calculation of gift and estate taxes owing. Discussion of estate planning concepts. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 548 State and Local Taxation (3) Differences in definition of income at state and federal levels, treatment of state income taxes, piggyback for state income taxes, state tax rates, minimum tax, double taxation of income by home and host states, Uniform Division of Income for Tax Purposes Act, concept of nexus for taxation, multistate tax planning. Offered: S.

ACCTG 549 Employee Tax Problems and Deferred Compensation (3) Covers the tax issues facing employees and self-employed tax payers, including deferred compensation arrangements, fringe benefit packages, restricted property, independent contractor status, achieving favorable tax treatment of retirement plans, and substantiating employee business expenses. Offered: S.

ACCTG 560 Special Topics in Professional Accounting (1-4, max. 4) Lectures, discussion, and case analyses dealing with special current topics relevant to professional accounting. Satisfies the professional accounting elective requirement for the M.P.Acc. degree program. Prerequisite: permission of instructor.

ACCTG 562 Accounting for Business Combinations in a Global Marketplace (4) The examination of acquisitions and mergers in a global context. Explores the issues involved in accounting for domestic and foreign equity investments, partnerships with respect to financial statement interpretations.

ACCTG 564 Governmental Accounting (4) Budgetary and financial accounting/reporting as applied at the state, local, and special-purpose governments; financial accounting and reporting for not-for-profit organizations.

ACCTG 566 Issues in International Accounting (4) Insights into the conceptual, managerial, professional, and institutional issues of international accounting. Focus on current topics in international accounting and on the cultural, managerial, and governmental forces that shape both internal and external accounting in specific countries.

ACCTG 568 Advanced Management Accounting (4) Discussion and analysis of costing techniques, use of accounting data in planning and evaluating managerial performance, and use of accounting data in short-term and long-run decisions. Special attention directed to issues in human behavior involved in cost allocation, budgeting, and performance evaluation. Prerequisite: ACCTG 502.

ACCTG 575 Internship (14) Professional internship in graduate accounting program. Prerequisite: enrollment in MPAcc program, accounting and assurances track.

ACCTG 576- Independent Research Project Proposal (2-) Topic identification and development for research project to be completed in ACCTG 577. Prerequisite: enrollment in MPAcc program, accounting and assurances track.

ACCTG -577 Independent Research Project Proposal (-4) Development and completion of independent research project. Topic identification and proposal approval completed in ACCTG 576. Prerequisite: enrollment in MPAcc program, accounting and assurances track; ACCTG 576.

ACCTG 580 Introduction to Accounting Research (4) Examination of research problems and techniques in accounting. Interdisciplinary nature of accounting research emphasized. Work in finance, economics, and psychology used to develop current trends in accounting research. Prerequisite: doctoral student status.

ACCTG 581 Seminar in Managerial Accounting (4) Critical examination of conceptual and practical issues of cost and managerial accounting. Specific topics may change from quarter to quarter, and they include application of behavioral, quantitative, and economic models to managerial accounting problems. Prerequisite: ACCTG 511 or permission of instructor.

ACCTG 596 Seminar in Financial Accounting Research (4) Review and critical analysis of research strategies and methods applied to problems in financial reporting practice and financial accounting standard setting. Prerequisite: doctoral student status and ACCTG 580 or equivalent or permission of graduate office.

ACCTG 597 Seminar in Managerial Accounting Research (4) Critical analysis of current managerial accounting research, both published and unpublished. Prerequisite: doctoral student status and 581 or equivalent or permission of graduate office.

ACCTG 599 Doctoral Seminar in Accounting (1, max. 12) Study and research in advanced topics of Accounting. The seminar is generally concerned with unpublished areas of research as well as research methodology and philosophy. It is conducted by departmental faculty and occasional distinguished visiting faculty. Prerequisite: doctoral student status.

ACCTG 600 Independent Study or Research (*, max. 10)

Administration

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

ADMIN 510- Integrative Administration ([1-15, max. 15]-) *Huber* Includes materials basic to study and analysis of administration in organizations; organization theory and administrative behavior; human resources management; resource allocation, accounting, and financial control, systems operation and analysis; marketing; governmental-societal framework; policy formulation and strategic planning. Faculty team-teaching approach. Not open to business administration majors. Credit/no credit only.

Business Administration

B A 410 Business Advantage (10) Four-week integrative course which focuses on business basics—finance, accounting, marketing strategy and human resources. Team-taught by faculty experts using case discussions, lectures, and student presentations.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

B A 500 Business Administration I (16) Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

B A 501 Business Administration II (16) Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

B A 502 Business Administration III (10) Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

B A 541 Environmental Management I (4) Survey of environmental ethics, environmental laws and regulation, the economics of environmental decisions, and the relationship of business to public policy and the environment. Must be taken concurrently with B A 544. Prerequisite: permission of instructor.

B A 542 Environmental Management II (4) Applications of the functional areas of business to environmental concerns. Major federal legislation affecting these concerns applied to business problems in the areas of accounting, finance, marketing, management information systems, and organizational behavior. Must be taken concurrently with 544. Prerequisite: B A 541 or permission of instructor.

B A 543 Environmental Management III (4) Case studies that integrate the fundamentals of business and environmental management to address such issues as plant siting, regulatory compliance, production line changes, and innovative, proactive responses to environmental issues. Case studies include results of student consulting projects and a capstone case in environmental management. Must be taken concurrently with 544. Prerequisite: B A 542 or permission of instructor.

B A 544 Environmental Management Seminar (1, max. 3) Guest lecturers from academia, business, government, and advocacy groups discuss environmental science, ethics, law, regulation, economics, finance, accounting, and policy issues. Seminar topics supplement course material in 541, 542, 543 which are to be taken concurrently.

B A 545 The Global Business Forum: Current Issues in Global Business (1, max. 3) Discussion of current trends in the global business environment and of international issues facing companies. Leaders from international businesses and other organiza-

tions, as well as faculty members from various departments and specializations, invited to share their perspectives with seminar participants. Topics change each quarter.

B A 560 Cooperative Education in Business (1) Business practicum: internship with approved business or governmental agency. Open only to students who meet requirements of internship program. Internship credit may not be applied to fulfill specific course requirements or to credits required for graduation. Credit/no credit only. Offered: S.

B A 700 Master's Thesis (*)

B A 800 Doctoral Dissertation (*, max. 10)

Business Administration Research Methods

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

BA RM 580 Applied Econometrics I (4) 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, and hypothesis testing. Prerequisite: STAT 342 or STAT 395 or STAT 481, or permission of instructor.

BA RM 581 Applied Econometrics II (4) Continuation of 580. Measurement errors, distributed lags, and simultaneous equation models. Prerequisite: BA RM580.

BA RM 590 Behavioral Research Methods-Theory and Design (4) Philosophy of science, development of scientific method, and meaning of behavioral research. Historical perspective of scientific investigation and the evaluation of research. The development of theory and its relationship to research. Various strategies and designs in behavioral research. Prerequisite: STAT 361, STAT 362, or permission of instructor.

BA RM 591 Behavioral Research Methods-Approaches and Applications (4) 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. Prerequisite: STAT 361, STAT 362, or permission of instructor.

Business Communication

B CMU 410 Business Reports and Other Specialized Communications (4) Covers both internal and external communications that businessmen and businesswomen write on the job. Emphasis 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: B CMU 301; may not be repeated.

B CMU 490 Special Topics in Business Communications (1-6, max. 12) Students and faculty focus on current topics of concern. Prerequisite: B CMU 301.

B CMU 499 Research in Business Communications (1-6, max. 9)

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

B CMU 510 Business Communications for Managers (4) Seeks to develop understanding of communications and related theories, to describe strategies for planning managerial communications, and to build skills in oral and written reporting and persuading.

Business Economics

B ECON 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: either B ECON 301 or ECON 301; may not be repeated.

B ECON 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- and long-term international financing. Prerequisite: either B ECON 300 or ECON 300; either B ECON 301 or ECON 301; may not be repeated.

B ECON 490 Special Topics in Business Economics (1-6, max. 6) Study and research on topics of current concern to faculty and students. Only offered when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings.

B ECON 499 Undergraduate Research (1-6, max. 9) Research in selected areas of business economics. Recommended: either ECON 301 or B ECON 300 and B ECON 301.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

B ECON 500 Introduction to Business Economics (4) Factors underlying the determination of cost and prices for the industry and the firm, demand and supply analysis and firm behavior. The relation of the economic environment to the microeconomic decisions of the firm.

B ECON 501 Macroeconomics and Global Issues (4) Analysis of real and monetary factors affecting national and international economics, supply and demand for money, interest rates and stabilization problems and policies, in relation to government policy effects on business and individual affairs. Focuses on global macroeconomic issues. Prerequisite: B ECON 500.

B ECON 520 Financial Markets (4) Analysis of the structures and functions of financial markets and institutions; the behavior of interest rates through time; the cross-sectional structure of interest rates; and the roles of the Federal Reserve and Treasury in financial markets. Prerequisite: FIN 509.

B ECON 526 Competing in the Global Economy (4) Examines the global environment for business and the challenges facing managers in this environment. Explores the implications of the common phrase "think globally—act locally." Offered: jointly with MGMT 526; WSp.

B ECON 527 International Finance and Investments (4) Study of selected problems in financing, international trade, investment, and foreign business operations; international aspects of money markets; problems of evaluation of foreign investments.

Prerequisite: either B A 502 or both B ECON 501 and FIN 502.

B ECON 528 International Financial Management (4) Analysis of financial problems facing businesses engaged in international activities: financing foreign investment, financial control of foreign operations, and working capital management including foreign exchange positions using cases and readings. Prerequisite: FIN 509.

B ECON 579 Special Topics in Business Economics (2/4, max. 12) Business economics topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offering. Prerequisite: permission of instructor.

B ECON 600 Independent Study or Research (*, max. 10)

Business Policy

B POL 470 Business Policy (4) Policy making and administration from a general management point of view. Emphasis is on problem analysis, the decision-making process, administration and control, and continuous reappraisal of policies and objectives. This course integrates and builds upon the work of the core curriculum. Prerequisite: FIN 350; MKTG 301; either HRMOB 300 or HRMOB 400; recommended: OPMGT 301. Offered: AWSp.

B POL 471 Entrepreneurship (4) Entrepreneurship presents the real challenges of starting new businesses, focusing on the skills and contacts an entrepreneur needs to develop ideas. The many facets of entrepreneurship—organization form, funding sources, the start-up team, the product launch—are illustrated through field and case studies and guest speakers. Prerequisite: FIN 350; MKTG 301; either HRMOB 300 or HRMOB 400; recommended: OPMGT 301. Offered: AWSp.

B POL 472 Business Planning for Entrepreneurs and Product Managers (4) Focuses on the process of developing and selling the new venture's business growth plan. Also covers franchising and business acquisition. Students develop their own business plans for venture concepts. Prerequisite: B POL 471.

B POL 473 Practicum in Entrepreneurship (4) Explores requirements and challenges in establishing a business in the State of Washington. Broad areas of interest include developing business concepts, marshalling resources, startup actions, and strategic and operation planning. Recommended: B POL 472.

B POL 474 Small Business Management (4) Explores entrepreneurial activities within the special environment of the small firm and family-owned companies. Combines case studies with field projects assisting companies in the Puget Sound area.

B POL 490 Special Topics in Business Policy (1-6, max. 6) Study and research topics of current interest to faculty and students. Offered only when faculty is available and student interest is sufficient. Class is announced in advance of scheduled offerings.

B POL 499 Undergraduate Research (1-6, max. 9)

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

B POL 509 Foundations of Entrepreneurship (2) Evaluation of new market opportunities and starting a new venture, focuses on identifying and evaluating new venture opportunities, developing and testing

market strategies, evaluating test market performance, and evaluating business plans. Emphasizes the interplay between marketing, manufacturing, finance, accounting and team management. Prerequisite: Permission of School of Business Administration. Offered: Sp.

E-Business

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

EBIZ 501 E-Business Marketing (4) *Schlosser* Uses current strategies for Internet marketing and explores new frontiers. Topics include examining the history, culture, and design of the Internet and the resulting impact on marketing; Web-based business models; consumer demographics; Web usage behavior; privacy issues; brand loyalty; virtual communities; and commercial Web site effectiveness metrics. Offered: W.

EBIZ 502 E-Business Technology (4) *Mookerjee* Examines the underlying information technologies that are driving the e-business revolution, including the overall technical infrastructure required to execute an e-business solution. Taught via lectures, projects, and hands-on sessions in the E-Business lab. Students implement and manage an e-business site. Offered: A.

EBIZ 503 E-Business Economics (4) *Rice, Schall, Tarhouni* Uses economic principles to assess the implications of evolving Internet technology for business decision-making, market prices, and market structure. Develop theoretical extensions of the models covered in B A 500 to analyze the questions that the Internet poses. Includes a group paper and a group evaluation of an Internet company. Offered: W.

EBIZ 504 E-Business Strategy (4) *Kotha* Integrates issues pertaining to management of technology and entrepreneurship: the emergence of the global digital economy and its impact on commerce, business models in e-commerce, "netpreneurship" and its place in existing corporations. Lectures and featured speakers from online Seattle firms, case discussions, and group projects. Offered: ASP.

EBIZ 509 Foundations of E-Business (2) Examines the fundamental technologies associated with business-to-consumer and business-to-business interaction and delivery of content via the Internet. Contrasts clients- versus server-side approaches to database processing and XML, and execution of business rules and logic. Includes experience with the various technologies. Prerequisite: Permission of School of Business Administration. Offered: Sp.

Entrepreneurship

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

ENTRE 510 Entrepreneurial Ventures (4) Uses the tools of competitive strategy to analyze the success and failure of entrepreneurial ventures, identifying general strategic principles that might increase the probability that an entrepreneurial venture will succeed. Draws heavily on the principles of microeconomics and strategy. Prerequisite: B A 500; B A 502.

ENTRE 511 Entrepreneurial Marketing (2) Focuses on marketing issues related to the generation and development of innovative ideas, assessment of feasibility, implementation and execution, and valuation of business ventures, highlighting the real world

applications by new ventures. Prerequisite: B A 501 and entrepreneurial bridge course.

ENTRE 521 Corporate Entrepreneurship (4) Focuses on entrepreneurial activities in large, established corporation. Introduces the theory and best practices on the process of converting new ideas to commercial products and new businesses. Prerequisite: B A 500; B A 501; B A 502.

ENTRE 530 New Venture Creation and Managing Growth (4) *Song* Focuses on gaining experience in market analysis, new venture strategy formulation, and the management of a new venture. Topics include building an entrepreneurial firm, market opportunity analysis, product testing, developing and executing business plans, venture financing, and managing a growing company. Prerequisite: B POL 509; B A 501. Offered: `W.

ENTRE 531 Developing Business Models for Emerging Technologies (4) *Song* Focuses on the commercialization of emerging technologies. Topics include conducting feasibility assessments of intellectual property landscape, evaluating business opportunities, analyzing competition, developing business models and strategies, constructing a professional quality business plan, and presenting a market-ready technology-based business. Offered: W.

ENTRE 557 Entrepreneurial Finance (4) Analyzes the unique financial issues facing entrepreneurial firms. Topics include assessing financial performance, financial forecasting and planning, financial management of rapidly growing businesses, start-up ventures, valuation, sources of financing, venture capital, initial public offerings, and the decision to harvest. Prerequisite: MBA core courses. Offered: jointly with FIN 557.

ENTRE 579 Special Topics in Entrepreneurship (2-4, max. 12) Topics vary. Offered only when faculty members are available and there is sufficient student interest.

ENTRE 600 Independent Study or Research (*, max. 10)

Finance

FIN 423 Banking and the Financial System (4) Role of banks and nonbank financial institutions in the financial system; asset choices of banks and non-bank financial institutions; problems in the management of financial institutions with emphasis on commercial banks. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 450 Problems in Corporate 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. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

FIN 453 Financial Theory and Analysis (4) Business financial strategic planning. Topics include business valuation and financing, performance evaluation, risk analysis, capital budgeting, and inflation and taxes. Emphasizes tools with real-world applications while incorporating modern finance concepts. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 460 Investments (4) Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities portfolios, and

total wealth. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 461 Financial Futures and Options Markets (4) Introduction to financial futures and options markets. Institutional aspects and social functions of these markets, pricing of options and futures, and risk shifting by hedging. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 490 Special Topics in Finance (1-6, max. 6) Study and research on topics of current concern to faculty and students. Only offered when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings.

FIN 499 Undergraduate Research (1-6, max. 9) Research in selected areas of business finance, money and banking, or investments, with permission of instructor. Recommend: FIN 350; either B ECON 300 or ECON 300.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

FIN 502 Business Finance (4) Financial management of the firm, including capital budgets, working capital analysis, and financing policy. Prerequisite: ACCTG 500, B ECON 500, QMETH 500.

FIN 509 Foundations of Asset Valuation (2) Introduction to valuation, focusing on topics in asset-pricing, fixed income, financial options, and international markets. Emphasizes both theoretical and applied concepts. Course material prepares students for advanced topics covered in the finance electives. Prerequisite: Permission of School of Business Administration. Offered: Sp.

FIN 550 Advanced Business Finance (4) Systematic coverage of key theoretical issues in financial management. Application of quantitative analysis to financial problems of the firm that are important in practice, including issues related to financing and investment. Prerequisite: FIN 509.

FIN 551 Problems in Business Finance (4) Uses case studies to examine a broad range of financial management topics, including forecasting financial statements, use of bank credit, working capital management, public and private securities issues, capital budgeting, and business valuation. Prerequisite: B A 502.

FIN 552 Problems in Corporate Planning and Financing (4) Uses case studies to examine business financing. Topics include financial statement analysis, financial planning and forecasting, banking relationships, and financing sources, including the use of derivative securities, venture capital, and private equity. Cannot be taken for credit in combination with FIN 551. Prerequisite: FIN 509.

FIN 553 Problems in Capital Investment Planning (4) Case discussions used to examine corporate resource allocation decisions. Topics include capital budgeting techniques, estimation of capital costs, capital budgeting systems, strategic investment decisions, and financial restructurings. Prerequisite: FIN 509.

FIN 555 Financing Decisions, Payout Policy, and Corporate Control (4) Analysis of business financing methods, payout policy, management compensation, ownership structure, and the distribution of control rights. Covers the major issues critical to structuring contracts within the corporation. Prerequisite: FIN 509.

FIN 556 Business Valuation and Investment Analysis (4) Valuation of business enterprises, evaluation of financial performance, analysis of complex

investment opportunities, business taxation, leasing, and business acquisitions. Emphasis on complications encountered in practice. Prerequisite: FIN 509.

FIN 557 Entrepreneurial Finance (4) Analyzes the unique financial issues facing entrepreneurial firms. Topics include assessing financial performance, financial forecasting and planning, financial management of rapidly growing businesses, start-up ventures, valuation, sources of financing, venture capital, initial public offerings, and the decision to harvest. Prerequisite: MBA core courses. Offered: jointly with ENTRE 557.

FIN 560 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: FIN 509.

FIN 561 Financial Futures and Options Markets (4) Overview of futures markets and options markets. Analysis of pricing of futures contracts and options; comparison of futures, forward, and options contracts; risk management with hedging; alternative investment strategies; and review of empirical evidence. Prerequisite: FIN 509.

FIN 562 Management of Financial Risk (4) Modern tools for managing financial risk. Fixed income securities and interest rate risk, credit risk, foreign currency risk, and insurance. Emphasis on use of futures, forwards, swaps, and option contracts. Prerequisite: FIN 509.

FIN 579 Special Topics in Finance (2/4, max. 12) Finance topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offerings. Prerequisite: permission of instructor.

FIN 580 Doctoral Seminar in Financial Economics (4) 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. Prerequisite: ECON 500 or permission of instructor.

FIN 590 Doctoral Seminar in Capital Market Theory (4) Decision making under uncertainty, information and capital market efficiency, portfolio theory, capital asset pricing model, arbitrage pricing model, and options pricing model. Prerequisite: ECON 500 or permission of instructor.

FIN 591 Doctoral Seminar in Corporate Finance (4) Principles of intertemporal choice, alternative valuation models, theory of investment under uncertainty, impact of dividend and financing decisions on firm valuation in perfect and imperfect markets, and theory of firm organization and agency costs. Prerequisite: FIN 590 and BA RM 581 or ECON 582 or permission of instructor.

FIN 592 Doctoral Seminar in Financial Research (4) Empirical research in finance with emphasis on methodology and scientific method. Empirical research in market efficiency, capital asset pricing model, options pricing model, and impact of firm's dividend and financing decisions on firm value. Prerequisite: FIN 590 and BA RM 581 or ECON 582 or permission of instructor.

FIN 599 Doctoral Seminar in Finance (1, max. 12) Study and research in advanced topics of finance. Generally concerned with unpublished areas of research, conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

FIN 600 Independent Study or Research (*, max. 10)

Human Resources Management and Organizational Behavior

HRMOB 410 Staffing (4) Affirmative action, recruitment, testing, interviewing, placement, promotion, and overall human resource planning.

HRMOB 415 Performance Appraisal and Compensation (4) The various kinds of systems used by organizations to evaluate and reward employee performance. Job analysis, job evaluation, setting performance standards, giving appraisal feedback, designing incentive systems, administering a salary plan.

HRMOB 420 Collective Bargaining and Arbitration (4) Labor-management relations. The legal context, union organizing, grievance administration, collective bargaining. Individual and group simulations used.

HRMOB 450 Leadership and Decision Making (4) The manager as leader and decision maker. Various leadership theories, styles, and behaviors. Decision-making models and techniques.

HRMOB 460 Negotiations (4) The art and science of negotiations with the goal of making students more effective negotiators in a variety of business situations, such as budget negotiations, buying and selling, contracts, and merger negotiations. Concept and skill development.

HRMOB 470 Motivation and Performance (4) Various strategies for influencing employee motivation and performance. Reward systems, goal-setting procedures, and various techniques to enlarge and enrich ones job. Effects of these formal and informal strategies on job attitudes.

HRMOB 475 Organization Development and Change (4) Provides a conceptual understanding of organization development theory, practice, and research. Organization development is an umbrella term for a collection of behavioral science techniques for increasing individual, group, and organizational effectiveness.

HRMOB 490 Special Topics in Human Resources Management and Organizational Behavior (1-6, max. 6) Topics of current interest to faculty and students. Offered when allowed by faculty availability and sufficient student interest. Content announced in advance of scheduled offerings.

HRMOB 499 Undergraduate Research (1-6, max. 9)

Information Systems

I S 423 Object-Oriented Systems (4) Covers the design and programming of object-oriented application software. Includes introduction to object-oriented principles, representing objects in software, object management, object analysis and design, construction of object-oriented applications, and use of object-oriented language to program working applications. Prerequisite: 3.5 in I S 320; may not be repeated.

I S 460 Systems Analysis and Design I (4) First course in analysis and design of business information systems. Concentrates on analysis phase of systems development. Systems development life cycle, the feasibility study, analysis of user requirements, and the development of a logical model for the sys-

tem under study. Prerequisite: I S 320; may not be repeated.

I S 461 Systems Analysis and Design II (4) Second course in analysis and design of business information systems. Concentrates on design and implementation phases of systems development. Translation of logical system model into physical model, design of modules, file design, testing, implementation. Includes a project using third- and fourth-generation software development tools. Prerequisite: I S 460; may not be repeated.

I S 470 Business Data Communications (4) Technology and applications of business data communications including characteristics of data, fundamentals of transmission, communications hardware and software, common-carrier services, network configurations (LAN, MAN, WAN), design, management, and security. Exercises in use of information retrieval/distribution systems, file transfer, and Internet resources. Prerequisite: I S 320; may not be repeated.

I S 480 Database Management (4) Concepts of physical and logical data base organization. Physical file structures used in data management. Logical data models, including hierarchical, network, relational. Data base design, data dictionaries, data manipulation languages. Exercises in design, implementation, and use of data base systems. Survey of commercial data base management systems. Prerequisite: I S 320; may not be repeated.

I S 490 Selected Topics in Information Systems (1-6, max. 20) Topics of current concern to faculty and students. Potential topics include networks and distributed information-processing systems, office automation, artificial intelligence and knowledge-based systems, new approaches to systems development, fourth- and fifth-generation languages, economics of information systems. Prerequisite: I S 320.

I S 495 Practical Experience in Information Systems (1-4, max. 8) Undergraduate substantive I S internship and mentorship. Internships can be repeated up to two quarters for maximum of 4 credits; grades based on weekly status reports, paper, demonstration of knowledge. Mentorship program (maximum 1 credit/quarter) allows student to be matched with I S executive; grade based on status reports, other participatory events.

I S 499 Undergraduate Research (1-6, max. 12) Selected problems in information systems and computer applications.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

I S 504 Computer-Based Information Systems for Management (4) Introduction to information systems and computer technology. Covers concepts of information use in decision making. Use of decision-support problem-solving tools (e.g., spread sheet, database software). Management's responsibility in defining, developing, using information systems is focal point.

I S 530 Management of Information Systems Resources (4) Topics include general control problem in organizations; performance evaluation of data processing managers; technology and cost trends; software cost estimation; capacity planning; short term utilization; queuing and associated externalities; issues in centralization and decentralization of the information system facilities. Prerequisite: B A 501 or I S 504 or equivalent.

I S 545 Database Systems and Applications (4) Logical data models, relational database systems, structured query language (SQL), conceptual model-

ing, database design, transaction management, distributed and heterogeneous systems, data warehousing, data mining, database administration issues. Focuses on the use and management of business data as an organizational resource. Prerequisite: B A 502 or I S 504.

I S 560 Information Systems Development (4) Offers comprehensive look at information systems development from the initial stage of defining requirements to final evaluation of installed systems. Topics include analysis of user requirements, development of logical system model, translation of logical systems model into physical system model, testing, and implementation. Prerequisite: B A 501 or I S 504 or equivalent.

I S 570 Business Data Communications and Networking (4) Networking basics, Internet/Web-based services, client-server architecture, fundamentals of transmission, networking protocols, physical layer, data-link layer, local-area networks, backbone networks, internetworking devices, metropolitan and wide-area networks, wireless networking, network security, network analysis and management. Combines technical, operational, and management issues in data communications. Prerequisite: B A 502 or I S 504.

I S 579 Selected Topics in Information Systems (2/4, max. 12) Topics of current concern to faculty and students. Potential topics include networks and distributed information-processing systems, office automation, artificial intelligence and knowledge-based systems, new approaches to systems development, fourth- and fifth-generation languages, economics of information systems. Prerequisite: B A 501 or I S 504 or permission of instructor.

I S 585 Advanced Database Research (4) Introduces topics of interest in database research including heterogeneous database, derived data management, expert database systems, logical and physical database design, formal languages for data manipulation, and temporal databases. Prerequisite: doctoral student and previous course work and experience with database management system or permission of instructor.

I S 588 Advanced Expert Systems (4) Study of methodological, behavioral, and economic considerations of uncertainty handling in expert systems. Topics include the Certainty Factor model, the Dempster-Shafer theory, and probabilistic belief networks. Prerequisite: doctoral student and introductory knowledge of a programming language and basic probability theory or permission of instructor.

I S 599 Doctoral Seminar (1, max. 12) Advanced topics of information systems. Generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

I S 600 Independent Study or Research (*, max. 10)

International Business

I BUS 440 Business in Asia (4) Major aspects of the Asian business environment and how Asian enterprises are managed. Problems and opportunities of foreign corporations in Asia. Prerequisite: I BUS 300; may not be repeated.

I BUS 470- Management of International Trade Operations (4-, max. 8) Integrated study of international trade functions, practices, concepts, management, strategy, and policy. The approach utilizes lectures, case studies, research, guest speakers, and extensive practical application. Designed as a two-quarter sequence. Students may enroll at the begin-

ning of any quarter, summer included. Prerequisite: I BUS 300.

I BUS 480 Multinational Operations Management

(4) Case studies in foreign operations management: planning international objectives and strategies; developing multinational company structures and executives; adapting administrative practices and operating policies to international diversities. Prerequisite: I BUS 300; may not be repeated.

I BUS 490 Special Topics in International Business

(1-6, max. 12) Students and faculty focus on current topics of concern. Offered when faculty, student interest, and availability allow. Prerequisite: I BUS 300.

I BUS 491 CISB Track Seminar (1, max. 6)

Students meet with business community leaders to discuss international aspects of their companies. Allows for networking and sharing experiences with other students as well as practicing foreign languages. Credit/no credit only.

I BUS 495 International Business Practicum (4)

Offers students opportunity to apply principles, concepts, and skills learned previously to actual business situation. Working on projects provides students an exposure to the issues and choices facing managers operating in an international business environment.

I BUS 499 Undergraduate Research (1-6, max. 9)

Prerequisite: I BUS 300.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

I BUS 509 Foundations of International Business

(2) Introduction to governmental and organizational forces shaping international business. Considers the issues of trade, direct foreign investment, balance of payments, and comparative advantage. Looks at economic policies of governments and multilateral organizations such as WTO, IMF, and World Bank. Prerequisite: permission of School of Business Administration. Offered: Sp.

I BUS 520 International Trade Policy (4)

Examines issues important to trade policy. Topics include trade policy basics, tariffs and non-tariff barriers, safeguards, voluntary restraints, dumping, subsidies and strategic trade theory, agricultural trade, developing country rules, regionalism, and services. Prerequisite: B A 500 or course in international economics, trade, or international finance, or permission of graduate office.

I BUS 530 International Business in Less Developed Countries (4)

Understanding the economic, sociocultural, and political environment in the less developed countries. Problems of international trade and investment, north-south relations, commodities, technology transfer, foreign aid, and capital flows. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

I BUS 550 International Business Consulting (4)

Research, analysis, and report on a specific international business project with an existing organization involved with international trade. Possible tasks include identifying most viable foreign target markets, developing best market entry strategies, establishing international terms and conditions of sale, and completing a preliminary marketing or business plan for clients.

I BUS 560 Multinational Business Management (4)

Managerial responses to problems of international business organizations and operations. Strategy formulation in an international context; design and control of multinational organization; adaptation of management systems and policies to different economic,

sociocultural, and political environments. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

I BUS 570 International Study Tour (2)

Educational international study tour. Includes pre-tour and post-tour activities. Prerequisite: B A 502 and permission of School of Business Administration.

I BUS 579 Seminar: Special Topics in International Business (2/4, max. 12)

Application of international business principles to the analysis of a specific issue in trade or resource transfer, or to the business conditions in a particular country. Japan and other Pacific Rim countries are frequent topics. Prerequisite: B A 500 or permission of instructor.

I BUS 600 Independent Study or Research (*, max. 10)

Management

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

MGMT 500 Management and Leadership (4)

Behavioral aspects of management with emphasis on leadership, motivation, and decision making. May include communication, conflict management, group dynamics, and organizational change.

MGMT 502 Business Strategy (4)

Policy decisions and strategic leadership from the general management point of view. Determination of corporate product-service objectives, development of a network of internal operating policies and methods to achieve objectives at a cost satisfactory to the consumer and to society. Prerequisite: all first-year required courses in MBA curriculum.

MGMT 505 Business Ethics (2)

Business organization's political, social and legal environments. Critical managerial issues from historical, theoretical, and social/ethical perspectives. Corporate political power, corporate boards of directors, industrial power, social responsibility, business ethics, roles of the corporation in society, themes of change.

MGMT 520 Designing a Corporate Strategy (4)

Addresses the broad question: what business(es) should we compete in? Focuses on decisions related to an appropriate level of diversification and the means by which that diversification is implemented. Includes the following issues: mergers and acquisitions, strategic alliances, joint ventures, LBOs, and spin-offs.

MGMT 521 Strategic Management of Technology and Innovation (4)

Dooley, Steensma Examines how innovative firms often experience rapid and disruptive levels of growth and change and how without effective management of new technologies, the boom can quickly turn to bust. Investigates the micro-economic drivers of competition in technology industries, explores how technological change affects competition, and examines the implications for competitive strategy. Offered: WSp.

MGMT 523 Business Ethics in a High Technology Environment (4)

Examines business ethics from philosophical, theoretical, and pragmatic perspectives. Explores ethical theory and values in business. Attempts to place ethical concepts into a framework useful to practicing managers. Places emphasis on the ethical implications of rapidly changing hi-tech environments such as e-commerce and biotech.

MGMT 526 Competing in the Global Economy (4)

Dewenter, Steensma Examines the global environment for business and the challenges facing man-

agers in this environment. Explores the implications of the common phrase "think globally—act locally." Offered: jointly with B ECON 526; WSp.

MGMT 530 Entrepreneurship (4)

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.

MGMT 531 Managing Intellectual Property Rights

(4) Comprehensive analysis of the issues pertinent to the various forms of intellectual property, including how to recognize, develop, maintain, and capitalize on them.

MGMT 536 Software Entrepreneurship (4)

Case- and project-based course. Focuses on starting a software or hardware company. Guest entrepreneurs, lawyers, and financiers discuss market identification and analysis, planning the business, financing, and typical operating and administrative problems.

MGMT 540 Managing Human Capital (4)

Covers principles and techniques for recruiting, selecting, and developing employees, appraising their performance, and rewarding their contributions. Explores key topics primarily through case studies, readings, class discussion, and fieldwork. Reviews legal and regulatory issues that surround these methods. Intended for both general managers and human resource professionals.

MGMT 544 Managing Effectively Across Cultures

(4) *Chen* Examines how, with increasing globalization of business, employees at all levels of corporations often work and interact with people from different nations, cultures, and how they need an understanding of cross-cultural management and challenges of international settings. Focuses on international organizational behavior and international human resource issues, practices. Offered: W.

MGMT 545 Leading and Managing High-Performance Organizations (4)

Focuses on the nature and function of effective leadership in high-performance systems. Includes visionary and transformational leadership, decision-making and empowerment, power and influence in organizations desiring flexibility and innovation, and leading organizational change. Places emphasis on leadership of emerging forms of organization such as learning organizations, virtual organizations, and networks.

MGMT 546 High Involvement Employees (4)

Focuses on two domains: (1) how managers can lead and motivate their people; and (2) how actual organizations, particularly high technology and entrepreneurial firms, employ these strategies. Specific topics include commitment, involvement, enthusiasm, effort, participation, citizenship, and performance. Student teams investigate how local companies utilize these ideas.

MGMT 547 Successful Negotiations (2)

Focuses on a broad array of conflict resolution skills needed for effective management in a constantly changing business environment. Examines methods of conflict resolution—bargaining, distributive and integrative negotiation, mediation, and arbitration. Applies these tools to managerial challenges such as employment contracts, buyer-seller agreements, and mediated and arbitrated agreements.

MGMT 548 Dealmaking in High Velocity Ventures

(2) Focuses on negotiations in ventures that lack conventional customers, suppliers, employees, joint-venture partners, strategic allies, and money. Analyzes negotiations with early potential customers and essential suppliers, sources of funding (e.g., "angels" and venture capitalists), critical partners

and/or strategic allies (including established firms), and key employees. Prerequisite: MGMT 547.

MGMT 549 Dealmaking in the Global Arena (2) For students who expect to engage in significant international business negotiations. Includes deal-structuring skills needed in a range of cross-border transactions and relationships. Individual segments develop broad analytical themes, cross-cultural dimensions, and distinctive national approaches to corporate governance and their impact on negotiating strategy. Prerequisite: MGMT 547.

MGMT 579 Special Topics in Management (2/4, max. 12) In-depth study and research on topics of special interest to faculty members and students in the fields of human resources management, organizational behavior, and strategic management. Offered on an ad hoc basis. Content announced before scheduled offering.

MGMT 600 Independent Study or Research (*, max. 12)

Marketing

MKTG 430 Sales Force Management (4) Sales and distribution planning; sales organization and training; management of the sales force; methods of sales, cost, and performance analysis. Prerequisite: MKTG 301; may not be repeated.

MKTG 450 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: MKTG 301; may not be repeated; recommended: either ECON 311, QMETH 201, STAT 220, STAT 301, STAT 311, or STAT 390.

MKTG 452 Marketing Issues for New Ventures (4) Examines the skills and tools entrepreneurs need for bootstrap marketing in their start-up firms. Students learn to identify target market segments, position their products, estimate demand, set prices, gain access to channels, and manage the issues of rapid growth. Prerequisite: MKTG 301; may not be repeated.

MKTG 460 Marketing Research (4) Marketing research process; preliminary steps and research design, questionnaires, secondary and primary data, sampling, processing and interpreting data, evaluation and effective presentation of findings. A class research project provides practical application of methods studied. Prerequisite: MKTG 301; either ECON 311, QMETH 201, STAT 220, STAT 301, STAT 311, or STAT 390; may not be repeated.

MKTG 465 Marketing Research Topics (4) Topics such as experimental design, market analysis, positioning and segmentation research, advertising research, forecasting, and new product research covered in varying depths, depending on instructor's emphasis. Prerequisite: MKTG 301; may not be repeated.

MKTG 470 International Marketing (4) Focuses on assessing international marketing opportunities, formulating and implementing international marketing strategies. Examines how to use marketing analyses and deductive decision modeling in assessing international marketing opportunities. Uses marketing tools and concepts in the planning, preparation, and presentation and discussion of cases and class project. Prerequisite: MKTG 301; may not be repeated.

MKTG 475 Retail Structure and Strategy (4) Analysis of the nature and scope of competition within and between sectors of retail trade. Emphasis is placed on the importance of demographic, environmental, and legal differences between geographical areas in determining the level of competition. Prerequisite: MKTG 370; may not be repeated.

MKTG 490 Special Topics and Issues in Marketing (1-6, max. 8) Contemporary topics and issues in marketing: marketing in nonprofit organizations, marketing of services, marketing in the public sector, and marketing in an economy of scarcity. Ordinarily only one topic area is addressed in any one quarter. Course content reflects contemporary developments and the current interests of instructors and students. Prerequisite: MKTG 301.

MKTG 499 Undergraduate Research (1-6, max. 9) Prerequisite: MKTG 301.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

MKTG 501 Marketing Management (4) Analysis and management of customer satisfaction in goods and services markets by profit and nonprofit organizations. Buyer behavior, market segmentation and product positioning, product policy, pricing, distribution, sales force and advertising management, and market research in the contexts of strategy development, decision making, implementation, and control.

MKTG 509 Foundations of Marketing Analysis (2) Examines analytical and statistical methods useful in strategic decision making in marketing. A dynamic computer simulation activity allows students to develop and receive feedback on competitive marketing strategies. Prerequisite: either B A 501 or MKTG 501. Offered: Sp.

MKTG 510 New Product Development (4) Integrates business, design, and engineering functions in the presentation and application of structures, tools, and methodologies important for successful new product development. New product development projects are accomplished with a cross-functional team emphasis. Prerequisite: B A 501.

MKTG 511 Business-to-Business Marketing (4) Integrated approach to product marketing management in the business-to-business marketplace. Analysis of core competencies, competitive environment, positioning and segmentation strategies, cost structure, and customer satisfaction. Case-based and project-oriented approach to studying marketing management in the business-to-business market. Prerequisite: B A 501 or permission of instructor.

MKTG 512 Consumer Marketing and Brand Management (4) Analysis of marketing strategies for consumer products and services. Focuses on consumer satisfaction and brand management including product line and brand developments, pricing strategies, channel and retail relationships, and marketing communication strategies for consumer goods and services. Prerequisite: B A 501.

MKTG 520 Marketing Channels (4) Channels of distribution decisions for goods and services in profit and nonprofit organizations. Considers methods of optimizing the number, quality of institutions and activities employed in dealing with exchange, and space and time aspects of channel management. Relates management of marketing channels to marketing mix, organizational objectives. Prerequisite: B A 501.

MKTG 530 Managing the Sales System (4) Management of the system of personal selling responsibilities and activities. Setting objectives, determining sales strategies; recruiting, selection,

and training of sales representatives; allocation of effort, supervision, compensation, and control. Emphasis on case studies. Prerequisite: B A 501.

MKTG 540 Advertising and Promotion Management (4) Management of advertising and promotional activities and their integration with other elements of the marketing mix. Topics include: understanding the communication process, analyzing markets, working with suppliers, establishing objectives, determining budgets, selecting media, measuring and evaluating effectiveness, using publicity and promotions. Legal, social, and economic consequences are considered. Prerequisite: B A 501.

MKTG 550 Managing Customer Relationships Through Director Marketing (4) Management of customer relationships through the lens of direct marketing. Topics include direct marketing creative activity, strategy, and execution; media and segmentation; direct marketing budgeting and financials; targeting, database, and predictive modeling; catalogue marketing; relationship marketing; business-to-business complex sales; privacy. Prerequisite: B A 501.

MKTG 555 Entrepreneurial Marketing and Management (4) Examines the skills and tools entrepreneurs need for bootstrap marketing in their firms. Covers how to target market segments, position products, estimate demand, set prices, gain access to channels, and manage issues of rapid growth. Prerequisite: B A 501.

MKTG 560 Research for Marketing Decisions (4) Methods and applications of marketing research incorporating analytical procedures and relevant concepts from behavioral and quantitative sciences. Deals with various aspects of research: problem definition, research design, questionnaire construction, sampling, and data analysis. Introduces promising new developments: multivariate techniques of data analysis, laboratory and field experimentation, and demand analysis in both business and public environments. Prerequisite: B A 501.

MKTG 565 Database Marketing and Decision Models (4) Examines methodologies that are useful for analyzing customer databases. Presents models that can be applied in the analysis of marketing problems and the support of marketing decisions. Prerequisite: B A 501.

MKTG 570 International Marketing (4) Analysis of the marketing strategies and tactics of multinational corporations. Choice of entry strategies for foreign markets, analyzing international competition at home and abroad, and developing global marketing strategies. Prerequisite: B A 501; recommended: one I BUS course.

MKTG 575 Marketing High-Technology Products (4) Management of the marketing requirements of high-technology products. Examines how markets for high-tech products involve shortened product life cycles, demand for continual product updates, perceived risk of adoption by customers, requirements for intensive customer service and relationships, and growing reliance on business partners. Prerequisite: B A 501.

MKTG 579 Special Topics in Marketing (2/4, max. 12) Marketing topics of current concern to faculty and students. Offered only when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings. Prerequisite: B A 501.

MKTG 581 Doctoral Seminar in Consumer Behavior (4) *Loiie, Yalch* Survey of the field of consumer behavior introduces fundamental topics in consumer behavior including cognitive processes, emotion, and consumer satisfaction. Provides exposure to a variety of research methods including experiments, surveys, and phenomenological research.

MKTG 582 Doctoral Seminar in Multivariate Analysis for Marketing Research (4) *MacLachlan, Moineau* Survey of methods useful for empirical evaluation of multivariate marketing phenomena and relationships. Includes an overview of measurement theory and practice; multidimensional scaling; conjoint analysis; cluster, factor, and discriminant analyses; multivariate analysis of variance; structural equation modeling; and other methods commonly encountered in academic marketing research.

MKTG 583 Doctoral Seminar in Marketing Strategy (4) *Jacobson, Song* Study of factors influencing business performance and role of marketing in achieving competitive advantage. Analysis of prevailing, and emerging, theories underlying strategic thinking and competitive process. Examination of empirical research regarding measurement, level, and persistence of business success and implications of findings for theory and strategy development. Prerequisite: BA RM 580.

MKTG 584 Doctoral Seminar in Marketing Systems (4) Examines fundamental and institutional dynamics within marketing systems. Addresses market intermediation, including conditions under which institutions survive, flourish, or retreat and relevant forces on marketing systems including public policy, transportation, infrastructure, information and communications systems, business cycles, levels of economic development, international trade. Prerequisite: B A 500 or permission of instructor.

MKTG 591 Doctoral Seminar in Consumer Behavior Research Topics (4) *Louie, Yalch* Investigates research topics of current interest in consumer behavior. Considers the processes used by consumers to acquire and evaluate marketing information including advertising, publicity, word of mouth, packaging, product description, price, and retail outlets, and examines ways the principles in social perception influence consumers' individual responses to marketing-related activities.

MKTG 593 Doctoral Seminar in Marketing Models (4) *Erickson* Focuses on modeling research efforts in various areas of marketing. Discussion of mathematical and statistical modeling approaches which contribute to scientific development in the marketing area and ways in which modeling is used to characterize and summarize the nature of general marketing situations in complex environments.

MKTG 599 Doctoral Seminar in Marketing (1, max. 12) Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

MKTG 600 Independent Study or Research (*, max. 10)

Operations Management

OPMGT 402 Introduction to Logistics (4) Logistics studies of the efficient delivery of goods and services. A total-cost approach recognizes this involves not only the obvious vehicle-routing issues but also shipment size and mix, warehouse location, product design, and customer services. Includes study of real companies' logistics problems. Prerequisite: OPMGT 301.

OPMGT 443 Inventory and Supply Chain Management (4) Use of material and supply chain management in manufacturing and service organizations to reduce inventory levels while providing adequate service to customers. Specific topics include forecasting, Just-in-Time production, deterministic and stochastic inventory models, and material

requirements planning (MRP). Prerequisite: OPMGT 301.

OPMGT 450 Introduction to Project Management (4) Focuses on the management of complex projects and the tools and techniques which have been developed in the past 25 years to assist managers with such projects. The course covers all elements of project planning, scheduling and control as well as implementation and organizational issues. Prerequisite: OPMGT 301.

OPMGT 490 Special Topics in Operations Management (1-6, max. 20) Operations management topics of current concern to faculty and students. Potential topics are: logistics management, project scheduling, manufacturing strategy, site and location analysis, management of service operations. Prerequisite: OPMGT 301.

OPMGT 499 Undergraduate Research (1-6, max. 9)

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

OPMGT 502 Introduction to Operations Management (4) Managerial decision making in operations problems, including application of quantitative analysis and use of computers. Production of goods or services in any type of organization. Inventory management, scheduling, facility location, management of service systems, and quality assurance. Prerequisite: QMETH 500.

OPMGT 535 Global Logistics Management (4) Provides an overview of the concepts and substance of trade, transportation, and logistics. Deals with management of physical, documentation, and information flows within supply chains, including purchasing, distribution, intermodal transportation, ERP e-commerce and e-fulfillment, financial transactions, and regulations. Prerequisite: permission of instructor. Offered: jointly with GTTL 501; AW.

OPMGT 536 Seminar in Global Trade, Transportation, and Logistics (4) Interdisciplinary seminar that brings together students with academics and practitioners at the forefront of trade, transportation, and logistics in discussions of selected topics. Additionally, students research issues of special interest. Prerequisite: OPMGT 535, GTTL 501, or permission of instructor. Offered: jointly with GTTL 502; Sp.

OPMGT 550 Project Management (4) Management of complex projects, and tools and techniques (e.g., CPM and PERT) developed to aid the planning, scheduling, and control of projects. Includes work breakdown structures, precedence networks, Gantt charts, resource leveling and allocation, and the use of microcomputer programs. Prerequisite: B A 502 or OPMGT 502 or equivalent.

OPMGT 570 Operations Strategy (4) Strategic management of operations and manufacturing in domestic and international companies. Developing and implementing a coherent strategy based on continuous improvement of quality, productivity, products, processes, and customer services. Facilities, capacity, process/work-force planning, organization, people, systems integration, coordination between operations, marketing, engineering, and R&D. Prerequisite: B A 502 or OPMGT 502 or equivalent.

OPMGT 579 Special Topics in Operations Management (2/4, max. 12) Major topics in operations management and systems analysis. Emphasis on research and, where appropriate, application of quantitative analysis and computers. Topics vary, including workforce planning, project management, research and development management, quality assurance, technology planning and forecasting,

systems analysis of complex organizations, and urban systems analysis. Prerequisite: B A 502.

OPMGT 587 Advanced Topics in Inventory Management (4) Survey of literature in inventory/production control with emphasis on current research. Topics include single-echelon deterministic and probabilistic models and multi-echelon stochastic models. Prerequisite: QMETH 592 and course in probability theory and in stochastic processes.

OPMGT 599 Doctoral Seminar in Operations Management (1, max. 12) 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. Prerequisite: doctoral student status.

OPMGT 600 Independent Study or Research (*, max. 10)

Organization and Environment

O E 403 Commercial Law (5) Principles of the law of contracts, agency, property, sales, negotiable instruments, and security transactions. Prerequisite: O E 200.

O E 490 Special Topics and Issues in Organization and Environment (1-6, max. 6) Topics and issues of business organization and a changing environment. Content reflects interests of faculty members and students not otherwise covered in the curriculum.

O E 499 Undergraduate Research (1-6, max. 9) Selected problem areas or issues in consultation among faculty members and students. Prerequisite: permission of the undergraduate office.

Quantitative Methods

QMETH 450 Spreadsheet Models for Managerial Decision Making (4) Formulation and solution of business problems using operations research techniques in a spreadsheet environment. Techniques of linear and integer programming, decision analysis, network optimization, queuing, and simulation. Applications from marketing, finance, and operations. Prerequisite: I S 300.

QMETH 490 Special Problems in Quantitative Analysis (1-6, max. 20) Specialized quantitative techniques useful for solving business problems. Topics from operation research, statistics, computer methods. Emphasis on application. Prerequisite: either ECON 311, QMETH 201, PSYCH 213, PSYCH 218, STAT 220, STAT 301, STAT 311, or STAT 390.

QMETH 499 Undergraduate Research (1-6, max. 9) Research in selected problems in business statistics, operations research, decision theory, and computer applications.

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.

QMETH 500 Statistical Data Analysis for Management (2) Statistical models, techniques, and tools for aiding management decisions. Use of spreadsheets in basic business problems. Probability distributions, random sampling and standard errors, hypothesis testing, multiple regression, ANOVA, chi-square tests. Prerequisite: preparation in elementary calculus and successful completion of university-administered proficiency exam.

QMETH 501 Decision Support Models (2) Introduction to computer-based modeling techniques for management decision making. Linear programming, decision analysis, and simulation. Formulation and interpretation. Prerequisite: QMETH 500.

QMETH 520 Managerial Applications of Regression Models (4) Data exploration and inference using regression models for business forecasting and management. Models include simple, multiple, logistic, and nonlinear regression, use of dummy variables, transformations, variable selection, and diagnostics. Prerequisite: QMETH 500 or B A 500.

QMETH 528 Survey Sampling Applications (4) Introduction to design and implementation of sample surveys with emphasis on business applications. Simple random, stratified, cluster, multistage sample methods. Probability sampling, optimal allocation of sampling units. Mail, telephone, interview methods. Estimation methods, Questionnaire design. Non-response. Prerequisite: QMETH 500 or B A 500 or equivalent or permission of instructor.

QMETH 530 Forecasting Models in Business (4) Introduction to time series analysis and forecasting. Topics include seasonal adjustment, decomposition, exponential smoothing, moving average, and autoregression as well as model identification, estimation, diagnostics, and adaptive forecasting illustrations using real data. Prerequisite: QMETH 500 or B A 500.

QMETH 551 Modeling with Spreadsheets (4) Advanced formulation and modeling of business problems in a spreadsheet environment. Techniques of linear, integer, and nonlinear programming, multi-objective goal programming, and simulation. Applications from finance, marketing, and operations. Prerequisite: B A 502 or QMETH 501 or equivalent.

QMETH 579 Special Topics in Quantitative Methods (2/4, max. 12) Presentation of topics of current concern to students and faculty in operations

research and applied business statistics. Potential topics include applications and extensions of mathematical programming, stochastic processes, discrete programming, networks models, and the application of statistical techniques.

QMETH 580 Mathematical Programming (4) Advanced survey of mathematical programming with applications to business problems. Includes linear, integer, stochastic, nonlinear, and dynamic programming and network optimization. Treatment includes formulation, optimality conditions, duality theory, solution algorithms. Applications to production, scheduling, marketing, finance, and equipment replacement. Prerequisite: B A 501 or equivalent and doctoral student or permission of instructor.

QMETH 592 Stochastic Models: Queuing and Simulation (4) Application of stochastic processes to business problems. Focuses on development and application of queuing theory and discrete event simulation. Prerequisite: stochastic processes, knowledge of high level programming language, and doctoral student or permission of instructor.

QMETH 599 Doctoral Seminar in Operations Research (1, max. 12) Study and research in advanced topics of operations research. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status. Credit/no credit only.

QMETH 600 Independent Study or Research (*)

ST MGT 591 Theories of the Firm and Strategic Management: Economic Models (4) Reviews the economic theories that support strategies pursued by firms and explores the links between market processes, firm strategy, and firm performance. Topics include agency theory, transaction cost economics, resource dependence, population ecology, and neo-Austrian economics.

ST MGT 592 Theories of the Firm and Strategic Management: Sociological Models (4) Explores the sociology of organizations from multiple perspectives while introducing fundamental sociological questions and preparing students for conducting research in organizations. Emphasis on structural contingencies, institutions, resource dependence, population ecology, negotiated order and culture, organizational learning and decision making, organizational power and politics, networks, and inter-organizational relations.

ST MGT 593 Contemporary Strategic Management Research (4) Facilitates understanding of empirical foundations of theory development and testing in contemporary strategic management research. Focuses on evaluation of ways in which the empirical tradition has evolved in the strategic management area. Attention to evaluating research methodologies used in the field.

ST MGT 594 The Social and Political Environment of the Firm (4) Focuses on the social and political factors that help shape corporate strategy using stakeholder management as an integrating concept. Topics include corporate governance, corporate political activity, governmental regulation, comparative political economy, and normative aspects of strategic management, including ethics and corporate social responsibility.

Strategic Management

Courses for Graduates Only

Approval of the graduate business program office required. Entry code required for nonmajors.



School of Dentistry

Acting Dean

James C. Steiner
D322 Health Sciences



General Catalog Web page:
www.washington.edu/students/genocat/academic/School_Dentistry.html



School Web page:
www.dental.washington.edu

Established in 1945, the University of Washington School of Dentistry offers courses leading to a Doctor of Dental Surgery (D.D.S.) degree, and advanced education leading to a Master of Science in Dentistry degree and/or a certificate of proficiency in endodontics, oral medicine, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Residency training is available in oral and maxillofacial surgery and general practice. The Department of Oral Biology offers a Master of Science (M.S.), an M.S. non-thesis degree for dental hygiene educators, and a doctoral degree (Ph.D.). Postdoctoral study is available in various disciplines. The School also offers a baccalaureate degree completion program in dental hygiene.

Opportunities to earn other degrees concurrently (M.S. or Ph.D. in the School of Dentistry's Department of Oral Biology and other schools) may be arranged on an individual basis.

These educational programs are enriched by the School's strong commitment to research and the presence of a Regional Clinical Dental Research Center, a Comprehensive Center for Oral Health Research, a Dentist-Scientist program, and a fellowship research training program for predoctoral students. The mission of the Regional Clinical Dental Research Center is to foster clinically relevant research that will advance dentistry's knowledge base, improve patient care, and promote oral health. The Comprehensive Center for Oral Health Research is focused on children's dental health and is one of only six such programs to be funded nationally by the National Institute of Dental and Craniofacial Research. State-of-the-art clinical research facilities are available for faculty and student use.

School of Dentistry Mission Statement: "The School of Dentistry shares the University's overall mission to generate, disseminate, and preserve knowledge and serve the community. The School is an integral part of the Health Sciences Center and is an oral health-care center of excellence serving the people of the state of Washington and the Pacific Northwest. Through its exemplary educational, research, and service programs, the School prepares students to be competent oral health-care professionals. Its research programs fundamentally contribute to the understanding of basic biologic processes and behavioral, biomedical, and clinical aspects of oral health. The School values and seeks diversity in its students, staff, faculty, and patient populations. It fosters an environment of mutual respect where objectivity, imaginative inquiry, and the free exchange of ideas can flourish to facilitate personal development, professionalism, and a strong sense of self-worth." (July 1994)

The following departments participate in the curriculum for the School's programs: *Dental Public Health Sciences* is concerned with the social, legal, political, economic, and psychological aspects of dental

health-care delivery as well as the epidemiology of oral diseases and the application of biostatistical methods in studying them. *Endodontics* offers training in the diagnosis and treatment of diseases and injuries of the tooth pulp and periradicular tissues. *Oral and Maxillofacial Surgery* trains students in the procedures used for all types of operations in the oral cavity and all phases of dental pain control. *Oral Biology* encompasses the study of basic biological mechanisms in normal and diseased oral tissues and structures. *Oral Medicine* provides training in diagnostic techniques and nonsurgical treatments of oral disease. *Orthodontics* provides training in the prevention and correction of malocclusion of the teeth. *Pediatric Dentistry* provides students with a broad understanding of prevention, diagnosis, and treatment of most dental needs from infancy through adolescence with emphasis on the psychological and educational requirements of the patient and parent. *Periodontics* offers training relative to the periodontium and dental implants, with emphasis placed on diagnosis, prevention, treatment, and maintenance. *Prosthodontics* provides instruction in the fabrication and maintenance of removable, complete, and partial dentures, and dental implants. *Restorative Dentistry* offers training in the restoration or replacement of tooth structure and study of the form and function of the masticatory structures.

Undergraduate Program

Dental hygiene seeks to understand why some people get preventable oral diseases, and why others do not. Risk factors, such as poverty, ethnicity, and education, as well as environment, contribute to perpetuation of these diseases. The dental hygienist observes and defines dental diseases, assesses potential outcomes of interventions, and manages conditions that compromise oral health. As an applied discipline, dental hygiene links its theoretical foundation to behavioral and natural sciences. Using evidence-based science, the discipline seeks to facilitate holistic assessments of individuals and communities and to find solutions to oral health problems. Students in the discipline learn to transfer learning from clinical to community contexts as a means of improving the oral health status among people.

Advisor

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Department Web Page:
www.depts.washington.edu/dhyg

Bachelor of Science

The University of Washington Dental Hygiene Degree Completion Program provides postlicensure education for dental hygienists who have completed a prelicensure program and who are certified or licensed to work as dental hygienists. Completion of this education enables graduates to function professionally as dental hygienists in business, management, advanced clinical dental hygiene services, public health, research, education, or private enterprise, depending upon path selections. It also provides opportunity for dental hygienists to prepare for advancement into graduate or professional schools or other careers.

For information on the dental hygiene undergraduate program, see the undergraduate volume of the *General Catalog* or visit the *General Catalog* online at www.washington.edu/students/genocat/.

Professional Programs

Doctor of Dental Surgery

The Doctor of Dental Surgery (D.D.S.) curriculum provides opportunities to learn the fundamental principles significant to the entire body of dental knowledge. Students are expected to learn fundamentals of basic health sciences, to attain proficiency in clinical skills, to develop an understanding of professional and ethical principles, and to develop reasoning and critical decision-making skills that will enable implementation of the dental knowledge base. The first year is divided among lecture, laboratory, and preclinical activities in basic sciences, dental anatomy, occlusion, and dental materials. In the second year, students develop further preclinical skills, learn how basic science principles are applied to the clinical setting, and begin clinical patient treatment. In the third and fourth years, students concentrate on providing clinical treatment, attend lectures that refine technical and diagnostic skills, and participate in electives. Students are required to take one elective in each of the junior and senior years. Electives are chosen by students from courses offered by all departments, including opportunities in independent study, research, seminars on various topics, and specialty clinical topics.

The curriculum extends for 42 months or 14 quarters, including two summer quarters. The 12 academic year quarters are variable in length (ten weeks of instruction, one week of examination), while the two required summer quarters following years two and three are each nine weeks long. If needed, students may be allowed additional time to complete required course work.

Admission

To be considered for admission to the predoctoral program, a student will need to have completed the required courses listed below, have taken the Dental Admission Test, and have attended a personal interview. The School does not select or give preference to a particular undergraduate major field. The Admissions Committee encourages diversity in majors. Courses in the social sciences and the humanities are also important and reviewed by the Committee.

The School of Dentistry is a state supported institution and participates in the student exchange program provided by the Western Interstate Commission for Higher Education (WICHE) which supports students from western states without dental schools. Although all applications are carefully reviewed, preference in admission is given to residents of Washington and WICHE states. Required courses are: general chemistry—2 quarters or 1 semester; organic chemistry—2 quarters or 1 semester; general biochemistry—2 quarters or 1 semester; general physics—3 quarters or 2 semesters; general biology or zoology—3 quarters or 2 semesters; general microbiology—2 quarters or 1 semester. The School enrolls a first-year class of 50-55 students. The School is committed to diversity within the dental school student body and the dental community.

Transfer Applicants: The School rarely, and only under exceptional circumstances, admits transfer students from other dental schools.

Foreign Applicants: The School does not provide a special program for foreign-trained dentists.

Health Sciences Minority Student Programs: To increase diversity of students, the School participates in the Health Sciences Minority Student Program. In addition to advising and career counseling, this office

works with Health Sciences schools to provide student development and support programs, networking opportunities, and summer research programs. The HSMSP Office activities include participation on several Health Sciences and campus-wide committees for purposes of collaborating and exchanging strategies on effective methods for recruiting and retaining a diverse student body; as well as promoting and celebrating diversity.

The School belongs to the American Association of Dental Schools Application Service (AADSAS). The School has established November 1 as its AADSAS priority filing deadline. Only those applications received in the AADSAS Washington, D.C. office by the priority filing date will be forwarded to the University of Washington for consideration by the Admissions Committee. Applications are available online at www.adea.org. Information regarding the Dental Admission Test should be requested from the American Dental Association, Dental Admissions Testing Program, 211 East Chicago Ave., Suite 1846, Chicago, IL 60611-2678, 312-440-2689, www.ada.org/prac/careers/dat-01.html.

For information on admission to the University of Washington School of Dentistry contact either Kathleen Craig, Office of Student Admissions, School of Dentistry, University of Washington, Box 356365, Seattle, WA 98195-6365, 206-543-5840, fax 206-616-2612, askuwsod@u.washington.edu, www.dental.washington.edu, or Jason Boyd, Pre dental Advising Office, University of Washington, 171 Mary Gates Hall, Box 353760, Seattle, WA 98195-3760, advuac@u.washington.edu.

Once the AADSAS application has been received, a preliminary screening determines if an applicant meets the Admissions Committee's criteria to receive a supplemental application and request for the following materials:

1. A supplementary application which includes a short personal statement
2. A non-refundable application fee of \$35.
3. Three letters of recommendation. Letters of recommendation should include one from a science instructor who can evaluate the applicant's academic and intellectual qualifications, a second from a dentist who is familiar with the applicant's knowledge of and motivation toward the dental profession, and the third (character reference) from someone who can indicate the applicant's contribution to fellow man, community, etc. If a pre dental committee exists on the applicant's campus, a combined recommendation from that committee may be used to replace all three recommendations. The School of Dentistry will accept letters of recommendation processed by AADSAS.
4. Dental Admission Test scores. **Test must be taken by October 31 of the year prior to entry.**
5. Transcripts from all higher education institutions attended.
6. A list of current and future courses.
7. Acknowledgment of having read, understood, and of being able to meet, with or without reasonable accommodation, the *Essential Requirements of Dental Education at the University of Washington School of Dentistry* (to be sent with the supplemental application form).
8. Conviction/criminal history information. Washington state law requires that all faculty, students, and staff disclose background information concerning crimes and offenses against vulnerable populations. A complete copy of the law is available from the School's Office of Student Services

and will be forwarded upon request. Applications will not be considered until completed disclosure forms have been returned to Student Admissions.

The application will be considered complete once all materials noted above (1-8) are returned. Upon receipt of the completed application, invitations for an interview are sent to applicants based on a preliminary screening of grades and DAT scores. The interview is an opportunity for an open and friendly discussion of the applicant's interests, background, and reasons for selecting dentistry as a profession. The interview allows the applicant to ask questions about the School, faculty, and student life, and is conducted by a member of the Admissions Committee. In addition to the interview, the applicant will have an opportunity to hear information about financial aid, meet with enrolled students, take a tour of the School, and meet one of the School's deans.

Following the interview, the Admissions Committee, which is composed of faculty, students, and alumni, will make a decision concerning admission status. In their deliberations, the following seven areas are considered, with the first two areas receiving the most weight in assessing the applicant's merits as a candidate:

1. *Grades.* Overall grade-point average (GPA) and GPA of pre dental required science courses are reviewed. College grades are an important indicator of dental school performance and success. The Committee members review these grades for a strong, consistent GPA without withdrawals, incompletes, repeated courses, or non-graded options.
2. *DAT (Dental Admission Test).* The test, sponsored by the American Dental Association, covers several areas: quantitative reasoning, survey of natural sciences (including biology, general, and organic chemistry), and perceptual ability (including form development, apertures, angles, cubes, and orthographic projections). At the University of Washington the scores are reviewed to identify an applicant's areas of strength. The test must be taken no later than October 31, one year prior to matriculation.
3. *Level of Pre-professional Education.* The majority of applicants will have a baccalaureate degree by the time of entry. Admission may be offered to applicants without a baccalaureate degree but only to those applicants who have completed all pre dental requirements and have an extremely competitive academic record. A minimum of three years' full-time coursework is required.
4. *Dental Knowledge.* Knowledge of the field of dentistry through experience in a dental setting (dentist's office, clinic, etc.), introductory dental course work, and exploration of the dental literature are considered as admission factors. A qualified applicant will have a clear understanding of the profession and a demonstrated interest in the field.
5. *Unique Life Experiences.* Research and teaching efforts, travel, and work experience are some of the life experiences that are considered important. Such experiences demonstrate the breadth and level of maturity of a candidate.
6. *Personal Attributes.* In addition to motivation, the applicant's poise and communication skills are examined by the Admissions Committee. Personal attributes such as integrity, responsibility, leadership, initiative, community service, perseverance, and diversity of interests are important.
7. *Contribution to Diversity.* Diversity in the student body contributes to the development of oral

health care professionals prepared to address the needs of society.

Although interviews begin in October, the earliest the Admissions Committee will notify applicants of its decision is December 1. The School uses a "rolling admission" format, so interviews and committee decisions will continue to be made between December and March. The Admissions Committee will make one of three decisions regarding all applications:

1. *Offer of Acceptance.* Admission application has been accepted. The applicant will have a specified time to reply to reserve enrollment in the entering first-year class. In addition, enrollment will be contingent on timely submission of the following requirements: required registration deposit, transcripts showing completion of pre dental courses, physician statement, registration for autumn quarter of the upcoming academic year, and completion of required immunizations.
2. *Alternate Status.* Applicant is offered a position on the Alternate List. The applicant will have a specified time to reserve a position on this list which is maintained until the beginning of the school year.
3. *Denial of Admission.* The Committee has considered the application but cannot offer a position or alternate status.

Accepted applicants will receive follow-up letters and information. Letters detailing registration procedures and providing financial aid information will be sent in early summer. In late summer, new students receive a packet of materials welcoming them to the School and describing the orientation program, also called Prep Weeks. Attendance is mandatory and will provide an opportunity for the newly enrolled student to learn about the upcoming curriculum, student rights and responsibilities, financial aid information, student organizations, and to begin course work. Prep Weeks begin approximately ten days prior to the start of the School of Dentistry's autumn quarter. New students attend an off-campus student retreat to meet classmates and relax in an informal setting.

Western Interstate Commission for Higher Education (WICHE): The School participates in the program administered by WICHE for students who reside in Western states not served by a dental school (Alaska, Arizona, Hawaii, Montana, Nevada, New Mexico, North Dakota, and Wyoming). Such students should seek requests for certification from the WICHE commission office in their state of residence. Students who enroll in the School under the WICHE program pay in-state tuition, the nonresident portion being paid by the member state that sponsors the student.

Information on loans and scholarships may be obtained from the Director of Financial Aid, D322 Health Sciences, Box 356365. Information relating to student life, including the Academic Regulations Manual and Professional Ethics Code may be obtained from the Associate Dean for Student Services, D322 Health Sciences, Box 356365.

Facilities

School clinics, teaching laboratories, and lecture halls are up-to-date, well maintained, and periodically renovated. Clinical Modules are assigned to students for use in patient treatment. The D-1 Simulation is a state-of-the-art teaching facility used for preclinical and laboratory courses.

School Accreditation and Licensure

The School is fully accredited by the Commission on Dental Accreditation, the recognized accrediting body for dentistry and the related dental fields. For information, write to the Commission on Dental

<i>Projected costs for 1998-99</i>	<i>First Year</i>	<i>Second Year</i>	<i>Third Year</i>	<i>Fourth Year</i>	<i>Total</i>
Tuition (resident)	10,143	13,523	13,523	10,142	47,330
Tuition (nonresident)	25,668	34,224	34,224	25,668	119,784
Immunizations Fee	400	0	0	0	400
Supplies (includes issue, rental, nonrental, syllabi, clinic fees, models)	3,760	4,638	1,277	205	9,880
Textbooks	1,306	856	226	0	2,338
Miscellaneous	329	398	201	694	1,622
Total Education Costs (resident)†	15,937	19,415	15,227	11,041	61,620
Total Education Costs (nonresident)‡	31,463	40,116	35,928	26,567	134,074

†Total Educational Costs do not include living and personal expenses. Nonrental instruments belong to the student, and should be considered a long-term investment and not part of the expendable educational costs.

‡Nonresident Total Educational Costs include Total Educational Costs plus the additional tuition for students with nonresident tuition status.

Accreditation, 211 East Chicago Ave., Chicago, IL 60611-2678. Admission to the practice of dentistry in any state is conditional upon meeting the requirements of the individual state dental licensure requirement. In order to practice in the State of Washington, the candidate for licensure must have a dental degree from a U.S. or Canadian dental school, and have successfully completed the American Dental Association National Board Examinations and the Western Regional Examining Board Examination. Additional information about licensure requirements should be requested from the Washington State Department of Health, Dental Quality Assurance Commission, PO Box 1099, Olympia WA 98504-1099, 360-586-6898.

Health Care and Immunization Policy

Accepted students at the university of Washington School of Dentistry are entitled to limited outpatient basic healthcare at the Hall Health Primary Care Center. There are additional fees associated with this care. This care does not cover spouses and dependants. In addition, the University has arranged for an Accident and Sickness Insurance Plan specifically designed for students, their dependants, and domestic partners.

Graduate Programs

Through their respective departments, the graduate faculty members of the School offer programs leading to the degrees of Master of Science in Dentistry, Master of Science, and Doctor of Philosophy, as well as postgraduate certificate programs.

Master of Science in Dentistry/Postgraduate Certificates

Fields of study for the M.S.D. programs include endodontics, oral pathology, oral medicine and orofacial pain, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Although students may enroll in a graduate certificate program only, students may elect to pursue an M.S.D. The programs are planned to prepare students to think independently, to evaluate their own services and the literature of the programs, and to develop their clinical skills to a level to permit successful clinical practice, teaching, or

research in their chosen specialty. Emphasis is placed on the basic principles of diagnosis and treatment. The purpose of the programs is not only to train students in their respective specialties but also to encourage preparation for academic careers or for research. Research may be undertaken in basic or applied science. Opportunities for collaborative research are available with the cooperation of other colleges, schools, or departments of the University.

Applicants for admission to the M.S.D. and certificate programs must be graduates of a school of dentistry approved by the Commission on Dental Accreditation of the American Dental Association or a university dental school located outside the North American continent whose curriculum and admission requirements are similar to those of the UW School of Dentistry. Applications must be submitted to the appropriate department on or before the following deadlines: September 1 for prosthodontics; October 1 for endodontics, oral surgery, orthodontics, pediatric dentistry, and periodontics; November 1 for oral medicine and orofacial pain. A concurrent Application for Admission to the Graduate School also must be filed. International students must complete a preliminary evaluation process before the application deadline and must demonstrate competency in the English language, for which TOEFL scores are required. Applicants who have not received dental degrees from an institution within the United States will be required to supply Graduate Record Examination scores for admission to the University of Washington Graduate School (graduates of U.S. institutions are not required to submit GRE scores). Requests for information or application forms may be forwarded to the department of the specialty field, School of Dentistry, University of Washington, Seattle, WA 98195-6365, 206-543-5840.

A minimum of eight consecutive full-time quarters of residence is required except in the periodontics, orthodontics, and prosthodontics programs. Certificate training in periodontics requires a minimum of 12 consecutive full-time quarters of enrollment and may be pursued concurrently with other advanced degrees which may extend the program length. The graduate prosthodontic program requires a minimum of 12 full-time quarters of didactic, clinical care, and research activities. The graduate orthodontic program is ten consecutive full-time quarters. The M.S.D. program in endodontics requires three to

six months of additional training beyond the eight quarter requirement for the certificate program only.

Postgraduate certificate programs are not administered by the Graduate School, and no thesis is required. The course content may vary somewhat from the M.S.D. program, although the same academic standards are applied in both programs. Tuition and fees are assessed at the graduate level for both programs.

Master of Science, Doctor of Philosophy

Curriculums for the M.S. and Ph.D. programs are offered through the Department of Oral Biology. Faculty from several dental departments also participate in the Oral Biology Ph.D. Program.

Oral biology is concerned with the nature of the oral and paraoral tissues and with the applicability of basic scientific knowledge to oral tissues in health and disease. The courses and research programs in the department deal with the origin, growth and development, structure, and functions of oral tissues, as well as with the etiology and pathogenesis of oral diseases and malfunctions. By its nature, oral biology overlaps the basic medical sciences and clinical dental sciences.

The department contains well-equipped laboratories actively engaged in various aspects of research involving the following approaches: biochemical, including studies on protein synthesis and secretion and the structure of salivary macromolecules, as well as studies on the structural proteins of the cytoskeleton of oral epithelial and epidermal cells; pharmacological, including molecular mechanisms in the regulation of secretion; physiological, including ion fluxes and their control in secretory tissues; microbiological, including the molecular basis of bacterial colonization of oral surfaces, and the identification, taxonomy and pathogenicity of oral pathogens; pathological, including the growth and metastasis of oral tumors; tissue culture, including studies on factors regulating the growth and development of oral epithelial cells; and morphological, including studies on oral tissues at the light and electron microscopic levels.

Several programs are available through the Department of Oral Biology to accommodate students with different educational objectives.

A program of study and research leading to the Doctor of Philosophy degree is available for those students desiring extensive research training as well as in-depth course work in oral biology. In addition to the courses offered by this department, students in the Ph.D. program are expected to gain proficiency in one of the biomedical sciences.

A separate program of study and research leading to the Master of Science degree is available for those students who want less training than the Ph.D. program affords.

A non-thesis option exists in the Master of Science program for the purpose of training dental hygiene educators to instruct in certain basic and applied sciences as well as in the clinic.

The School offers a program leading to the degree of Master of Science in Dentistry in oral pathology. Students enroll in a series of advanced courses in general and oral pathology.

Clinical specialty training (e.g., endodontics, oral medicine and orofacial pain, orthodontics, pediatric dentistry, periodontics) can also be obtained in conjunction with either the M.S. or Ph.D. programs.

Applicants for all programs must have either a baccalaureate or professional degree from a dental or medical school. Acceptance into the programs

requires approval of both the Department of Oral Biology and the Graduate School. For information or application materials, contact the Graduate Program Adviser, Department of Oral Biology, B224 Health Sciences, Box 357132, University of Washington, Seattle, WA 98195-7132, 206-543-5477, www.dental.washington.edu/ob/.

Residency Training

Residency training programs are available in oral and maxillofacial surgery and the general practice of dentistry. Both programs provide for rotation through several of the University-affiliated hospitals. Each is a fully accredited program that grants a certificate upon successful completion of the training. Stipends are provided.

The Oral and Maxillofacial Surgery Program is four years in duration and provides broad exposure to all aspects of the practice of oral and maxillofacial surgery. Application, selection, and administration of this training program is provided through the Department of Oral and Maxillofacial Surgery. Further information can be obtained by contacting the Residency Program Coordinator, Department of Oral and Maxillofacial Surgery, Box 357134, University of Washington, Seattle, WA 98195-7134, 206-543-7722.

The General Practice Residency is a one-year training program that emphasizes the general dentist's role in a hospital and the management of medically, physically, and mentally compromised patients. Application, selection, and administration of the General Practice Residency is provided through the Department of Restorative Dentistry. Further information can be obtained by contacting Dr. Barton S. Johnson, Division of Hospital Dentistry, Department of Restorative Dentistry, Box 357456, School of Dentistry, University of Washington, Seattle, WA 98195-7456, 206-543-7496.

Postdoctoral Fellowships

Postdoctoral training fellowships are available in behavioral or public-health research in dentistry in addition to those in oral biology. Programs vary in duration and many accommodate degree-seeking or research fellows pursuing an academic career. NIH-sponsored partial tuition and a stipend for up to three years are provided for U.S. citizens, noncitizen nationals, and those foreign nationals with permanent-residency status in the United States. Members of ethnic minorities and women are especially invited to apply. Application, selection, and administration of the program are provided through the Departments of Dental Public Health Sciences and Oral Biology.

Graduate Training in Dental Public Health

Opportunities exist for pursuing graduate degrees in public health which emphasize applications to research in dentistry. Master of Public Health (M.P.H.) programs in the Departments of Epidemiology and Health Services of the School of Public Health and Community Medicine can be pursued in conjunction with postdoctoral training in the School of Dentistry's Department of Dental Public Health Sciences. Didactic course work is taken in the School of Public Health and Community Medicine, augmented with independent study and thesis research on selected topics in the School of Dentistry. Similar opportunities exist for pursuing the Ph.D. in epidemiology or biostatistics with an emphasis on research in dentistry. Further information may be obtained from the Department of Dental Public Health Sciences, Box 357475, School of Dentistry, University of Washington, Seattle, WA 98195-7475, 206-543-2034.

The Office of Continuing Dental Education, School of Dentistry, offers programs and courses throughout the year to provide dentists, auxiliary personnel, and

others involved in health care with current scientific knowledge and methodology of patient treatment. Utilizing local, national, and international experts, these programs provide a broad spectrum of information relevant to the needs of dental-health professionals. The instructional program consists of lectures, clinical courses, study clubs, extended clinical training, correspondence, and participation courses, some of which are offered in the new simulated-patient laboratory. Various programs are presented throughout the year in the Pacific Northwest, Alaska, Arizona, and Hawaii. Preceptorships and externships are available in endodontics. These are specially designed programs for dentists to gain additional training in endodontics. Further information can be obtained from the Department of Endodontics, Box 357448, University of Washington, School of Dentistry, Seattle, WA 98195-7137, 206-543-5044.

A list of courses offered may be obtained from the Office of Continuing Dental Education, Box 357137, University of Washington, School of Dentistry, Seattle, WA 98195-7137, 206-543-5444, www.dental.washington.edu/conted/.

Dental Hygiene

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

D HYG 404 Field Experience in Delivery of Oral Health Care (2-12, max. 12) Focuses on healthcare delivery issues: environmental, social, educational, economic, or cultural. Students participate at approved health agencies to learn about societal, ethical, cultural, and client oral healthcare needs and demands. The 2-credit minimum includes 30 hours on-site, end-of-quarter seminar, written assignment, and weekly e-mail communication with faculty. Offered: A/WSpS.

D HYG 465 Theoretical and Scientific Basis for Dental Hygiene Practice (3) Emphasis on new or emerging oral health theory and science and its relevance to global and local unsolved preventable dental diseases in context of economic, political, cultural, social, and moral issues. Provides framework for Internet search and retrieval of information and evidence-based science decision-making. Includes technical writing and public speaking. Offered: A.

D HYG 482 Local Anesthesia for Dental Hygienists (2) Techniques of local anesthesia and initial management of emergencies in the dental office.

D HYG 492 Principles of Scientific Investigation for Oral Health Professionals (3) QSR Introduction to principles of scientific investigation and their application to unresolved preventable community-based oral health problems. Includes development of a research study protocol, scientific writing, and critical-thinking skill development. Offered: W.

D HYG 493 Review of Literature for Oral Health Professionals (3) QSR Implementation and testing of a research project designed to promote oral health or prevent dental disease in a community-based setting. Includes skills for critical review of literature, technical writing, and public speaking. Offered: Sp.

D HYG 494 Principles of Teaching for Oral Health Professionals (3) Application of principles of learning to teaching methods and techniques used in edu-

cation, with opportunity for course planning, demonstration, and practice teaching. Offered: A.

D HYG 497 Directed Studies for Oral Health Professionals (*, max. 14) Based on student interest in special areas. Independent study and tutorial student-faculty relationships. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

D HYG 565 Theoretical and Scientific Basis for Dental Hygiene Practice (3) Emphasis on new or emerging oral health theory and science and its relevance to global and local unsolved preventable dental diseases in context of economic, political, cultural, social, and moral issues. Provides framework for Internet search and retrieval of information and evidence-based science decision-making. Includes technical writing and public speaking. Offered: A.

D HYG 595 Internship (*, max. 12) Clinical and/or didactic teaching experience or program administration. Teaching and administration responsibilities assigned according to student's previous experience, education needs, and interest. Seminar required. Prerequisite: D HYG 494 or D HYG 594 and permission of instructor. Offered: A/WSpS.

Dental Public Health Sciences

Faculty

Chair

Timothy De Rouen

Professors

Beaton, Randal D. * 1976, (Adjunct Research); PhD, 1972, University of Washington; assessment and treatment of temporomandibular joint pain and dysfunction.

Cameron, Cheryl A. 1979; MEd, 1978, University of Kentucky, PhD, 1986, University of Washington, JD, 1994, Seattle University; dental hygiene, educational policy, academic and health law.

Chapko, Michael K. *, (Adjunct Research); MA, 1970, Hunter College, PhD, 1972, City University of New York; ambulatory effectiveness in health care, international health.

Conrad, Douglas A. * 1977; MHA, 1973, University of Washington, MBA, 1977, PhD, 1978, University of Chicago; alternative vertical and horizontal market structures in health care.

De Rouen, Timothy * 1975; PhD, 1971, Virginia Polytechnic Institute and State University; applications of biostatistics to clinical epidemiology of oral and infectious diseases.

Domoto, Peter K. * 1973, (Adjunct); DDS, 1964, University of California (San Francisco), MPH, 1975, University of Washington; pediatric dentistry, dental behavioral science.

Fales, Martha H. * 1959, (Emeritus); PhD, 1978, University of Michigan; dental hygiene.

Grembowski, David * 1981; MA, 1975, Washington State University, PhD, 1982, University of Washington; health services research, survey research, program evaluation, performance of health care systems.

Milgrom, Peter M. * 1974; DDS, 1972, University of California (San Francisco); management of fearful and phobic dental patients, quality of dental care.

Weinstein, Philip * 1972; PhD, 1971, University of Kentucky; dental behavioral science, treatment and prevention of fear and pain, clinical assessment.

Associate Professors

Chin, Mae 1984, (Clinical); BS, 1963, University of Washington.

Critchlow, Cathy W. * 1979; PhD, 1993, University of Washington; epidemiology of sexually transmitted diseases; HIV prevention, diseases of oral cavity.

Hujoel, Philippe P. 1989; DDS, 1984, University of Brussels (Belgium), MSD, 1986, PhD, 1993, University of Washington.

Leroux, Brian * 1991; MSc, 1985, PhD, 1989, University of British Columbia (Canada); mixed models, correlated data, statistical applications in dentistry, toxicology, and psychology.

Martin, Michael D. * 1986, (Adjunct); DMD, 1979, University of Kentucky, MA, MPH, 1989, PhD, 1993, MSD, 1994, University of Washington; dental education in oral health care of persons with disability.

Wells, Norma J. 1960; MPH, 1966, University of California (Los Angeles); oral health promotion, dental caries, dental hygiene education.

Assistant Professors

Coldwell, Susan E. * 1998; MA, 1990, PhD, 1994, University of Pennsylvania; pain, anxiety, and taste preference.

Mancl, Lloyd A. * 1995, (Research); MS, 1988, University of Washington, PhD, 1992, University of Washington; statistical methodology in periodontal disease, TMD, and correlated data.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

DPHS 201 Planning a Career in Dentistry for the Future (2) Future-oriented overview of important concepts in dental science, contemporary modes of patient treatment, and dental-care delivery systems. Provides firsthand exposure to practice of dentistry and prerequisite materials in oral anatomy, epidemiology, and other basic sciences subjects. Open to all second-, and third-year undergraduate students. Offered: Sp.

DPHS 449 P-Directed Studies in Dental Public Health Sciences (*) Students and faculty with common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Credit/no credit only. Offered: AWSpS.

DPHS 510 Social and Historical Perspectives in Dentistry (2) Examines dental care problems involving biological, behavioral, and community elements and has student develop hypotheses regarding nature and complexity of problem, set objectives, seek resources and information, and contribute to development of outcomes. Credit/no credit only. Offered: A.

DPHS 535 P-Scientific Literature in Clinical Decision Making (1) Introduction to critical reading of individual articles in professional journals and integrating the findings of several articles. Use of the literature to assist the practicing dentist in making clinical decisions. Offered: Sp.

DPHS 541 P-Ethics in Dentistry (1) Seminar improving ethical reasoning skills and conveying ethical and legal standards of the profession. Credit/no credit only. Offered: Sp.

DPHS 550 P-Directed Studies in Dental Public Health Sciences (*, max. 6) Students and faculty members who have common academic interests can pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Credit/no credit only. Offered: AWSpS.

DPHS 568 Biostatistics in Dentistry (3) Introduction to concepts and methods of descriptive and inferential statistics with applications in dentistry emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, non-parametric methods, linear regression, and correlation. Prerequisite: enrollment in School of Dentistry or permission of instructor. Offered: jointly with BIOST 510.

DPHS 569 Clinical Epidemiology and Study Design in Dentistry (2) An introduction to epidemiological methods as they relate to dental research. Topics covered include the estimation of dental disease occurrence at patient level and site level and the design and analysis of clinical trials with special emphasis on designs unique to dentistry, such as split-mouth designs. Credit/no credit only. Offered: S.

DPHS 575 Behavioral Dental Research (1) Survey of behavioral science research and methodology in dentistry and related fields. Emphasis in various quarters varies: literature review, research design, instrumentation, data analysis. Designed for advanced students who plan a research career. Credit/no credit only. Prerequisite: doctoral degree or permission of instructor. Offered: AWSp.

DPHS 640 P-Professional Issues: Clinical Management of the Fearful and Phobic (1) Introduction to assessment process and treatment strategies for successful management of anxious, fearful, or phobic patient, combined with clinical observation of diagnostic and treatment appointments of active patients. Offered: AWSpS.

DPHS 660 Dental Fear Clinic (2) Clinical instruction in the care of the severely anxious or phobic adult or child. Strategies from behavioral and cognitive psychology. Credit/no credit only. Prerequisite: graduate standing in dentistry or permission of instructor. Offered: AWSpS.

Dentistry

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

DENT 510 Introduction to Clinical Dentistry (1) Introduction to clinical dental training including infection control, personal dental hygiene, oral anatomical landmarks, medical histories, fluoride application, fabrication on athletic mouth guards, and professional ethics. Students participate in classroom exercise followed by rotations in functioning dental clinics. Credit/no credit only. Offered: W.

DENT 520 P-Clinical Practice Management 1 (1) Designed to provide the student with the knowledge required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, authorized treatment plan-

ning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines. Offered: S.

DENT 521 P-Oral Pathology (3) 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. Correlations between clinical findings, etiologic factors, and histopathologic features are stressed. Attendance in the laboratory is required. Offered: A.

DENT 522 P-Oral Pathology (3) 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. Correlations between clinical findings, etiologic factors, and histopathologic features are stressed. Attendance in the laboratory is required. Offered: W.

DENT 523 Medical Emergencies in the Dental Setting (1) Initial emergency training, focusing primarily upon recertification in BLS. Emphasizes intellectual and psychomotor skills for universal treatment of emergencies (which includes BLS). Offered: A.

DENT 533 Medical Emergencies in the Dental Setting II (2) Comprehensive medical emergency training, including review of BLS. Students participate in real-time simulated drills to prepare both their intellectual and psychomotor skills for emergency care situations. Credit/no credit only. Offered: A.

DENT 534 P-Geriatric Dentistry (1, max. 2) Two-quarter sequence on special needs of older persons seeking dental care: oral health, psychology of aging, socioeconomic problems, effective communication, dental management, and special problems in long-term care settings. Offered: WSp.

DENT 537 P-Hospital Dentistry (1) Introductory course presenting hospital procedures and protocol and the role of the dentist in the hospital. Offered: Sp.

DENT 543 Medical Emergencies in the Dental Setting III (1) Comprehensive review/refreshment of medical emergency training, including recertification in BLS. Students participate in real-time simulated drills to prepare both intellectual and psychomotor skills for emergency care situations. Offered: S.

DENT 547 Dental Practice Administration (2) Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: A.

DENT 548 Dental Practice Administration (2) Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: W.

DENT 549 Dental Practice Administration (2) Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: Sp.

DENT 550 P-Special Studies in Dentistry (*, max. 12) Series of courses offered by the various departments from which students may elect study in areas of special interest to them. These courses include subject matter applicable to all phases of dentistry. Credit/no credit only. Offered: AWSpS.

DENT 551 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including

obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 552 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 553 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 554 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 555 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 556 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 557 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 562 Elective Offering in Advanced Cardiac Life Support (2) Introduction to airway management (masking/intubation/oropharyngeal airways/nasopharyngeal airways/cricothyrotomy), 12-lead EKG recognition and diagnosis, cardiac physiology and pathophysiology, and pharmacologic action of several different medications. Students who pass AHA guidelines for completion of an ACLS course are awarded ACLS certification. Credit/no credit only. Offered: W.

DENT 563 Elements of Conscious Sedation (1-2) Details theory and techniques for rendering oral, inhalation, transmucosal, intramuscular, and intravenous forms of conscious sedation. Focuses on pharmacology and pharmacokinetics of nitrous oxide, benzodiazepines, narcotics, and barbiturates. Addresses usual applications, special considera-

tions, legal issues, and proper record keeping. Emphasizes prevention and management of emergencies. Credit/no credit only. Offered: A.

DENT 565 Dental Photography (2) Provides student with sufficient knowledge and experience to select and use correct photographic equipment for photographing patients (facial and interoral), casts, instruments, x-rays, charts, and objects. Credit/no credit only. Offered: A.

DENT 566 Physical Diagnosis (1) Seminar on performing complete physical examination including basic assessment of overall patient, vital signs, cardiac, pulmonary, abdominal, extremities, neurologic, and head/neck. Examination techniques include observation, auscultation, percussion. Writing findings and interpreting physical examinations. Offered: S.

DENT 568- Internal Medicine for Dentistry ([1-3]-max. 6) Review of major organ systems, including normal anatomy and physiology, common pathophysiologies, medical interventions. Details modifications necessary for dental treatment and medical emergency management. Offered: AS.

DENT 640 P-Extramural Clinics in Geriatric Dentistry (2) Extramural geriatric clinical experience, including three days at a nursing home or community clinic, and brief didactic component. Credit/no credit only. Offered: AWSpS.

DENT 645 P-Hospital Rotation (2) Clinical experience that puts into practice the material presented in 537. The student is involved in hospital procedures and protocol and in dental care of the hospital patient as well as after-hours call duty. Offered: AWSpS.

DENT 650 P-Extramurals (*, max. 12) Extramural sites arranged to provide dental students, at varying levels of their education, with opportunities to treat a wide variety of patients in the delivery systems outside the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

DENT 655 Medical Emergency Management: Basic Life Support (1) Review of principles and practical applications for the management of medical emergencies in dental practice in conjunction with training and certification in Basic Life Support. Offered: S.

DENT 657 Comprehensive Clinic (1-10, max. 10) Clinical comprehensive care for patients. Offered: S.

DENT 659 Comprehensive Clinic (1-10, max. 10) Clinical comprehensive care for patients. Offered: S.

DENT 660 Temporomandibular Joint Diagnosis and Treatment (2, max. 8) Seminar and clinic sequence for comprehensive examination, diagnosis, and treatment of patients with temporomandibular joint problems. Includes management of dysfunction and morphologic alterations in associated muscles and occlusion. Prerequisite: permission of instructor. Offered: AW.

DENT 690 P-Extended Clinical Dentistry (1) Educational experiences in clinical dentistry. Available to students who have successfully completed the University of Washington Doctor of Dental Surgery curriculum and seek additional supervised experience in the delivery of oral health care services within three quarters of graduation and prior to licensure. Prerequisite: permission of instructor. Offered: AWSpS.

DENT 700 Master's Thesis (*) Offered: AWSpS.

Endodontics

Faculty

Chair

Gerald Glickman

Professors

Byers, Margaret R. * 1972, (Adjunct Research); PhD, 1969, Harvard University; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions.

Glickman, Gerald N. 2001; DDS, 1978, Ohio State University, MS, 1984, Northwestern University, MBA, 1988, Southern Methodist University, JD, 1994, Texas Wesleyan University; endodontics and biomaterials; Diplomate, American Board of Endodontics.

Harrington, Gerald W. * 1969, (Emeritus); DDS, 1959, St Louis University, MSD, 1969, University of Washington; endodontics.

Natkin, Eugene * 1962, (Emeritus); DDS, 1957, New York University, MSD, 1962, University of Washington; endodontics.

Oswald, Robert J. * 1974, (Affiliate); DDS, 1969, Virginia Commonwealth University; endodontics.

Steiner, James C. * 1992, (Clinical); DDS, 1956, Case Western Reserve University, MSD, 1966, University of Washington; normal sensory mechanisms of human dental pulp and pathologic alterations causing pain.

Associate Professor

Pitts, David Leroy * 1977; DDS, 1972, Indiana University, MSD, 1977, University of Washington; endodontics.

Assistant Professor

Oviir, Tiina 1999; DDS, 1986, University of Tartu (Estonia); biology and mechano-sensory system of pulp-dentin complex, dentinal (bone) fluid.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

ENDO 520 P-Introduction to Endodontics (2) Lecture course dealing with the differential diagnosis and the treatment of pulp pathosis and associated periapical pathosis. This course also deals with criteria and procedures for the evaluation of success and failure of endodontic treatment. Offered: Sp.

ENDO 531 P-Endodontic Technique (4) Laboratory course in root canal therapy in terms of present-day concepts. Treatment of extracted teeth as practice for clinical cases. Offered: A.

ENDO 534 P-Endodontic Clinical Procedures(1) Lecture course dealing with clinical procedures particular to endodontics, diagnosis and treatment of endodontic emergencies, and surgical management of endodontic problems. Offered: W.

ENDO 535 P-Clinical Management of Endodontic Treatment Problems (1) Management of a variety of technical problems frequently encountered in the

treatment of endodontic cases and the diagnosis and treatment of impact injuries to teeth. Offered: Sp.

ENDO 545 Honors Endodontics (2, max. 4) Seminar discussions of advanced endodontic diagnosis and treatment planning issues as well as clinical sessions on treatment of calcified negotiable canals, alternate instrumentation procedures and obturation systems. Credit/no credit only. Offered: W.

ENDO 550 P-Directed Studies in Endodontics (*, max. 6) See DPHS 449 for course description and prerequisite. Credit/no credit only.

ENDO 560 Advanced Endodontic Diagnosis and Treatment (2) Current concepts are presented and discussed relating to the diagnosis and treatment of pulpal and periapical pathosis. Criteria for evaluation of success or failure of root canal therapy are presented. Offered: W.

ENDO 561 Anatomical Basis for Clinical Endodontics (2) Root canal anatomy of significance in clinical endodontics is discussed in a seminar format. Offered: A.

ENDO 562 Anatomical Bases for Surgical Endodontics (2) Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship between periodontal and pulpal pathosis, including differential diagnosis and appropriate treatment planning, are discussed. Offered: Sp.

ENDO 563 Radiographic Interpretation (2) Various aspects of radiographic interpretation of particular relevance to endodontics, including interpretation of normal structures, acquired and developmental abnormalities, infections, sialoliths, dysplasias, cysts, malignant lesions, benign tumors, and various diseases other than tumors.

ENDO 568 Endodontic Practice Management (1) Essentials elements for establishing and managing a successful specialty practice in Endodontics. Prerequisite: ENDO 562. Offered: A.

ENDO 580 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 581 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 582 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 583 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 584 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 585 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 586 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 587 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and

related literature and discussion of research methods.

ENDO 590 Treatment Planning Seminar (2, max. 16) Weekly seminar to discuss controversial treatment problems and difficult diagnostic cases.

ENDO 593 Clinical Practice Teaching (1, max. 3) Closely supervised experience in teaching clinical endodontics to the undergraduate dental student.

ENDO 598 Endodontics Teaching Seminar (2) Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Offered: Sp.

ENDO 600 Independent Study or Research (*) Prerequisite: permission of graduate program adviser.

ENDO 630- P-Clinical Endodontics (1-, max. 7) Student is required to complete endodontic treatment of anterior, premolar, and molar teeth. In addition to nonsurgical treatment of several endodontic cases, the student assists with a periapical surgery. Student must complete seven quarters of 630 and all course requirements before a grade is awarded.

ENDO 658 Endodontic Emergency Rotation (1) Clinical experience in managing and treating patients in pain. Offered: AWSpS.

ENDO 660 Clinical Endodontics (4, max. 32) Clinical diagnosis and treatment of pulpal pathosis and related sequelae.

Oral and Maxillofacial Surgery

Faculty

Chair

Owen Ross Beirne

Professors

Beirne, Owen Ross * 1985; DMD, 1972, Harvard University, PhD, 1976, University of California (San Francisco); basic and clinical biology of bone tissue reconstruction, bone alloplasts, and anesthesia.

Gehrig, John D. * 1954, (Emeritus); DDS, 1946, MSD, 1951, University of Minnesota; oral and maxillofacial surgery, biological structure.

Kiyak, H. Asuman * 1977; MA, 1974, PhD, 1977, Wayne State University; geriatric dentistry, behavioral aspects of health care.

Oda, Dolphine * 1985; BDentS, 1975, University of Baghdad (Iraq), MSc, 1981, University of Manitoba (Canada); chemical and viral carcinogenesis and genetic alteration of oral cancer.

Worthington, Philip 1976; MD, 1956, BDentS, 1962, University of Liverpool (UK); oral and maxillofacial surgery.

Associate Professors

Bloomquist, Dale S. * 1972; DDS, 1969, University of Washington; oral and maxillofacial surgery.

Egbert, Mark A. 1986; DDS, 1981, University of Washington; oral and maxillofacial surgery.

Kinney, Lisa A. 1996; DDS, 1982, Case Western Reserve University; oral and maxillofacial surgery.

Assistant Professors

Evans, John R. 1982, (Clinical); DDS, 1975, University of Washington; oral and maxillofacial surgery.

Pirinjian, Goarik G. 1994; DDS, MD, 1984, Kirov Medical Institute (Armenia), PhD, 1989, Moscow Medical Institute (Russia); oral and maxillofacial surgery.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

O S 520 P-Local Anesthesia (2) Pharmacology, physiology, anatomy, and techniques of local anesthesia for dental students.

O S 530 Oral Surgery: Didactic (1, max. 3) Covers the scope of oral and maxillofacial surgery as practiced in the United States today. Introductory course for predoctoral dental students.

O S 532 P-Sedation and Pain Control (2) Techniques of sedation (oral, inhalational, intravenous) and pain control.

O S 550 P-Directed Studies in Oral Surgery (*, max. 16) See DPHS 449 for course description and prerequisite.

O S 560 Dental Sedation (2) For graduates of the various dental specialties on the theory, application, and techniques of dental sedation. All forms of sedation, including oral, intramuscular, intravenous, and inhalation, are covered. Clinical experience is provided in the second half of the quarter.

O S 630 P-Oral Surgery Clinic (2, max. 6) Clinical experience in simple and complex dentoalveolar and pre-prosthetic surgery. A problem-based course using an auto-tutorial approach covering the extraction of teeth, impaction surgery, medications, surgical complications, treatment of infections, bone cysts, maxillary sinus complications, and salivary gland and mucosal pathology.

O S 651 P-Harborview Clerkship (2-10, max. 10) Six-week rotation at Harborview Medical Center, including intensive instruction in oral surgery procedures and observing and assisting oral and maxillofacial surgery in the operating room. Credit/no credit only. Prerequisite: permission of department chairperson.

Oral Biology

Faculty

Chair

Kenneth Izutsu

Professors

Byers, Margaret R. * 1972, (Adjunct Research); PhD, 1969, Harvard University; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions.

Byers, Peter H. * 1976, (Adjunct); MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics.

Dale-Crunk, Beverly A. * 1972; PhD, 1968, University of Michigan; keratin biochemistry, epithelial differentiation, antimicrobial peptides.

Eyre, David R. * 1985, (Adjunct); PhD, 1969, University of Leeds (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism.

Herring, Susan W. * 1990, (Adjunct); PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

Izutsu, Kenneth * 1971; PhD, 1970, University of Washington; salivary gland physiology and pathophysiology, Ca²⁺ signaling in cell function and differentiation.

Keller, Patricia J. * 1983, (Emeritus); PhD, 1953, Washington University; protein structure and function.

King, Gregory J. * 1996, (Adjunct); DMD, 1969, Tufts University, MDSc, 1976, Harvard University; bone remodeling, bone cells, mineral metabolism, bone paracrine/endocrine mechanisms.

Lamont, Richard J. * 1988; PhD, 1985, University of Aberdeen (UK); pathogenic mechanisms of oral bacteria, host pathogen interactions, biofilms, gene regulation.

Morton, Thomas H. * 1975; DDS, 1972, Creighton University, MSD, 1975, University of Washington; oral pathology, oral medicine.

Robinovitch, Murray * 1966; DDS, 1961, University of Minnesota, PhD, 1967, University of Washington; salivary biochemistry and salivary anti-HIV activity.

Verdugo, Pedro * 1974, (Adjunct); MD, 1965, State University of Chile; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology.

Watson, Eileen L. * 1972; PhD, 1970, University of Utah; salivary gland physiology and regulation.

Associate Professors

Bordin, Sandra * 1981, (Adjunct Research); PhD, 1966, University of Ferrara (Italy); regulation of connective tissue repair by immune-inflammatory complement components.

Cunningham, Michael L. * 1988, (Adjunct); MD, 1988, University of Vermont, PhD, 1996, University of Washington; molecular, development, craniofacial, malformation, human, mouse, craniosynostosis, birth defects.

Darveau, Richard P. * 1989, (Adjunct Research); PhD, 1981, Washington State University; innate host defense interactions between bacteria and their hosts.

Presland, Richard B. * 1994; PhD, 1987, University of Adelaide (Australia); epithelial/epidermal differentiation, genetic diseases, regulation of development.

Rose, Timothy M. * 1991, (Adjunct); PhD, 1981, University of Geneva (Switzerland); molecular biology of tumor viruses, cell growth, differentiation, and transformation.

Wells, Norma J. 1960, (Adjunct); MPH, 1966, University of California (Los Angeles); oral health promotion, dental caries, dental hygiene education.

Assistant Professors

Cangelosi, Gerard A. * 1985, (Adjunct Research); PhD, 1984, University of California (Davis); molecular biology of tuberculosis.

Fatherazi, Sahba * 2000, (Research); PhD, 1979, University of London (UK); signaling pathway in salivary gland and epithelial cell.

Jackson, Douglass L. * 1997, (Adjunct); DMD, 1986, University of Pittsburgh, MS, 1989, University of Michigan, PhD, 1996, University of Minnesota; the peripheral regulation of sensory neurons during tissue injury.

Park, Yoonsuk * 1995, (Research); PhD, 1995, University of British Columbia (Canada); pathogenicity of an oral pathogen, *Porphyromonas gingivalis*.

Popowics, Tracy 1997; PhD, 1997, Brown University; dental biomechanics, craniofacial biology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

ORALB 449 Undergraduate Research Topics in Oral Biology (*) Individual research on topics selected in collaboration with a faculty member. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

ORALB 510- P-Development, Structure, and Function of Oral Tissues (3-) Development, microscopic and submicroscopic structure, functional aspects of hard and soft oral tissues. Embryonic development of head and neck; morphodifferentiation of face and oral structures. Structure-function relationships in descriptions of development and histology-ultrastructure of oral tissues by integration of traditional oral histology and oral physiology topics. Offered: WSp.

ORALB 520 P-Molecular Microbiology and Oral Diseases (3) *Lamont* Applies students' background knowledge in basic sciences to an understanding of the molecular bases of the interactions between microorganisms and oral tissues that lead to plaque formation and dental diseases. Principles of clinical aetiology and diagnosis of caries and periodontal diseases also covered. Offered: A.

ORALB 521 Medical Microbiology and Immunology (2) Bacterial structure, physiology and genetics. Viral structure and function. Bacterial and viral diseases of the respiratory tract, skin, GI tract, UG tract. Innate and adaptive immunity. Immune responses to infection, immunodeficiencies and autoimmunity.

ORALB 540 P-Clinical Oral Pathology Conference (2) *Morton* Seminar stressing basic science aspects and clinical findings of various oral lesions through exploration of etiology, pathogenesis, histopathology, and treatment modalities for oral pathology cases drawn from files of the Division of Oral Pathology. Offered: A.

ORALB 550 P-Directed Studies in Oral Biology (*, max. 12) *Morton* Selected readings and seminars on a topic chosen by individual arrangement in collaboration with a faculty member. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

ORALB 561- Oral Tissue Development, Structure, and Function (3, max. 6) Selected readings and discussions explore recent advances in cellular and molecular biology relevant to oral biology and medicine. Special emphasis on craniofacial and dental development, oral mucosa and periodontal tissues, salivary gland function, and olfaction and gustation. Prerequisite: permission of instructor. Offered: WSp.

ORALB 562 Supervised Teaching in Oral Biology (1-5, max. 10) 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 of instructor. Offered: A/WSp.

ORALB 565 Clinical Oral Pathology (1-3, max. 10) *Morton* Presentation of interesting oral lesions from the dental school and the University of Washington Medical Center 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 DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: A/WSpS.

ORALB 566 Surgical Oral Pathology (2-4, max. 16) Students are trained to interpret microscopic slides of lesions from the oral cavity and related areas, and to correlate these with the clinical findings. Each student is responsible for the grossing of specimens and the preparation of histology reports. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: A/WSpS.

ORALB 569 Advanced Oral Microbiology (2) *Lamont* Viral, bacterial classification; physiology; toxicity mechanisms reviewed. Formation and composition of plaque and calculus, and chemical methods of control discussed. Specific microbial floras of acute and chronic gingivitis, early onset forms of periodontitis, and adult periodontitis studied. Principles of antibiotic use reviewed. Offered: A.

ORALB 570 Seminar in Oral Pathology (1-3, max. 9) Consists of in-depth studies of specific oral diseases through use of seminar and discussion. Students are required to present literature reviews and to act as discussion leaders. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: A/WSpS.

ORALB 572 Oral Pathology (3, max. 6) *Oda* Survey of the diseases of the oral facial regions in lecture and laboratory sessions. Diseases of teeth and their supporting structures and diseases of the oral and para-oral soft tissues and bones. Correlations between clinical findings and histopathologic features. Attendance in the laboratory is required. Offered: AW.

ORALB 574 Clinical Stomatology (3) *Morton* Diseases of the oral cavity and jaw are presented as the practitioner encounters them-detailed clinical pictures, laboratory tests, radiographic findings, surgical exploration for the establishment of a therapeutic diagnosis. Offered: Sp.

ORALB 575 Oral Biology Seminar (1-3, max. 10) Presentation and discussion of current research problems by members of the staff, investigators from other departments in the University, visiting scientists, and trainees. Prerequisite: permission of instructor. Offered: A/WSp.

ORALB 576 Molecular Aspects of Epithelial Biology (2) *Dale* In-depth discussion of cytoskeleton, cell junctions, influence of growth factors, retinoids, and other exogenous agents on differentiation and function of normal stratified epithelia. Prerequisite: BIOC 440 (or equivalent) or permission of instructor. Offered: odd years; Sp.

ORALB 577 Applied Therapeutics in Dentistry (2) *Watson* Practical information about drugs included in practice of dentistry. Topics include evaluation of case histories, dental considerations pertaining to medical conditions and drug therapies, types of drugs and dosages used for common medical con-

ditions, the pharmacology of drugs prescribed by the clinician, and the mechanisms involved in drug interactions. Offered: odd years; A.

ORALB 578 Research Techniques in Oral Biology (2-4, max. 15) 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. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 579 Molecular Biology (2) *Presland* Applications of molecular biology and recombinant DNA methodologies to oral biology topics of interest in dental sciences. Credit/no credit only. Prerequisite: BIOCHEM 405 or BIOCHEM 406 or equivalent, and permission of instructor. Offered: even years; S.

ORALB 581 Secretory Process in Exocrine Glands (1-3, max. 3) *Izutsu* Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: A.

ORALB 582 Secretory Process in Exocrine Glands (1-3, max. 3) *Izutsu* Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: W.

ORALB 583 Secretory Process in Exocrine Glands (1-3, max. 3) *Izutsu* Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: Sp.

ORALB 591 Advanced Topics in Oral Biology and Medicine I (1-2, max. 2) *Herring, Izutsu* Review of current molecular and cellular advances in developmental biology relevant to head and neck embryology, tooth development and epithelial differentiation. Credit/no credit only. Offered: jointly with ORTHO 591; A.

ORALB 592 Advanced Topics in Oral Biology and Medicine II (1-2, max. 2) *Herring* Review of current scientific literature relevant to cranioskeletal development and growth, bone biology and orthodontic tooth movement. Credit/ no credit only. Offered: jointly with ORTHO 592; W.

ORALB 593 Advanced Topics in Oral Biology and Medicine III (1-2, max. 2) *Herring* Review of current scientific literature relevant to oral soft tissue structure and physiology, including mastication and swallowing, salivary glands, periodontium and dental pulp. Credit/no credit only Offered: jointly with ORTHO 593; Sp.

ORALB 600 Independent Study or Research (*) Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 700 Master's Thesis (*) Offered: AWSpS.

ORALB 800 Doctoral Dissertation (*) Offered: AWSpS.

Oral Medicine

Faculty

Chair

Edmond L. Truelove

Professors

Dworkin, Samuel F. * 1974, (Emeritus); DDS, 1958, PhD, 1970, New York University; dentistry and clinical psychology, pain, psychosomatic and illness-related behavior.

Epstein, Joel B. 1983; DMD, 1976, University of Saskatchewan (Canada), MSD, 1979, University of Washington.

Hollender, Lars Gosta * 1988; DDS, 1958, University of Lund (Sweden), PhD, 1964, University of Lund (Sweden); oral radiology.

Izutsu, Kenneth * 1971; PhD, 1970, University of Washington; salivary gland physiology and pathophysiology, Ca²⁺ signaling in cell function and differentiation.

Le Resche, Linda A. * 1983; DSc, 1977, Johns Hopkins University; epidemiology of pain, specifically gender and pain; nonverbal behavior (facial expression).

Morton, Thomas H. * 1975; DDS, 1972, Creighton University, MSD, 1975, University of Washington; oral pathology, oral medicine.

Omnell, Karl-Ake * 1981, (Emeritus); DDS, 1950, Royal Dental School (Sweden), DO, 1957, University of Lund (Sweden); oral radiology.

Schubert, Mark M. * 1974; DDS, 1974, MSD, 1981, University of Washington; oral medicine/oral oncology.

Truelove, Edmond L. * 1972; DDS, 1967, MSD, 1970, Indiana University; oral medicine, orofacial pain, stomatitis, and salivary gland disorders.

Associate Professors

Chasteen, Joseph E. 1989; DDS, 1967, University of Michigan, MA, 1976, University of Michigan; dental informatics and multi-media instructional programs.

Martin, Michael D. * 1986; DMD, 1979, University of Kentucky, MA, MPH, 1989, PhD, 1993, MSD, 1994, University of Washington; dental education in oral health care of persons with disability.

Sommers, Earl E. * 1972, (Clinical); DDS, 1971, Indiana University; diagnosis/management of orofacial pain, stomatitis, salivary gland disorders and dental management.

Stiefel, Doris * 1972, (Emeritus); DDS, 1954, University of Washington; dental education in oral health care of persons with disability.

Assistant Professors

Jackson, Douglass L. * 1997; DMD, 1986, University of Pittsburgh, MS, 1989, University of Michigan, PhD, 1996, University of Minnesota; the peripheral regulation of sensory neurons during tissue injury.

Middaugh, Dan 1967, (Emeritus); DDS, 1961, University of Minnesota, MPA, 1972, University of Washington; oral medicine.

Lecturers

Glass, Ernest G. 2000; DDS, 1968, University of Detroit, MSD, 1975, George Washington University, MSD, 1987, University of Washington.

Govin, Glenn M. 1999; DDS, 1985, University of Texas (San Antonio), MPH, 1992, University of Texas (Houston); dental education in oral health care of persons with disabilities.

Course Descriptions

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ORALM 404 Considerations in Care of the Patient With a Disability (*, max. 6) Role of auxiliaries in dental treatment of the special patient, including psychosocial issues, communication techniques, wheelchair transfers; dental prevention, medical and dental management of specific disabilities; drug therapy, sedation, and anesthesia. Offered: AWSpS.

ORALM 460 Clinical Management of Patients With Disabilities (*, max. 10) Participation in chair/bedside dental treatment of a broad range of disabled populations, including homebound and institutionalized patients. Offered: AWSpS.

ORALM 520 P-Introduction to Oral Radiology (2) Physical, biological, technical, and diagnostic aspects of dental x-ray procedures. Offered: AWSp.

ORALM 524 Communication Skills in Dentistry—Introduction to Patient Interviewing (1) Different aspects of verbal and non-verbal communication, recognizing obstacles to effective communication, and developing strategies to overcome communication obstacles. Clinical interviewing exercises.

ORALM 525 P-Introduction to Patient Assessment (1) Provides early clinical experience, and develops skills necessary to learn from patients what the practitioner needs to know about their social, medical, and dental histories to effectively understand the "whole patient" so as to diagnose, plan, and provide appropriate treatment. Offered: A.

ORALM 526 P-Physical and Oral Diagnosis (2) Techniques of patient assessment including history taking, physical examination, and interpretation of findings. Includes development of skills through participation in clinical sessions with patients. Offered: W.

ORALM 527 Introduction to Treatment Planning (1) Problem-oriented record system with basic concepts of treatment planning. Students prepare treatment plans in advance of seminar. Offered: Sp.

ORALM 528 P-General Medicine, Disabilities, and Oral Medicine (6) Review of fundamentals and specifics of most common medical, physical, mental, and psychological conditions that impact the practice of dentistry. Examines how to gather appropriate data and integrate information into plans and practices relevant to the routine management of patients in dental practices. Offered: S.

ORALM 531 P-Acute and Chronic Orofacial Pain (1) Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: A.

ORALM 532 P-Acute and Chronic Orofacial Pain (1) Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic

ic pain, including differential diagnosis, and behavioral factors. Offered: W.

ORALM 533 P-Acute and Chronic Orofacial Pain (2) Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: Sp.

ORALM 540 P-Oral Medicine Senior Seminar (2-, max. 4) Clinical conference devoted to case presentations of patients with dental treatment needs and complicating medical problems. Offered: AW.

ORALM 545- P-Clinical Conference in Oral Medicine (1-, max. 2) Clinical pathologic conference utilizing interdisciplinary approach to patient care and emphasizing basic science application. Offered: AW.

ORALM 550 P-Directed Studies in Oral Diagnosis (*, max. 12) See DPHS 449 for course description and prerequisite. Offered: AWPpS.

ORALM 564 Dental Care of the Disabled I (*, max. 10) Advanced topics in rehabilitation dentistry including psychosocial issues; characteristics and needs of patients with specific disabilities; patient management and use of portable equipment; drug therapy, sedation and anesthesia; dental prevention, and emergency procedures. Seminars and self-directed study. Prerequisite: permission of instructor. Offered: AWPpS.

ORALM 565 Oral Medicine Clinical Conference (*, max. 16) 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. Offered: AWPpS.

ORALM 567 Behavioral Management of Acute and Chronic Orofacial Pain (2) Overview of adult psychopathology and illness behavior as it relates to psychosomatic concepts and chronic pain. review of assessment and behavioral management strategies for the dental practitioner. Open to graduate students, postdoctoral fellows, residents in dentistry, medicine, psychology. Offered: Sp.

ORALM 570- Oral Medicine and Therapy (2-, max. 6) Lecture 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. Offered: AWPpS.

ORALM 576 Oral Medicine Literature Review (1) Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease. Offered: AWPpS.

ORALM 578 Dental Care of the Disabled Literature Review (1, max. 3) Review of the current scientific literature pertaining to disability issues, including research, clinical management, resources, and legislation pertaining to oral health of persons with disabilities. Credit/no credit only. Offered: AWPpS.

ORALM 580 Current Concepts in Oral Radiology (2) Lecture/seminar covering current concepts in oral radiology including technical factors, radiation risks, observer characteristics and variation, radiographic localization, interpretation, and overview of current extraoral techniques. Offered: AWPpS.

ORALM 581 Advanced Seminars in Oral Radiology (2, max. 8) Explores aspects of oral and maxillofacial radiology and related fields. Offered: AWPpS.

ORALM 584 Dental Care of the Disabled III (*, max. 10) Field practice in community outreach to facilities and agencies serving disabled populations. Includes observation, dental screenings, patient education

and in-service training of direct care staff. Prerequisite: ORALM 404 or ORALM 664. Offered: AWPpS.

ORALM 600 Independent Study or Research (*) Credit/no credit only. Offered: AWPpS.

ORALM 601 Oral Medicine Research Seminar (1, max. 10) Presentation and discussion of current research problems by graduate students, faculty, and investigators from other departments in the university. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

ORALM 630- P-Clinical Diagnosis and Oral Medicine ([1/2]-, max. 5) Develops skills in assessment of patients requiring comprehensive dental care. Includes interviewing and physical examination, radiographic interpretation, problem list formation, and chart documentation. Students participate in diagnosis and treatment of patients requiring emergency and specialized dental care. Offered: AWPpS.

ORALM 640- Advanced Clinical Diagnosis and Oral Medicine ([1/2]-, max. 3) Advanced instruction in diagnosis and management of patients requiring emergency and specialized care. Includes participation in clinical rotations to oral medicine specialty clinics. Offered: AWPpS.

ORALM 650 P-Oral Medicine Clinical Elective (1-6, max. 6) Opportunities for students to work in various clinical activities at local hospitals or other sites outside the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

ORALM 660 Rotations in Medical Disciplines (1-4, max. 24) 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. Credit/no credit only. Offered: AWPpS.

ORALM 663 Introduction to Educational Methods in Dentistry (2) Principles of teaching and learning, their applications in dental education. Basic principles include learning theory and cognitive processing, identifying prerequisite knowledge of learners, determining objectives of outcomes of learning, selecting appropriate methods and materials, using evaluation procedures. Increases understanding of instruction process to provide a sound foundation for teaching. Offered: AWPpS.

ORALM 664 Dental Care of the Disabled II (*, max. 10) Practicum in chair/bedside delivery of dental care to different disabled populations. Includes rotations to institutions, long-term care facilities, and home-bound service, using mobile equipment. Prerequisite: ORALM 564 and permission of instructor. Offered: AWPpS.

ORALM 665 Clinical Oral Medicine (*, max. 33) 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. Offered: AWPpS.

ORALM 670 Clinical Oral Medicine Teaching (1-4, max. 16) 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. Offered: AWPpS.

Orthodontics

Faculty

Chair

Gregory J. King

Professors

Herring, Susan W. * 1990; PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

King, Gregory J. * 1996; DMD, 1969, Tufts University, MDS, 1976, Harvard University; bone remodeling, bone cells, mineral metabolism, bone paracrine/endocrine mechanisms.

Little, Robert M. * 1974; DDS, 1966, Northwestern University, MSD, 1970, PhD, 1974, University of Washington; orthodontics.

Moffett, Benjamin C. * 1964, (Emeritus); PhD, 1952, New York University; anatomy.

Moore, Alton W. 1980, (Emeritus); DDS, 1941, University of California (San Francisco), MS, 1948, University of Illinois; orthodontics.

Ramsay, Douglas S. * 1983; DMD, 1983, University of Pennsylvania, PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

Associate Professors

Bollen, Anne-Marie 1990; DDS, 1984, University of Brussels (Belgium), MSD, 1986, PhD, 1990, University of Michigan; bone metabolism, skeletal growth and development.

Joondeph, Donald R. * 1971; DDS, 1967, MS, 1969, Northwestern University; orthodontics.

Course Descriptions

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ORTHO 449 Directed Studies in Orthodontics (*) See DPHS 449 for course description and prerequisite. Credit/no credit only. Offered: AWPpS.

ORTHO 520 P-Craniofacial Growth and Development in Orthodontic Diagnosis and Treatment (4) Basic principles of pre- and postnatal growth and development integrated with the recognition, analysis, and treatment planning of problems encountered in dental and skeletal malocclusions. Offered: Sp.

ORTHO 522 P-Beginning Adjunctive Orthodontics (2) Lecture/laboratory instruction in indications for, and techniques of, simple orthodontic tipping, rotational and extrusive movements, as well as orthodontic study model fabrication. Prerequisite: ORTHO 520. Offered: S.

ORTHO 550 P-Directed Studies in Orthodontics (*, max. 6) See DPHS 449 for course description and prerequisite. Offered: AWPpS.

ORTHO 551 Review of Selected Literature in Orthodontics (1) Students select a topic for review,

review appropriate literature, and prepare written critique. Offered: AWSp.

ORTHO 552 Journal Club (1) Predoctoral students join graduate students in review of current orthodontic literature. Offered: AWSp.

ORTHO 560 Orthodontics Seminar (1-5, max. 25) 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. Offered: AWSpS.

ORTHO 562 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 563 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 564 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 565 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 566 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 570 Roentgenographic Cephalometry (2) Basic principles, history, and techniques of roentgenographic cephalometry. Offered: AS.

ORTHO 575 Post-Retention Seminar (1, max. 2) Each student is required to locate three or more former orthodontic patients who qualify as at least ten years postretention. Complete orthodontic records must be obtained, analyzed, and discussed in the seminar. Instructor critiques the presentation and offers similar or contrasting cases for comparison. Offered: WSp.

ORTHO 580 Orofacial Biology (*, max. 8) Three-quarter sequence pertaining to craniofacial anatomy, development, and function. Summer quarter is combined lecture/laboratory on clinical and functional anatomy and may be taken separately. Autumn and winter quarters are lecture/seminars on development, growth, and function. Outside reading assignments by the students are discussed and critiqued during sessions. Offered: AWS.

ORTHO 582 Adult Orthodontics Seminar (2) Seminar for orthodontic, periodontic, and restorative dentistry graduate students in comprehensive, integrated diagnosis and treatment planning of the dental problems of the adult patient. Offered: AWSpS.

ORTHO 585 Surgical Orthodontic Diagnosis and Treatment Planning (3) Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diagnosis, and treatment planning for patients with major facial deformities. Offered: AWSpS.

ORTHO 584 Clinical Management of Cleft Lip and Palate and Craniofacial Anomalies (2) Management of these complex patients involves members of a dedicated, highly specialized multidisciplinary team. Insight gained into specific evaluation and treatment modalities of each discipline through lectures, seminars, assigned readings. Integrated approach to management is illustrated by attendance at craniofacial staffing and clinics. Prerequisite: graduate students in orthodontics. Offered: AW.

ORTHO 587- Management of Debilitated Dentitions (1-, max. 2) Integrated diagnosis and treatment planning for patients with edentulous spaces, emphasizing use of osseointegrated implants. Offered: AW.

ORTHO 589 Applied Psychology in Orthodontics and Pediatric Dentistry (1) Application of psychological theories, research, and intervention strategies to orthodontics and pediatric dentistry. Topics include the principles of behavior change, patient compliance with therapeutic regimens, and motivations for orthodontic treatment. Prerequisite: graduate standing in dentistry or permission of instructor. Offered: A.

ORTHO 590 Scientific Methodology in Dental Research (2) Review of the scientific method. Evaluation of dental literature. Discussion of proposed master's degree research projects. Formulation and discussion of hypothetical research projects related to orthodontics. Offered: W.

ORTHO 597 Preclinical Technique (1) Techniques of construction and manipulation of the edgewise arch mechanism. Offered: AWS

ORTHO 598 Archwire Formation (1) Principles of wire bending and the use of orthodontic pliers. Offered: AS

ORTHO 599 Biomechanics (1) Principles of biologic reactions to application of orthodontic forces. Credit/no credit only. Offered: S.

ORTHO 600 Independent Study or Research (*) Managing the experimental protocol. Data collection and analysis. Preparation and writing of a thesis or publishable manuscript. Prerequisite: permission of instructor. Offered: SpS.

ORTHO 630- P-Introduction to Clinical Orthodontics (1) Direct clinical application of principles of orthodontic diagnosis and treatment planning for simple orthodontic appliances to modify tooth position in preparation for definitive restorative and/or periodontal therapy. Prerequisite: ORTHO 522. Offered: ASpS.

ORTHO 631 Minor Orthodontic Treatment (1) Clinical treatment of minor orthodontic problems suitable for the general dentist i.e., direct clinical application of principles of orthodontic diagnosis and treatment planning for simple orthodontic appliances to modify tooth position in preparation for definitive restorative or periodontal therapy. Offered: AWSpS.

ORTHO 660 P-Clinical Orthodontics (1-6, max. 24) Clinical application of the techniques in the treatment of malocclusion. Offered: AWSpS.

ORTHO 682 Adult Orthodontics Clinic (1) Clinic for orthodontic graduate students in the treatment of the dental problems of the adult patient. Offered: AWSpS.

Pediatric Dentistry

Faculty

Chair

Peter K. Domoto

Professors

Domoto, Peter K. * 1973; DDS, 1964, University of California (San Francisco), MPH, 1975, University of Washington; pediatric dentistry, dental behavioral science.

Leggott, Penelope J. * 1993; BDentS, 1969, University of Bristol (UK), MSc, 1980, University of Illinois; pediatric dentistry.

Ramsay, Douglas S. * 1983; DMD, 1983, University of Pennsylvania, PhD, 1988, MSD, 1990, University of Washington; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry.

Weinstein, Philip * 1972, (Adjunct); PhD, 1971, University of Kentucky; dental behavioral science, treatment and prevention of fear and pain, clinical assessment.

Associate Professors

Peterson, Devereaux * 1982; DMD, 1975, MSD, 1977, PhD, 1980, University of Pittsburgh; pediatric dentistry, educational administration, dental treatment for medically compromised patients.

Assistant Professors

Coldwell, Susan E. * 1998, (Adjunct); MA, 1990, PhD, 1994, University of Pennsylvania; pain, anxiety, and taste preference.

Jackson, Douglass L. * 1997, (Adjunct); DMD, 1986, University of Pittsburgh, MS, 1989, University of Michigan, PhD, 1996, University of Minnesota; the peripheral regulation of sensory neurons during tissue injury.

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PEDO 520 P-Pediatric Dentistry (4) Introduction to clinical pediatric dentistry, including behavior management, oral diagnosis, preventive dentistry, dental anomalies, radiography, anesthesia, restorative procedures, pulpal therapy, interceptive orthodontics, and traumatic dental injuries of the child patient. Offered: S.

PEDO 524 P-Communication Skills II (1) Continuation of basic communication skills. Credit/no credit only. Offered: A.

PEDO 525 P-Management of Pediatric Patient Behavior (1) Introduction to selected theories of child development and application in dental setting; pediatric cognitive, affective, and social development and introduction to problematic child behaviors; use of social systems approach to overview child psychosocial development for the dentist. Credit/no credit only. Offered: W.

PEDO 550 P-Directed Studies in Pediatric Dentistry (*, max. 6) See DPHS 449 for course description and prerequisite. Offered: S.

PEDO 560 Fundamentals of Pediatric Dentistry (1) Preclinical laboratory, lecture course covering fundamentals of primary care in pediatric dentistry, including behavior management, dental emergencies, prevention, diagnosis and treatment planning, and infection control Offered: S.

PEDO 570 Pediatric Dentistry Seminar I (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: S.

PEDO 571 Pediatric Dentistry Seminar II (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: A.

PEDO 572 Pediatric Dentistry Seminar III (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: W.

PEDO 573 Pediatric Dentistry Seminar IV (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: Sp.

PEDO 574 Pediatric Dentistry Seminar V (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: S.

PEDO 575 Pediatric Dentistry Seminar VI (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: A.

PEDO 577 Pediatric Dentistry Seminar VIII (2) Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: Sp.

PEDO 580 Developmental Disabilities Seminar (1) Multidisciplinary approach to managing children with developmental disabilities. Offered: S.

PEDO 581 Developmental Disabilities Seminar (1) Multidisciplinary approach to managing children with developmental disabilities. Offered: A.

PEDO 582 Developmental Disabilities Seminar (1) Multidisciplinary approach to managing children with developmental disabilities. Offered: W.

PEDO 600 Independent Study or Research (*) Prerequisite: permission of instructor. Offered: AW.

PEDO 630- P-Clinical Pediatric Dentistry (1-, max. 7) Educational experiences in comprehensive clinical pediatric dentistry. Students register third and fourth years for 24 sessions in the pediatric dentistry clinic, a 3-day rotation at a community clinic, computer assisted clinical simulations, behavioral change projects, and a written analysis of videotaped patient/student clinic encounters. Offered: AWSpS.

PEDO 650 P-Pediatric Dentistry Extramurals (1-6, max. 6) Clinical extramurals in the field of children's dentistry. Prerequisite: permission of instructor. Offered: AWSpS.

PEDO 660 P-Clinical Pediatric Dentistry (1-3, max. 3) Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: S.

PEDO 661 P-Clinical Pediatric Dentistry (1-3, max. 3) Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: A.

PEDO 662 P-Clinical Pediatric Dentistry (1-3, max. 3) Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: W.

PEDO 663 P-Clinical Pediatric Dentistry (1-3, max. 3) Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: Sp.

PEDO 664 P-Clinical Pediatric Dentistry (1-3, max. 3) Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: S.

PEDO 667 P-Clinical Pediatric Dentistry (1-3, max. 3) Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: Sp.

PEDO 669 Supervised Clinical Teaching (1-3, max. 4) Graduate pediatric dental students provide clinical instruction for predoctoral dental students by supervising clinical sessions. Offered: AWSpS.

PEDO 670 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: S.

PEDO 671 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: A.

PEDO 672 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: W.

PEDO 673 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: Sp.

PEDO 675 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: A.

PEDO 676 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: W.

PEDO 677 Hospital Pediatric Dentistry (1-3, max. 3) Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: Sp.

PEDO 679 Care of the Disabled Pediatric Patient (1) Clinical experiences in the management of disabled patients. Offered: S.

PEDO 680 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: S.

PEDO 681 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: A.

PEDO 683 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: Sp.

PEDO 693 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: S.

PEDO 699 Pediatric Orthodontic Clinic (1-4, max. 4) Clinical orthodontic care for pediatric patients. Offered: AWSpS.

Periodontics

Faculty

Chair

Murray Robinovitch

Professors

Ammons, William F. * 1970, (Emeritus); DDS, 1959, University of Texas (Houston), MSD, 1970, University of Washington; periodontics.

Dale-Crunk, Beverly A. * 1972, (Adjunct); PhD, 1968, University of Michigan; keratin biochemistry, epithelial differentiation, antimicrobial peptides.

Johnson, Robert H. * 1981; DDS, 1962, McGill University (Canada), MSD, 1964, Indiana University; periodontics.

Lukehart, Sheila A. * 1980, (Adjunct Research); PhD, 1978, University of California (Los Angeles); immunol-

220 SCHOOL OF DENTISTRY / PERIODONTICS

ogy of infectious diseases, microbiology, sexually transmitted diseases.

Page, Roy C. *; DDS, 1957, University of Maryland, PhD, 1967, University of Washington; coninflammation, immunopathology, periodontal disease.

Persson, Gosta Rutger * 1985; DDS, 1967, PhD, 1978, University of Lund (Sweden); diagnosis of periodontal diseases and the consecutive process of clinical decision making.

Robertson, Paul B. * 1992; DDS, 1966, MS, 1972, University of Alabama; host-bacterial interactions in the etiology and pathogenesis of the periodontal diseases.

Robinson, Murray * 1966; DDS, 1961, University of Minnesota, PhD, 1967, University of Washington; salivary biochemistry and salivary anti-HIV activity.

Associate Professors

Bordin, Sandra * 1981; PhD, 1966, University of Ferrara (Italy); regulation of connective tissue repair by immune-inflammatory complement components.

Darveau, Richard P. * 1989; PhD, 1981, Washington State University; innate host defense interactions between bacteria and their hosts.

O'Neal, Robert B. * 1995; MEd, 1971, Wayne State University, DMD, 1971, University of South Carolina; periodontics.

Assistant Professor

Roberts, Frank A. 1996; DDS, 1990, University of Tennessee, PhD, 1996, University of Alabama; immunological and biochemical regulatory mechanisms of inflammatory periodontal disease progression.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crsctat/.

PERIO 449 Directed Studies in Periodontics (*) See DPHS 449 for course description and prerequisite.

PERIO 517 Introduction to Periodontics (2) Epidemiology, natural history, etiology, histopathology, and genetics of various periodontal diseases. Offered: Sp.

PERIO 525- P-Prevention/Periodontics (2-) Introduction to periodontal therapy. Offered: W.

PERIO -526 P-Prevention/Periodontics (-2) Overview of preventive dentistry, introduction to periodontal therapy. Offered: Sp.

PERIO 530- P-Principles of Periodontics (2-) Diagnosis of periodontal diseases and development of a treatment plan including maintenance program, rationale for non-surgical, surgical, and antibacterial management of periodontal diseases. Discussion of principles of various periodontal procedures. Prerequisite: PERIO 525-526 and PERIO 527. Offered: A.

PERIO -531 P-Principles of Periodontics (-2) Seminar emphasizing multidisciplinary approach to comprehensive treatment planning. Offered: W.

PERIO 542 Advanced Periodontics (1) Designed to improve the understanding of sequencing of patient care and providing periodontal therapy into the per-

spective of a comprehensive care system. Offered: Sp.

PERIO 550 P-Directed Studies in Periodontics (*, max. 6) See DPHS 449 for course description and prerequisite.

PERIO 561- Periodontal Case Management (2-, max. 8) Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutics. Offered: AWSp.

PERIO 566 Practice Management (1) Aspects of setting up and administering a private periodontal practice. Financing, insurance, office design, equipment, employees, professional forms, marketing strategies, and patient management. Prerequisite: PERIO 561. Offered: S.

PERIO 567 Oral Medicine Case Studies (1, max. 3) Weekly seminar discussing series of unknown oral and perioral conditions. Discussion of history taking, differential diagnoses, relevant tests, therapeutic approaches, and outcomes. Offered: AWSp.

PERIO 574 Periodontal Microbiology (2) Viral, bacterial classification; physiology; toxicity mechanisms reviewed. Formation and composition of plaque and calculus, and chemical methods of control discussed. Specific microbial floras of acute and chronic gingivitis, early onset forms of periodontitis, and adult periodontitis studied. Principles of antibiotic use reviewed. Offered: jointly with ORALB 569; A.

PERIO 575 Immunologic Aspects of Oral Diseases (2) Lecture course designed to acquaint students with basic concepts of immunology and immunopathology. Topics include cellular immunology, antibody structure and function, complement system, immunopathologic mechanisms, tumor immunology and immunologic manifestations in mucocutaneous oral lesions as well as immunology of caries and periodontal disease. Offered: W.

PERIO 576 The Molecular and Cellular Biology of the Periodontium (2) Nucleic acid, protein, and carbohydrate biochemistry reviewed. Roles of collagens and proteoglycans in gingival tissues and the organization of oral epithelia discussed. Structures of human and animal periodontal lesions compared. Cellular and molecular inflammatory and immunological mechanisms in periodontal disease discussed. History, classification, and epidemiology of periodontal diseases described. Offered: Sp.

PERIO 577 Review of Literature (2, max. 16) Concise review of the scientific periodontal literature with specific focus on studies of periodontal diagnosis, wound healing, periodontal regeneration, microbiology, and implant procedures. Offered: AWSpS.

PERIO 582- Periodontic Treatment Planning Seminar (1-, max. 12) Weekly seminar involved with the presentation, discussion, and tentative solution of moderate to complex problems in diagnosis and treatment. Offered: AWSpS.

PERIO 585- Periodontal Therapy Seminar (1-, max. 12) Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease. Offered: AWSpS.

PERIO 586- Longitudinal Evaluation of Periodontal Therapy (1-, max. 9) Close examination of case progress from initial therapy to most recent maintenance visits to determine efficacy of method, demands upon patient, and temporal effect of therapy and survival. Preparation and delivery of a lecture on a therapeutic modality. Offered: AWSp.

PERIO 592- Prescription Surgery (1-) Clinical course in periodontal surgery in which surgical procedures are performed on prescription basis for patients undergoing therapy in the undergraduate dental clinic. Exposes student to a wider spectrum of

patients and to stimulate an environment in which the student can encounter the problems in communication and patient management that occur in the private sector.

PERIO 600 Independent Study or Research (*) Prerequisite: permission of graduate program adviser.

PERIO 620 P-Introduction to Clinical Periodontics (1) Clinical periodontics, with emphasis on examination, assessment, and treatment planning. Offered: S.

PERIO 630- P-Periodontics (1-) Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 517. Offered: A.

PERIO -631 P-Periodontics (-1-) Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 517. Offered: W.

PERIO -632 P-Periodontics (-1) Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 517. Offered: Sp.

PERIO 640- P-Advanced Clinical Periodontics (1-) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: A.

PERIO -641- P-Advanced Clinical Periodontics (-1-) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: W.

PERIO -642 P-Advanced Clinical Periodontics (-1) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: Sp.

PERIO 660- Clinical Periodontics ([2-6]-, max. 60) Clinical experience in diagnosis and treatment of periodontal disease.

PERIO 663 Pre-Prosthodontics Clinical Periodontics (*) Clinical diagnosis and treatment of periodontal disease for nonperiodontics student. Prerequisite: permission of department chairperson.

PERIO 665 Clinical Practice Teaching (*) Supervised experience in teaching clinical periodontics to undergraduate dental students.

PERIO 685 Hospital Periodontics (1) Preparation in periodontics to practice in hospital situations, including experience in operation of nitrous oxide analgesia, general anesthesia, intravenous premedication, treating of out- and inpatients.

Prosthodontics

Faculty

Chair

L. Brian Toolson

Professors

Bolender, Charles L. * 1959, (Emeritus); DDS, 1956, MS, 1957, University of Iowa; removable prosthodontics.

Brudvik, James S. * 1979, (Emeritus); DDS, 1957, University of Minnesota; removable prosthodontics.

Frank, Richard P. * 1971; DDS, 1962, University of Iowa, MSD, 1968, University of Washington; removable prosthodontics.

Smith, Dale E. * 1972, (Emeritus); DDS, 1952, University of Pittsburgh, MSD, 1962, University of Washington; removable prosthodontics.

Associate Professors

Faine, Mary P. 1982, (Emeritus); MS, 1975, University of Washington; nutrition.

Rubenstein, Jeffrey E. * 1989; DMD, 1975, Tufts University, MS, 1980, University of Texas (Houston); maxillofacial and implant prosthodontics.

Toolson, L. Brian * 1970; DDS, 1967, MSD, 1977, University of Washington; removable prosthodontics.

Lecturers

Phillips, Sandra L. 1988; MPA, 1985, University of Washington.

Press, Randi J. 1998; DDS, 1995, Western Ontario University (Canada), MSD, 1999, University of Washington; implant prosthodontics.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

PROS 520 P-Introduction to Complete Dentures-Lecture (3) Didactic course in the treatment of completely edentulous patients. Instruction is provided in diagnostic procedures, complete denture construction, and maintenance care. Offered: A.

PROS 521 P-Management of Immediate Denture Patients (1) Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overdenture). Offered: S.

PROS 523 P-Removable Partial Denture Design (2) Lectures in the basic principles of removable partial denture design. Practical drawings and more advanced designs are discussed in seminars. Certain technical aspects of design procedures are done in the classroom. Offered: W.

PROS 525 P-Removable Partial Denture Clinical Preparatory Course (4) 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 exer-

cises prior to beginning prosthodontic treatment of a partially edentulous patient. Offered: S.

PROS 560 Complete and Immediate Dentures (2) Lecture/seminar devoted to the diagnosis and treatment of the completely edentulous patient and the immediate denture patient, with emphasis on management of patients with difficulties in treatment. Offered: A.

PROS 562 Removable Partial Dentures (2) Lecture/seminar concentrating on factors peculiar to fabrication of removable partial dentures, with emphasis on management of combined fixed and removable therapy. Offered: W.

PROS 563 Maxillofacial Prosthetics I (1) Introductory lecture/seminar series with emphasis on diagnosis and prosthodontic rehabilitative treatment of patients who have experienced trauma or have congenital or acquired defects in the oral region. Offered: S.

PROS 564 Maxillofacial Prosthetics II (1) Introductory lecture series focusing on the prosthodontic rehabilitation of patients with loss and compromise of facial anatomy, i.e., ocular, orbital, nasal, auricular, combination intraoral/extraoral, and other related facial deformities.

PROS 571 Review of Literature Seminar (1, max. 12) Continuous weekly seminar devoted to the review of prosthodontic and related literature.

PROS 572 Special Topics Related to Prosthodontics (1) Lecture-seminar series focusing on relating principles of basic science to clinical application in prosthodontics. A wide and varied range of topics including surgery, psychology, speech, pharmacology, practice management, physiology, temporomandibular/myofascial joint dysfunction.

PROS 600 Independent Study or Research (*) Prerequisite: permission of graduate program adviser.

PROS 620- P-Clinical Complete Dentures (1/3, max. 3) Basic principles of complete denture fabrication and of diagnosis and treatment of completely edentulous patient. In second quarter student completes denture patient care, provides follow-up treatment, and participates in four competency examinations. Offered: AW.

PROS 630- P-Clinical Prosthodontics (1-, max. 3) Clinical course involving the diagnosis and management of completely and partially edentulous patients. Removable partial dentures and immediate dentures are fabricated. Follow-up care provided for patients previously treated.

PROS 640- P-Clinical Prosthodontic Maintenance (1-, max. 3) Clinic involving additional patient treatment with complete, partial, or intermediate dentures, plus indirect relines, managing adjustment chair, peer review, recall clinic, and follow-up care for patients previously treated. Offered: AWSp.

PROS 650 P-Extramurals in Prosthodontics (*, max. 12) Elective clinical experiences or clinical practice teaching. Credit/no credit only. Prerequisite: permission of instructor.

PROS 660 Clinical Prosthodontics (1-2, max. 6) Practical application of material covered in 560 and 562.

PROS 665- Clinical Practice Teaching (1-, max. 4) Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

Restorative Dentistry

Faculty

Acting Chair

Richard B. McCoy

Professors

Canfield, Robert C. * 1967, (Emeritus); DDS, 1951, University of Washington; restorative dentistry.

Hamilton, A. Ian * 1968, (Emeritus); DDS, 1936, University of Toronto (Canada), MA, 1958, University of Washington, PhD, 1968, University of London (UK); restorative dentistry.

Hodson, Jean Turnbaugh * 1952, (Emeritus); MS, 1958, University of Washington; restorative dentistry.

Johnson, Glen H. * 1980; DDS, 1978, University of Washington, MS, 1983, University of Michigan; instruction, clinical trials and laboratory research with dental bio materials.

Morrison, Kenneth N. * 1948, (Emeritus); DDS, 1943, University of Toronto (Canada), MSD, 1952, University of Washington; restorative dentistry.

Nicholls, Jack I. * 1965; PhD, 1965, Purdue University; dental materials.

Warnick, Myron E. * 1956, (Emeritus); DDS, 1955, University of Alberta (Canada); restorative dentistry.

Yuodelis, Ralph A. * 1963, (Emeritus); DDS, 1955, University of Alberta (Canada), MSD, 1964, University of Washington; restorative dentistry, periodontics.

Associate Professors

Bales, David J. 1983; DDS, 1957, University of Washington, MSD, 1972, Indiana University; restorative dentistry.

Chasteen, Joseph E. 1989, (Adjunct); DDS, 1967, MA, 1976, University of Michigan; dental informatics and multi-media instructional programs.

Johnson, Barton S. * 1991; DDS, 1985, MS, 1989, University of California (Los Angeles); hospital dentistry, medical compromise, oncology, sedation, pharmacology, molecular biology.

Lepe, Xavier * 1993; DDS, 1980, University of Guadalajara (Mexico), MS, 1987, Loyola University (Chicago); dental materials.

Ostlund, Lyle E. 1972, (Emeritus); DMD, 1947, University of Oregon, PhD, 1993, Johns Hopkins University; restorative dentistry.

Assistant Professors

Alberts, Marco 2001, (Clinical); DMD, 1979, Catholic University of Nijmegen (Netherlands), MPH, 1999, University of South Florida; public health dentistry, hospital dentistry, geriatric dentistry.

Aw, Tar C. 1995; DDS, 1990, Northwestern University, MS, 1995, University of Michigan; restorative dentistry, operative dentistry, dental materials, computers.

Junge, Thomas 2000, (Clinical); DDS, 1988, Pontifical Catholic University (Brazil), MSD, 1997, University of Washington; implants, post/core systems.

Phillips, Keith M. 1990; DMD, 1987, University of Pennsylvania, MSD, 1991, University of Washington; restorative dentistry, fixed prosthodontics, implants.

Schwedhelm, E. Ricardo 1994, (Clinical); DDS, 1978, Universidad Tecnologica de Mexico (Mexico), MSD, 1983, Indiana University; tooth fracture, restoration of endodontic-treated teeth, laboratory procedures, treatment planning.

Verhoef, Douglas R. 1998; DDS, 1973, University of Washington; fixed prosthodontics.

Senior Lecturer

McCoy, Richard B. 1992; DDS, 1961, University of Washington, MS, 1973, Loma Linda University; restorative dentistry.

Lecturer

Townsend, John D. 1977; DDS, 1967, McGill University (Canada), MSD, 1973, University of Washington; restorative dentistry, fixed prosthodontics, periodontics, implants.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crsca/.

RES D 510- P-Dental Materials Science ([1/2]-, max. 3) Basic concepts of dental materials science including physical, mechanical, chemical, and biological properties of restorative dental materials. Clinical use of restorative dental materials also presented. Offered: WSp.

RES D 511 P-Applied Dental Materials (3) Lecture/laboratory emphasizing proper use of restorative dental materials through simulated clinical projects. Student self-evaluation also emphasized. Offered: Sp.

RES D 515 P-Dental Anatomy (3) Lecture and laboratory on the morphology and nomenclature of individual teeth of the adult human dentition. Introduction to tooth histology and function and the influence of tooth anatomy on clinical dental procedures. Offered: A.

RES D 516 P-Introduction to Occlusion (3) Lecture/laboratory in the functional determinants of occlusal morphology. Preparation and waxing techniques for developing opposing quadrants by the additive waxing technique. Offered: W.

RES D 517 P-Functional Analysis of Occlusion (3) Clinical and laboratory experiences in examination and charting of patient's occlusion, record-taking for analysis of occlusion on a dental articulator, and pre-clinical diagnostic correction of problems of occlusion on articulated clinical casts. Provides basic background or technique information relative to laboratory and clinical experiences. Offered: Sp.

RES D 519 P-Operative Dentistry (1) Lecture series introducing operative dentistry. Nomenclature, cavity classification, instrumentation, pulp protection, and principles of cavity preparation. Offered: Sp.

RES D 520 P-Introduction to Operative Dentistry Technique (3) Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for one-surface restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: A.

RES D 521 P-Introduction to Operative Dentistry Technique (3) Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for multiple-surface direct filling restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: W.

RES D 522 P-Introduction to Operative Dentistry Technique (3) Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for proper coverage cast gold and foundation buildup restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: Sp.

RES D 525 P-Fixed Prosthodontics (3) Serves as introduction to area of restorative dentistry dealing with indirect partial-coverage restorations and complete coverage restorations. Preclinical experience provided in tooth preparation, provisional restoration, and fabrication for various crown designs. Projects emphasize the various designs of single-tooth preparations and restoration. Offered: A.

RES D 526 P-Fixed Prosthodontics (3) Serves as introduction to area of fixed prosthodontics dealing with multiple-unit restorations. Preclinical experience provided with multiple tooth preparations and provisional restoration. Fabrication for various crown designs, singly and in conjunction with various pontic and connector types, to serve as fixed partial denture prostheses. Projects emphasize multiple-tooth preparation/restoration and implant-supported restorations. Offered: W.

RES D 527 P-Fixed Prosthodontics (3) Serves as introduction to area of fixed prosthodontics dealing with esthetic veneer indirect restorations. Preclinical experience provided in tooth preparation and restoration, fabrication for various esthetic veneer crown designs, singly and in conjunction with various pontic types to serve as fixed partial denture prostheses. Projects emphasize anterior single- and multiple-tooth preparation/restoration, provisional prostheses, and esthetic veneer restorations. Offered: Sp.

RES D 530 P-Restorative Dentistry (2) Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Emphasis on single-unit gold and esthetic veneer clinical procedures. Offered: A.

RES D 531 P-Restorative Dentistry (2) Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Emphasis on multiple-unit gold and esthetic veneer clinical procedures. Offered: W.

RES D 532 P-Restorative Dentistry (2) Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Offered: Sp.

RES D 540 Implant Dentistry (2) Introduction to dental implantology based on lectures and laboratory activities. Offered: A.

RES D 541 P-Advanced Restorative Dentistry (2) Broadens base of restorative procedures. Introduction of new techniques and presentation of complex restorative treatment involving other specialties. Offered: W.

RES D 542 P-New Developments in Dental Materials (1) Dental materials recently introduced to dental profession reviewed, compared to current materials, and clinically demonstrated. Offered: Sp.

RES D 550 P-Directed Studies in Restorative Dentistry (*, max. 6) See DPHS 449 for course description and prerequisite. Offered: AWSpS.

RES D 570 Review of Literature Seminar (1, max. 6) Continuous weekly seminar devoted to a review of restorative and related literature, and discussion of teaching methods, philosophy of teaching and treatment. Offered: AWSp.

RES D 580- Restorative Treatment Planning Seminar (1-, max. 8) Continuous weekly seminar to discuss controversial treatment problems and difficult diagnostic cases selected for graduate students. Offered: AWSp.

RES D 585 Advanced Dental Materials Science (2) Advanced concepts of dental materials science including physical, mechanical, chemical, and biological properties of restorative dental materials. Emphasis also on research design, testing methods, and proper selection of dental materials for clinical practice. Offered: W.

RES D 588 Masticatory Functional Analysis and Occlusal Adjustment (2) Lecture/seminar and clinical sessions in the study of the physiology of occlusion. Pertinent literature reviewed and discussed from the multidisciplinary viewpoint. The clinical sessions include training in masticatory functional analysis and treatment of occlusally related diseases. Offered: A.

RES D 589 Review of Literature in Occlusion (2) Seminar to review pertinent literature in occlusion. Offered: S.

RES D 590- Fundamentals of Fixed Prosthodontics (2-, max. 4) 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 articulators. Offered: A.

RES D 600 Independent Study or Research (*) Prerequisite: permission of graduate program adviser. Offered: AWSpS.

RES D 620 P-Introduction to Clinical Restorative Dentistry (3) Orientation to restorative clinical operations, administrative procedures associated with patient management and completion of initial treatment plans. Emphasizes problem-based learning, treatment outcomes, the sequence of clinical treatment, and the diagnosis and management of caries-susceptible patients. Offered: S.

RES D 630- P-Clinical Restorative Dentistry ([1-3]-, max. 9) Clinical training in fundamental restorative dentistry procedures, including diagnostic, treatment planning, and therapeutic aspects of operative dentistry, fixed prosthodontics, and occlusal treatment. Offered: AWSp.

RES D 640- P-Advanced Clinical Restorative Dentistry ([1-3]-, max. 12) Clinical training in restorative dentistry procedures, including diagnostic, treatment planning, and therapeutic aspects of operative dentistry, fixed prosthodontics, and occlusal treatment. Offered: AWSp.

RES D 650 Restorative Dentistry Clinical Elective (1-6, max. 12) Elective offering in clinical areas related to discipline. Offered: AWSpS.

RES D 659 P-Restorative Dentistry Extended Learning (*, max. 4) Supplemental work in restorative dentistry to correct an area of student deficiency. Credit/no credit only. Offered: S.

RES D 660- Oral Rehabilitation ([1-6]-, max. 32)

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. Offered: AWSpS.



College of Education

Dean

Patricia Wasley
222 Miller

Associate Deans

James Antony
Deborah E. McCutchen



General Catalog Web page:
www.washington.edu/students/genocat/academic/College_Education.html



College Web page:
www.educ.washington.edu

The College of Education is a graduate and professional school dedicated to equity and excellence in education through the preparation and on-going renewal of education professionals, the promotion of social justice, the advancement of knowledge through research, and the connection of research to inform policy and improve practice. The College has four broad curricular areas: Curriculum and Instruction, Educational Leadership and Policy Studies, Educational Psychology, and Special Education. Degrees conferred are M.Ed., Ph.D., Ed.D., and M.I.T. Certificates can be earned in teaching (elementary, secondary, and special education), school administration (principals, program administrators, and superintendents), school counseling, mental health counseling, and school psychology.

The College of Education at the University of Washington believes that an effective public education system for a diverse citizenry is the cornerstone of a democratic society. To that end, the College dedicates its resources to helping make an excellent education an everyday reality for every student in every community across the state and country. As part of a major university located in a metropolitan area, the College is able to work in collaboration with a number of school districts in the area to provide teaching, research, and field experiences for its students.

Special Offices and Services

The College of Education maintains a number of specialized offices to assist in the fulfillment of its goals. Among these are the Office of Teacher Education, the Office of Student Services, and the Office of Minority Recruitment and Retention. In addition, the College of Education maintains formal relationships with a number of school districts in the area to provide research and field experience opportunities for students in the various programs. Individuals interested in teacher certification or in graduate degree programs may visit the College's Web site at www.educ.washington.edu or email edinfo@u.washington.edu.

Professional Certification

The College of Education is authorized by the State Board of Education to offer professional certificate programs in education for administrators, educational staff associates, and teachers. Academic counselors are available to help with pre-program coun-

seling, long-range planning, applications, registration, referrals to other campus resources, general program advising, and continuing/professional certificate requirements.

Administrator Certificates

Administrator Certificate preparation programs for superintendents, principals, and program administrators are offered through the College of Education. The following Web sites contain specific information about admissions, curriculum, faculty, and general advising:

For principals and program administrators, the Danforth Educational Leadership Program, depts.washington.edu/k12admin/principal.html

For superintendents, the School District Leadership Program, depts.washington.edu/k12admin/superintendent.html

Educational Staff Associate Certificates

Educational Staff Associate Certificate preparation programs are offered for the school counselor, school psychologist, school speech language pathologist or audiologist (SLP), occupational therapist, and school social worker. Information concerning requirements and admission may be obtained as follows: school counselor and school psychologist—College of Education Office of Student Services, 206 Miller, or Area of Educational Psychology, 312 Miller, Box 353600, University of Washington, Seattle, Washington 98195-3600; school speech language pathologist or audiologist—Department of Speech and Hearing Sciences, 203 Eagleson, Box 354875, University of Washington, Seattle, Washington 98195-4875; occupational therapist—Department of Rehabilitation Medicine, CC902 University of Washington Medical Center, Box 356490, Seattle, Washington 98195-6490; school social worker—School of Social Work, Box 354900, University of Washington, Seattle, Washington 98195-4900.

Teaching Certificates

The College of Education is authorized by the State Board of Education to prepare and recommend individuals for Residency and Professional Teaching Certificates. The Teacher Education Program is accredited by the National Association of State Directors of Teacher Education and Certification, and the National Council for Accreditation of Teacher Education. Graduates are qualified for certification in all states party to the Interstate Certification Compact and in other states as well.

Title II of the Higher Education Act requires institutions of higher education and states that approve such programs to develop and publish an annual report on their teacher preparation programs. The University of Washington report may be viewed on the Web at www.educ.washington.edu/COEWebSite/pdf/Title2.pdf, or requested via email from edinfo@u.washington.edu.

Residency Teaching Certification Program

The College of Education offers residency teaching certification for individuals desiring careers as elementary or middle/secondary school teachers, or as special education teachers working with students with severe disabilities or emotional and behavioral disorders, and with infants, toddlers, and preschool children with disabilities. Candidates may also select a teacher education/special education option which provides initial certification in elementary education with course work in special education. All programs are offered at the master's level. For additional information, email edinfo@u.washington.edu, or visit the College's Web site at www.educ.washington.edu.

An undergraduate or postbaccalaureate program leading to certification in music education, grades K-12, is offered through the School of Music. For additional information contact the School of Music Advising Office, 116 Music, Box 353450, University of Washington, Seattle, WA 98195-3450.

Professional Teaching Certificates

For information on the OSPI guidelines and where programs exist, contact any Educational Service District or the Office of Professional Licensing and Certification, OSPI, Box 47200, Old Capitol Building, Olympia, Washington 98504, or visit www.k12.wa.us/cert/. For information about Professional Teacher Certificate programs at the University, contact the Office of Teacher Education at 206-543-1754.

Endorsements on Teaching Certificates

Teachers holding an initial/residency or continuing/professional teaching certificate may add endorsements to their certificates which will qualify them to teach additional subjects. Information on endorsement requirements is available on the Web at www.educ.washington.edu/COEWebSite/research/rofdev/endorse.htm, or contact the Office of Teacher Education, 211 Miller, Seattle, WA 98195-3600, or email teached@u.washington.edu.

Graduate Degree Programs

Graduate Program Coordinator
206 Miller, Box 353600
206-543-7833
edinfo@u.washington.edu

The College of Education currently offers four advanced degrees: Master in Teaching, Master of Education, Doctor of Education, and Doctor of Philosophy. The M.I.T. degree will be awarded to elementary and secondary certification students at the completion of their program. Graduate students may specialize their degree studies in teacher preparation, curriculum and instruction, educational psychology including cognitive studies, educational leadership and policy studies, or special education. A focus on higher education leadership leading to Master of Education or Doctor of Education degrees is offered through the Evening Degree Program. Questions regarding graduate study in education should be directed via email to edinfo@u.washington.edu, or visit the College's Web site at www.educ.washington.edu.

Master in Teaching

The Master in Teaching (M.I.T.) degree program results in a Washington residency teaching certificate for elementary or secondary (specific subjects) school teaching. The program is an integrated sequence of full-time, daytime course work and field experiences spanning five quarters. One quarter is devoted to full-time placement in a school. Field experiences are in schools in the Seattle/Puget Sound area chosen to provide a variety of situations in regard to level, school population, and location.

Master of Education

The Master of Education (M.Ed.) degree requires a minimum of 45 credits, including at least 15 credits in a specialized area of study in education; 9 credits related to, but outside of, the specialization, some course work outside education; 9 thesis credits or, for the non-thesis option, 9 credits in a field study or other approved project; and a final examination.

Doctor of Education

The Doctor of Education (Ed.D.) degree is designed to prepare professionals whose primary interest is to

deal directly with problems of educational practice. The program of study leading to the Ed.D., as a professional degree, focuses on the utilization of research and practitioners' knowledge, rather than on the production of research knowledge. Those who aspire to positions as master teachers, curriculum designers, or learning resource specialists, for example, would appropriately seek the Doctor of Education degree.

This professional degree requires at least two years of resident study, a program of specialized study with credit in education and related fields, sufficient preparation in research methodology to interpret research findings for use in practice, an internship and leadership training, a General Examination, a dissertation on a problem of educational practice, and a Final Examination.

Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) in education is a research degree. It offers preparation for a career of research on issues fundamental to education—issues that range from fairly narrow questions about human learning to macroquestions regarding the form of societies' educational institutions. The scope of the Ph.D. degree in education is broad. It is possible to pursue a degree organized around traditional study areas such as educational psychology, curriculum and instruction, special education, or educational leadership and policy making. A student may develop a course of study that integrates various elements of more than one study area (e.g., multiethnic education and literacy). One of the study options in the Ph.D. program is school psychology, which prepares students for the professional practice of psychology with school-age children, as well as for research.

Degree requirements include a minimum of two years of resident study, a program of specialized study with credits both in education and in other academic units, preparation in research methodology adequate to design and assess research in the field of specialization, sufficient study in cognate fields inside and outside of education to ensure that the candidate can place the specialized research in a broader context, a General Examination, a research dissertation, and a Final Examination.

Accreditation

Within the College of Education, a number of degree programs have formal accreditation. The School Psychology Ph.D. program is accredited by the American Psychological Association (APA) and the National Association of Social Psychologists (NASP). The School Psychology M.Ed. program is also accredited by NASP and the Washington State Board of Education for Initial Residency and Continuing/Professional teaching Certificates and Initial/Residency certification. The School Counseling M.Ed. program is also accredited by the Washington State Board of Education for Initial/Residency and Continuing/Professional teaching certificates and Initial/Residency certification. The administrator preparation programs are accredited through the National Council for Accreditation of Teacher Education and University Council for Educational Administration (UCEA). Graduates qualify for certification in all states party to the Interstate Certification Compact.

Admission Requirements

Applicants to the Master of Education and Master in Teaching degree programs must hold a baccalaureate degree from an accredited institution. Admission decisions are based on the applicant's grade-point average, Graduate Record Examination general test scores, goal statement, and other prerequisites stipulated by the area of specialization within the College. Application deadlines vary by program.

Consideration for admission to either doctoral program requires a master's degree or equivalent preparation in a field appropriate to the area of specialization, a sample of scholarly writing, goal statement, and other prerequisites stipulated by the individual program of study. Graduate Record Examination general test scores are required.

Although admission is competitive, admitted students have exhibited a wide range of performance on traditional criteria such as GPA and GRE scores. The College values diversity and encourages all interested persons to seek additional information and apply. For more information email edinfo@u.washington.edu or visit the College's Web page at www.educ.washington.edu.

Financial Aid

The College of Education offers a limited number of awards with varying stipends for graduate students in education. Primary consideration is given to doctoral students with a background of successful teaching or administrative experience. Specific information on the various types of remunerative appointments for graduate students in education, amounts of stipends, and application procedures may be obtained via email at edinfo@u.washington.edu or via the College's Web page at www.educ.washington.edu. The annual application deadline is March 1.

Special Research and Service Facilities

Within the College of Education opportunities exist for students to gain research and service experience.

The Center for Multicultural Education focuses on research projects and activities designed to improve practices related to equity issues, intergroup relations, and the achievement of students of color. Visit the center's Web page at depts.washington.edu/centerme/home.htm.

The Clinical Training Laboratory, operating under the aegis of Educational Psychology, offers observation rooms equipped with video recorders where counseling and psychology trainees and clients can be observed and taped through one-way mirrors.

The world-renowned **Experimental Education Unit** offers an interdisciplinary approach to research, training, and service, providing integrated classes for 150-200 young children, toddlers, and infants with disabilities and their typically developing peers, and services for their families. Learn more about the EEU by visiting depts.washington.edu/eeuweb/.

The Multidisciplinary Learning Disabilities Center conducts research on preventing and treating reading and writing disabilities and on the biological basis of learning disabilities. The center disseminates its findings to teachers through workshops and presentations at regional, national, and international meetings, and at a unique teacher mentoring program during the summer program for students with dyslexia and dysgraphia.

Literacy Trek is a longitudinal study of the writing and reading skills of normally developing children using pens and computers.

The Write Stuff investigates interventions for preventing and treating writing disabilities.

The National Center for the Study of Teaching and Policy, a consortium of five universities headed by the University of Washington, conducts a wide range of studies aimed at local, state, and national policy strategies to promote teacher excellence. For more information, visit the center's Web page at www.ctpweb.edu, or email ctpmail@u.washington.edu.

The Institute for the Study of Educational Policy promotes interdisciplinary studies that bring together research and practice for the benefit of children and youth, educators, policy makers, and the larger community. The institute includes (a) **The Center for Educational Renewal**, which responds to a growing nationwide interest in the renewal of schools and teacher education by creating partnerships, promoting innovative programs and policies for the education of educators, and reforming leadership and governance structures; (b) **The Center for Effective Schools**, which is committed to engaging in research and service activities designed to promote instructionally effective schools through collaboration and self-evaluation; (c) **The Center for the Study and Teaching of At-Risk Students**, which was established to foster interprofessional projects to encourage students to stay in school; and (d) **The School Law Division**, which deals with the improvement of professional practices of school administrators, including superintendents, principals, and program directors. Additionally, the institute conducts policy research pursuant to grants and contracts with school districts, state and federal agencies, and other educational organizations.

Faculty

Professors

Abbott, Robert D. * 1975; PhD, 1970, University of Washington; measurement, statistics and research design.

Affleck, James Q. * 1967, (Emeritus); MA, 1963, San Francisco State, EdD, 1968, Columbia University; special education (severely handicapped).

Anderson, Robert A. * 1965, (Emeritus); PhD, 1964, University of Minnesota; educational administration.

Banks, James A. * 1969; MA, 1967, PhD, 1969, Michigan State University; social studies, multiethnic education.

Berninger, Virginia Wise * 1986; PhD, 1981, Johns Hopkins University; educational psychology.

Billingsley, Felix F. * 1977; PhD, 1974, University of Washington; special education (severely handicapped).

Bolton, Dale Leroy * 1965, (Emeritus); PhD, 1958, University of Wisconsin; educational administration.

Boroughs, Homer, Jr. 1978, (Emeritus); MA, 1947, PhD, 1949, University of Washington; history and philosophy of education.

Brammer, Lawrence M. * 1963, (Emeritus); PhD, 1950, Stanford University; counseling, adult development.

Brown, Frances A. 1953, (Emeritus); MA, 1950, Columbia University; business education.

Burgess, Charles O. * 1964, (Emeritus); PhD, 1962, University of Wisconsin; history of education.

Doi, James I. * 1979, (Emeritus); PhD, 1952, University of Chicago; finance and management of colleges and universities.

Driscoll, John P. * 1967, (Emeritus); PhD, 1957, Pennsylvania State University; educational communications.

Edgar, Eugene Bayard * 1972; PhD, 1972, George Peabody College; special education.

Evans, Ellis D. * 1964, (Emeritus); EdD, 1964, Indiana University; human development and cognition.

Forster, Jerald R. * 1966, (Emeritus); PhD, 1966, University of Minnesota; counseling.

Foster, Clifford D. * 1959, (Emeritus); PhD, 1957, University of Washington; elementary education (curriculum).

Freehill, Maurice F. * 1962, (Emeritus); EdD, 1948, Stanford University; school psychology/human development and cognition.

Gay, Geneva * 1989; PhD, 1972, University of Texas (Austin); general curriculum theory, multicultural education, and educating African American students.

Gehrke, Nathalie J. * 1979; PhD, 1976, Arizona State University; curriculum.

Glenn, Allen D. * 1989; PhD, 1970, University of Michigan; teacher education, social studies education, and instructional computing.

Goodlad, John I. * 1983, (Emeritus); PhD, 1949, University of Chicago, EdD, 1982, Eastern Michigan University; education reform, curriculum theory.

Haring, Norris Grover * 1965, (Emeritus); EdD, 1956, Syracuse University; special education (early childhood).

Heckman, Paul E. 2000; PhD, 1982, University of California (Los Angeles); school and after-school program revitalization, neighborhood political organizing.

Hill, Paul T. 1993, (Adjunct Research); PhD, 1972, Ohio State University; politics and reform of K-12 education; business and public policy; urban politics.

Hunkins, Francis Peter * 1966, (Emeritus); PhD, 1966, Kent State University; curriculum.

James, William 1979; PhD, 1979, University of Massachusetts; cross-cultural factors and substance abuse issues, program evaluation.

Jarolimek, John * 1962, (Emeritus); PhD, 1955, University of Minnesota; social studies.

Jenkins, Joseph R. * 1978; PhD, 1967, University of Minnesota; special education (mildly handicapped).

Kaltsounis, Theodore * 1967, (Emeritus); PhD, 1961, University of Illinois; social studies.

Kerr, Donna H. * 1973; PhD, 1973, Columbia University; philosophy and education.

Kerr, Stephen T. * 1985; PhD, 1975, University of Washington; information technology and telecommunications.

Klockars, Alan J. * 1963; PhD, 1967, University of Washington; measurement, statistics and research design.

Knapp, Michael S. * 1990; PhD, 1981, Stanford University; public policy in education; policy research; sociology of education.

Lowenbraun, Sheila * 1968, (Emeritus); PhD, 1969, Columbia University; special education (hearing impaired).

Madsen, David L. * 1962, (Emeritus); PhD, 1961, University of Chicago; history of education.

Mantle-Bromley, Corinne 2000, (Research); PhD, 1990, University of Idaho; preparing teachers to teach and model critical democratic skills.

McCartin, Rosemarie E. * 1969, (Emeritus); PhD, 1964, University of Southern California; school psychology/human development and cognition.

McCutchen, Deborah Elaine * 1986; PhD, 1985, University of Pittsburgh; cognitive processes underlying reading and writing skills.

Meacham, Merle L. * 1964, (Emeritus); MS, 1956, University of Washington; school psychology.

Mizokawa, Donald T. * 1973; PhD, 1974, Indiana University; human development and cognition.

Morishima, James K. * 1960, (Emeritus); PhD, 1967, University of Washington; measurement and evaluation.

Neel, Richard S. * 1972; PhD, 1972, University of Southern California; special education (behavior disorders, learning disabilities); education (social behavior).

Olswang, Steven G. * 1975; JD, 1971, University of Illinois, PhD, 1977, University of Washington; law and education.

Parker, Walter C. * 1985; PhD, 1982, University of Washington; curriculum and instruction: social studies, democratic education.

Peckham, Percy D. * 1968, (Emeritus); PhD, 1968, University of Colorado (Denver); measurement, statistics and research design.

Reitan, Henry M. 1967, (Emeritus); PhD, 1950, University of North Dakota; educational leadership and policy studies, higher education.

Schwartz, Ilene Sharon * 1991; PhD, 1989, University of Kansas; early childhood, autism, classroom-based interventions, and applied behavior analysis.

Sebesta, Sam L. * 1963, (Emeritus); EdD, 1963, Stanford University; reading/language arts.

Sirotnik, Kenneth A. * 1985; PhD, 1969, University of California (Los Angeles); measurement, statistics, research design and evaluation, educational change and school renewal.

Standal, Timothy * 1976; PhD, 1976, University of Minnesota; reading/language arts.

Stowitschek, Joseph James * 1986; EdD, 1973, Utah State University; early childhood education, linguistic and social development, school-to-adult life transition.

Strayer, George D. 1976, (Emeritus); MA, 1928, PhD, 1934, Columbia University; educational administration.

Thompson, Marie D. * 1979, (Emeritus); PhD, 1970, University of Washington; special education (hearing impaired).

Tostberg, Robert E. *, (Emeritus); PhD, 1960, University of Wisconsin; philosophy of education.

Valencia, Sheila Denise W. * 1987; PhD, 1978, University of Colorado (Boulder); reading remediation, comprehension, instruction and assessment.

Wasley, Patricia A. * 2000; EdD, 1989, University of Washington; school renewal, whole-school change, teacher and administrative change, teacher education.

White, Owen R. * 1973; PhD, 1971, University of Oregon; special education (severely handicapped).

Williams, Donald T. * 1969, (Emeritus); PhD, 1963, Stanford University; higher education.

Williams, Richard C. * 1990, (Emeritus); PhD, 1966, University of Minnesota; career socialization of school principals; the process of school reform.

Wineburg, Samuel S. * 1989; PhD, 1990, Stanford University; educational psychology, cognitive psychology of school subjects, historical cognition.

Winn, William David * 1985; PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

Zumeta, William M. * 1985; MPP, 1973, PhD, 1978, University of California (Berkeley); public policy analysis, higher education policy and finance, education and workforce policy.

Associate Professors

Antony, James Soto * 1995; PhD, 1996, University of California (Los Angeles); identifying the factors that influence aspirations and success of professional occupations.

Beadie, Nancy Elizabeth * 1993; PhD, 1989, Syracuse University; history of education.

Brown, Robert Lewis * 1965, (Emeritus); EdD, 1961, University of Arkansas; school psychology.

Brown, Sharan E. 1987; MA, 1979, Seattle University, PhD, 1991, University of Washington; educational law.

Cheney, Douglas A. * 1989; PhD, 1992, University of Washington; education, treatment and support of students with behavioral/learning disabilities.

Dimmitt, Norma M. 1969, (Emeritus); MEd, 1963, University of Washington, EdD, 1970, Stanford University; curriculum and instruction, teacher education.

Ferichs, Alberta J. 1955, (Emeritus); MEd, 1951, University of Nebraska; business education.

Frey, Karin S. * 1983; PhD, 1978, University of Washington; social-emotional development, adult-child and peer interaction, motivation, teacher development.

Gray, Carol A. * 1971, (Emeritus); PhD, 1971, University of Washington; school psychology/human development and cognition.

Hansen-Krening, Nancy M. * 1974; PhD, 1974, University of Oregon; reading/language arts.

Herrenkohl, Leslie R. * 1996; PhD, 1995, Clarkson University; cognitive and social processes of students in preschool and elementary school settings.

Jones, Diane Carlson * 1996; MA, 1969, University of Texas (Austin), MA, 1977, PhD, 1980, Wayne State University; the development of social-cognitive/emotional competencies and peer relations, especially friendship.

Kelly, Samuel E. 1970, (Emeritus); MA, 1960, Marshall University, PhD, 1971, University of Washington; educational leadership and policy study, higher education.

Kerdeman, Deborah * 1990; MA, 1988, PhD, 1991, Stanford University; philosophy of education, philosophy of social inquiry, and hermeneutics.

Mazza, James J. * 1996; MS, 1990, PhD, 1993, University of Wisconsin; educational psychology/child and adolescent mental health.

Nelson, Mary Lee * 1990; PhD, 1989, University of Oregon; counseling, interpersonal theory, process research, supervision, gender issues.

Nerad, Maresi * 1988, (Research); PhD, 1988, University of California (Berkeley); race, gender, class, cultural issues; focus on women, higher education.

Nolen, Patricia A. * 1970, (Emeritus); PhD, 1970, University of Washington; school psychology/human development and cognition.

Nolen, Susan B. * 1990; PhD, 1986, Purdue University; achievement motivation in educational settings, development of motivation.

Ostrander, Kenneth H. * 1968; EdD, 1968, University of Tennessee; educational administration.

Plecki, Margaret L. * 1994; MS, 1976, University of Illinois, PhD, 1991, University of California (Berkeley); school finance, economics of education, policy analysis, school choice, study of education reform.

Portin, Bradley S. * 1995; MEd, 1987, Seattle Pacific University, DPhil, 1995, Oxford University (UK); educational leadership, principalship, education policy and politics, and comparative education.

Smith, Albert J. 1988; PhD, 1983, University of Washington; K-12 schools, community-based programs focusing on students at risk of failure.

Smith, John P. * 1969, (Emeritus); EdD, 1969, Stanford University; science education.

Stage, Scott A. * 1995; MS, 1988, PhD, 1991, Florida State University; educational psychology.

Sulzbacher, Stephen 1976, (Adjunct); MA, 1964, Hollins College (Virginia), PhD, 1971, University of Washington; psychiatry and behavioral sciences.

Taylor, Catherine S. * 1991; MS, 1978, PhD, 1986, University of Kansas; educational psychology.

Taylor, Edward, Jr. 1990; MA, 1983, Gonzaga University, PhD, 1994, University of Washington; leadership, critical theory and discourse concerning race in education and society.

Thalberg, Stanton P. * 1965, (Emeritus); PhD, 1964, University of Iowa; school psychology.

Valadez, James R. * 1996; PhD, 1990, University of California (Santa Barbara); sociology of education, social and cultural influences that shape the decisions students make.

Vasquez, James A. * 1975, (Emeritus); PhD, 1973, University of California (Los Angeles); learning (minority youth)/bilingual education.

Windschitl, Mark A. * 1996; MS, 1993, PhD, 1995, Iowa State University; the impact of technology, constructivism, and epistemological beliefs on learning.

Assistant Professors

Bashey, Husain Ismail 1968, (Emeritus); MA, 1955, Bombay University (India), MA, 1960, MacMurray College, PhD, 1975, University of Oregon; counseling.

Bell, Philip L. * 1998; PhD, 1998, University of California (Berkeley); cognition and learning, science education, learning technologies.

Copland, Michael A. * 2001; PhD, 1999, Stanford University; the principalship, research and development of problem-based instructional materials.

Dutro, Elizabeth M. 1999; PhD, 1999, University of Michigan; critical and feminist approaches to literacy; children's and adolescent's gendered literacy practice.

Kazemi, Elham * 1999; PhD, 1999, University of California (Los Angeles); sociocultural analyses of learning, mathematics education, teacher education, school reform.

Kimball, Kathleen L. * 1987; EdD, 1993, University of Washington; school leadership, assessment and

accountability, program evaluation, education reform.

Rodriguez, Patricia 1999; PhD, 2001, University of North Carolina; special education (early childhood).

Sandall, Susan R. * 1999; PhD, 1986, University of Washington; effective intervention practices for very young children with disabilities.

Stevens, Reed R. * 1998; PhD, 1999, University of California (Berkeley); ethnography research on cognition, learning, social interaction, and technology use.

Stritikus, Tom * 2000; PhD, 2000, University of California (Berkeley); second language development, ESL/bilingual education, literacy, education policy.

Thomson, Jennifer B. 1992, (Research); PhD, 1992, University of Victoria (Canada); neuropsychology, reading and learning disabilities, cognition and learning.

Troia, Gary A. 1999; PhD, 1999, University of Maryland; oral and written language development, disabilities, assessment, and intervention.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

Education

EDUC 301 Introductory Practice in Community Service Activity (1-10, max. 10) Observation and participation in a variety of activities in a K-12 classroom. Placement made according to participant interests and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions are required. Offered: AWSp.

EDUC 305 The Purpose of Public Schools in a Democracy (5) Explores issues and questions pertaining to public schools in a democratic society through directed readings, dialogue, individual and group projects designed to engage students with a series of crucial issues in public schools.

EDUC 310 Current Issues in Education (5, max. 10) I&S Covers a current issue and provides the opportunity to read and discuss educational issues with other students and faculty and to learn of opportunities in the College of Education programs.

EDUC 401 Practicum in Community Service Activity (1-18, max. 18) Tutoring and teaching experiences in a school or community service organization. Placement made according to participant interests and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions are required. Offered: AWSp.

EDUC 402 Practicum in Classroom Teaching and Management: Primary (1-18, max. 18) Tutoring and teaching experiences in a primary school setting (grades K-3). Placements made according to participants interest and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions.

EDUC 403 Practicum in Classroom Teaching and Management: Intermediate (1-18, max. 18) Tutoring and teaching experiences in an intermediate school setting (grades 4-8). Placements made according to participants interest and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions.

EDUC 404 Practicum in Classroom Teaching and Management: Secondary (1-18, max. 18) Tutoring and teaching experiences in an intermediate school setting (grades 6-12). Placements made according to participants interest and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions.

EDUC 502 Advanced Practicum in Classroom Teaching and Management (1-18, max. 18) In-depth classroom practicum experiences to certificated teachers working on additional endorsements. Arrangements must be made prior to enrolling with an adviser in the Teacher Education Office. Offered: AWSpS.

EDUC 700 Master's Thesis (*) Prerequisite: permission of faculty adviser and graduate program coordinator. Offered: AWSpS.

EDUC 800 Doctoral Dissertation (*) Prerequisite: permission of supervisory committee chairperson and graduate program coordinator. Offered: AWSpS.

Curriculum and Instruction

EDC&I 324 Physical Education and Health in the Schools (2) Techniques and procedures for teaching physical education and health in elementary and secondary schools. For students in Teacher Education Program. Credit/no credit only.

EDC&I 424 Multiethnic Curriculum and Instruction (3) Primarily for preservice and in-service teachers who have little or no previous exposure to issues related to ethnicity and schooling. Designed to help teachers better understand the school's role in the ethnic education of students and acquire the insights, understandings, and skills needed to design and implement curricular and instructional strategies that reflect ethnic diversity.

EDC&I 425 Instructional Strategies for Minority Students (3) Designed to equip educators with appropriate skills in effective teaching of culturally and socioeconomically different students. Attention is directed to understanding how these students differ from mainstream youth and what the implications are for instructional strategies in the classroom.

EDC&I 434 Introduction to Computers in the Classroom (3) Overview of the uses of computers in education. Uses of computers in instruction, classroom management (gradebooks, utilities), evaluation of software, overview of programming, and word processing. Prior experience not required.

EDC&I 436 Design and Authoring of CAI (3) Introduction to the design of computer-assisted-instructional programs. Types of learning, characteristics of effective instruction. Students design and produce CAI programs using authoring systems for computers. Offered: jointly with T C 436.

EDC&I 437 Uses of Computer Application Packages in Schools (3) Introduction to the instructional and management uses of application programs. Topics may include: databases, spreadsheets, word processing, graphics packages, graphing utilities, telecommunication, desktop publishing. Emphasis is on K-12 setting. Prerequisite: EDC&I 434.

EDC&I 440 Gender and Education (5) I&S Gender bias, discrimination, and gender-equity efforts in education. Includes curriculum instruction, instructional materials, testing, counseling, athletics, teacher education, educational employment issues, and sexual harassment. Relevant federal and state laws, court decisions, and strategies for promoting gender equity also addressed. Recommended: WOMEN 200 or SOC 110. Offered: jointly with WOMEN 415.

EDC&I 453 Teaching the Bilingual-Bicultural Student (3) Educational needs of bilingual students: research findings, special programs, materials, and methodologies that bilingual-bicultural education can provide to meet those needs. Cultural combinations of bilingual populations in American culture; historical, social, and linguistic factors affecting their K-12 education.

EDC&I 454 Cooperative Learning in the Classroom (3) Theory and research on cooperative learning and current practices of managing such learning. Team learning activities and opportunities to plan and try out lessons and materials using several different cooperative strategies. Credit/no credit only.

EDC&I 455 The Language Arts: Language and Learning (3) The teaching of language arts requires research-based knowledge of language learning and its influence on listening, speaking, reading, writing, and nonverbal communication. Emphasizes techniques for building both a solid literacy curriculum and sound instructional practices.

EDC&I 456 Workshop in Instructional Improvement: Language Arts (1-6, max. 15) Individual or group study projects on the improvement of instruction in language arts.

EDC&I 457 Methods in Teaching English as a Second Language (3) Prepares preservice and in-service teachers to teach English as a second language and to meet the educational and linguistic needs of students who have little or no English language skills. Emphasis on a survey of first- and second-language acquisition research and its educational implications, as well as instructional strategies consistent with the audiolingual, cognitive, and creative construction approaches to second-language learning. Includes diagnostic-prescriptive strategies for classroom application.

EDC&I 459 Workshop in Instructional Improvement: Reading (1-6, max. 15) Projects on the improvement of instruction in reading. For experienced teachers and students in Teacher Education Program.

EDC&I 460 Early Literacy Instruction (3) Theory, research, and practice in early literacy acquisition including emergent literacy, phonemic awareness, word identification, comprehension, invented spelling, and writing. Emphasis on classroom instruction strategies for first and second language learners. Offered: A.

EDC&I 461 Materials for Teaching Reading: Children's and Young Adult's Literature (3) Designed to provide acquaintance with materials used in the teaching of reading. Trade books and materials from content areas are examined.

EDC&I 462 Reading Comprehension Instruction in Elementary and Secondary School (3) Research-based practices for explicit teaching of reading comprehension of both fiction and content-area texts including issues of reading strategies, text difficulty, teacher modeling, guided reading, discussion, assessment, and adaptations for struggling students. Offered: Sp.

EDC&I 464 Educating Native-American Youth (3) 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) Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social stud-

ies. For elementary and middle school teachers and students in Teacher Education Program.

EDC&I 466 Social Studies Education: Secondary School Programs and Practices (3) Stresses curriculum patterns, instructional procedures, resource materials, and a selection of content in social studies for middle, junior, and senior high school teachers. For experienced teachers and students in Teacher Education Program.

EDC&I 468 Workshop in Instructional Improvement: Social Studies (1-6, max. 15) Individual or group study projects on the improvement of instruction in social studies.

EDC&I 469 Teaching African American Students and Culture (3) Examination of sociocultural and pedagogical factors that influence African American students' learning styles, opportunities, and outcomes; exploration of ways to reform teaching techniques to better accommodate cultural styles and experiences to improve the educational achievement of African American students.

EDC&I 470 Science Education: Elementary School Programs and Practices (3) 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.

EDC&I 471 Science Education: Secondary School Programs and Practices (3) 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.

EDC&I 472 Environmental Education for Teachers (3) Status, selected problems, and role of environmental education in program of elementary, middle, and junior high schools. Opportunity to examine and receive instruction in use of existing environmental education instructional materials. Instruction is in the spirit of inquiry/discovery.

EDC&I 473 Workshop in Instructional Improvement: Science (1-6, max. 15) Individual or group study projects on the improvement of instruction in science.

EDC&I 474 Multi-Ethnic Studies: Methods, Content, and Materials (3) Designed to help preservice and in-service teachers identify content and materials and devise methods for implementing ethnic studies programs and for incorporating ethnic content into regular K-12 social studies, language arts, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Americans, African Americans, Asian Americans, Puerto Rican Americans, and White ethnic groups.

EDC&I 475 Improvement of Teaching: Elementary School Mathematics (3) Designed for elementary teachers. Emphasis is placed on the contributions of research to the improvement of the teaching of mathematics in the elementary school. For experienced teachers.

EDC&I 477 Improvement of Teaching: Secondary School Mathematics (5) Exploration of mathematical concepts for the purpose of improving the teaching of secondary-school mathematics. For experienced teachers.

EDC&I 478 Special Topics in Mathematics for Teachers (2-9, max. 9) NW Study of selected areas of mathematics. Designed for the improvement of

teachers of mathematics. Offered: jointly with MATH 497.

EDC&I 479 Workshop in Instructional Improvement: Mathematics (1-6, max. 15) Individual or group study projects for the improvement of instruction in mathematics.

EDC&I 482 Educational Technology in Schooling (3) Introduction to the application of technologies (computers, telecommunications, interactive video) in schools. Designed primarily for pre- and in-service teachers, but of interest to anyone involved in technology in education.

EDC&I 485 Workshop in Instructional Improvement: Educational Communication and Technology (2-6, max. 6) Individual or group study projects on the improvement of instruction through use of educational communication and technology.

EDC&I 488 Educational Technology and Learning in Alternative Settings (3) How educational technology can be used to encourage learning in non-school environments, such as museums, radio and television broadcasts, parks and recreation centers, and distance education programs. Students investigate one of these areas and prepare a project.

EDC&I 494 Workshop in Improvement of Curriculum (1-6, max. 15) Stresses the application of procedures for curriculum development, maintenance, and evaluation. Opportunities furnished to develop and perfect strategies for program development with occasions given to utilize the strategies in master plan and materials preparation for simulated or real school situations. Specific focus of workshop is determined by instructor or by arrangement with district.

EDC&I 495 Workshop in Improvement of Teaching: Selected Topics, Issues, or Problems (1-6, max. 15) Individual or group projects to help teachers adapt instruction to selected topics, issues, or problems and to identify the approaches and instructional resources that provide the soundest learning experiences.

EDC&I 496 Workshop in Instructional Improvement (2-6, max. 6) Individual or group study projects on the improvement of instruction with attention to designing instructional plans.

EDC&I 499 Undergraduate Research (2-5, max. 5) 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 (1-10, max. 10) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor must be filed in the Office of Curriculum and Instruction in the College of Education.

EDC&I 505 Seminar in Curriculum and Instruction (1-3, max. 15) Seminar on advanced topics in curriculum and instruction. Critical examination of current research and practice. Content varies, check quarterly Time Schedule for topics to be covered. Prerequisite: permission of instructor.

EDC&I 510 History of Educational Technology (3) Examines the role of technology in education through history. Early systems of instruction, advent of textbooks, models for school architecture, instructional devices and teaching machines, mediated and distance learning. Focuses on the interplay between designed educational approaches and contexts in which they were implemented, and consequent success for failure.

EDC&I 511 Current Issues in Technology and Education (3) Examines current genres of learning

technology, novel approaches for integrating technology into curriculum and instruction, and recent theoretical perspectives that inform future work in educational technology. Prerequisite: EDC&I 510 or instructor permission.

EDC&I 512- Survey of Educational Technology Research (2, max. 4) Critically examines active research projects in educational technology. Critiques of research practice. Corequisite: EDC&I 511 and EDC&I 580.

EDC&I 524 Seminar in Teacher Education (3, max. 6) Focus on recent research, issues, and proposals for future development in teacher education, certification, and continuing professional growth. Alternate year offering focuses on either preservice or inservice issues. Prerequisite: permission of instructor.

EDC&I 530 Approaches to Literacy Instruction (3) Designed to aid experienced teachers who possess background in the teaching of literacy, this course presents a variety of approaches and actual analysis of approaches. Prerequisite: teaching experience and a basic course in the teaching of reading.

EDC&I 531 Seminar: Critical Review of Literacy Materials (3) Students formulate and apply criteria for assessing materials, with emphasis on linguistic, cultural, and psychological factors; instruction effectiveness, interest level; and educational objectives. Prerequisite: teaching experience and one basic course in the teaching of reading.

EDC&I 532 Seminar in Literacy Research (3, max. 9) Primary focus on those aspects of the literacy process that are of concern in a developmental literacy program. Emphasis on research design, evaluation of research, and research findings, dealing with factors influencing literacy ability, problems in skill development, recreational reading, and writing. Prerequisite: permission of instructor.

EDC&I 533 Seminar: Conducting Research in Reading (3, max. 6) Students design and conduct original research studies in the field of reading. Emphasis on research rationale, choice of productive research types, and reporting of research results and implications. Prerequisite: EDC&I 532.

EDC&I 534 Seminar in the Reading of Literature (3) 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 education curriculum and instruction course in reading or language arts or one graduate course in literature for children or young adults.

EDC&I 542 Seminar in Bilingual Education: Instructional Foundations and Issues (4) Study of the theoretical foundations and instructional implications of psychology and linguistics as they apply to bilingual education. Assists graduate students in exploring learning styles of bilingual children and in becoming familiar with the crucial issues in bilingual education.

EDC&I 543 Seminar in Bilingual Education: Instructional Strategies (4) Study of instructional factors affecting bilingual education. Particular emphasis is given to research related to the variables involved in teaching in a bilingual environment. Assists graduate students in exploring instructional methodologies and formats as they apply to bilingual education and in becoming familiar with the current issues in bilingual education.

EDC&I 550 Educational Technology Research (3) Analysis, critique, and practical experience with research studies of all types (experimental, ethnographic, evaluation) concerning questions of interest

to educational technologists. Prerequisite: EDC&I 480, a research methods course, or permission of instructor.

EDC&I 551 Introduction to Instructional Design (3) An experimental course in analyzing, designing, developing and formatively evaluating instructional products using the Instructional Systems Design (ISD) Mode. Also, discussion of how to successfully implement an instructional product/program within an organization using change management principles. Business and industry training focus.

EDC&I 552 Management of Educational Technology Programs (3) Factors contributing to effective management of programs incorporating educational technology and microcomputers. Manager's role as agent of instructional change and processes leading to successful adoption and long-term implementation of a new instructional system. Prerequisite: EDC&I 510.

EDC&I 553 Seminar on Instructional Systems Development (3) Critical analysis of processes involved in the development of instructional systems. Prerequisite: EDC&I 481 or permission of instructor.

EDC&I 555 Educational Futures (3) Concept of alternative futures stressing manageability of the future. Attention is given to current and future events that can or might impact education. Basic future studies methods are considered with opportunities to apply such methods within educational arena. Prerequisite: prior graduate course work or experience in education.

EDC&I 556 Elementary School Curriculum (3) Study of elementary school curriculum, its design, rationale, and delivery. Current trends and issues affecting elementary school curriculum analyzed.

EDC&I 558 Secondary School Curriculum (3) Systematic analysis of current curriculum practices, with particular emphasis on the social and historical forces affecting secondary-school curriculum.

EDC&I 559 Principles and Procedures of Curriculum Development (3) Intensive study of basic principles and procedures utilized in development of curricula. Participants have opportunities to apply such procedures in class activities. Attention given to curriculum foundations.

EDC&I 561 Seminar in Language Arts (3) Study of language with special attention to research pertaining to the social context of language in the classroom. Course work includes group and individual analysis of language arts studies with attention to research design and measurement. Prerequisite: EDC&I 455.

EDC&I 562 Seminar in Reading and Language Arts: Secondary Emphasis (3) Study of recent research in listening, oral language, reading, and written language, emphasizing psychological and interrelated aspects. Prerequisite: permission of instructor.

EDC&I 563 Current Issues in Literacy Education (1-3, max. 6) Discussion of problems and issues of current interest and importance in language arts education. Prerequisite: EDC&I 561.

EDC&I 565 Seminar in Social Studies Education: Elementary Emphasis (3) Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: EDC&I 465 or equivalent.

EDC&I 566 Seminar in Social Studies Education: Secondary Emphasis (3) Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: EDC&I 466 or equivalent.

EDC&I 567 Current Issues in Social Studies Education (1-3, max. 6) Discussion of problems and issues of current interest and importance in social studies education.

EDC&I 569 Educating Ethnic Minority Youths (4) Intensive analysis and review of the research and curricular programs related to the social, psychological, and political factors that influence the school experiences of ethnic minority youths. Special attention given to instructional and curricular programs for African-American, American-Indian, Mexican-American, Puerto Rican-American, and Asian-American students. Prerequisite: graduate standing or permission of instructor.

EDC&I 570 Seminar in Science Education: Elementary Emphasis (3) Investigation of curriculum and instruction in science at elementary-school levels, with particular emphasis on current literature and research. Prerequisite: EDC&I 470 or equivalent.

EDC&I 571 Seminar in Science Education: Secondary Emphasis (3) Investigation of curriculum and instruction in science at secondary-school levels, with particular emphasis on current literature and research. Prerequisite: EDC&I 471 or equivalent.

EDC&I 572 Current Issues in Science Education (1, max. 6) Discussion of topics and problems of current interest and importance in science education. Prerequisite: graduate standing.

EDC&I 573 School Reform and Multicultural Education (3) Similarities and differences among the visions, goals, and strategies of proposals for school reform and multicultural education are analyzed; implications for practice in curriculum and instruction are deduced from these analyses. Prerequisite: one course in multicultural education or permission of instructor.

EDC&I 574 Race, Gender, and Knowledge Construction: Curriculum Considerations (3) Using historical and contemporary perspectives, considers ways in which knowledge related to race and gender has been and is constructed and the implications of ways in which knowledge is constructed for curriculum reform and teaching. Prerequisite: one course in ethnic studies, multicultural education, or women studies or permission of instructor.

EDC&I 575 Seminar in Mathematics Education: Elementary Emphasis (3) Investigation of curriculum and instruction in mathematics at the elementary-school level; review of research and preparation of proposals. Prerequisite: graduate standing.

EDC&I 576 Seminar in Mathematics Education: Secondary Emphasis (3) Investigation of curriculum and instruction in mathematics at the secondary-school level; review of research and preparation of proposals. Prerequisite: graduate standing.

EDC&I 577 Current Issues in Mathematics Education (1, max. 6) Discussion of problems and issues of current interest and importance in mathematics education. Prerequisite: graduate standing.

EDC&I 578- Qualitative Methods of Educational Research (5-) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second year doctoral standing and one course in statistics. Offered: jointly with EDPsy 586.

EDC&I -579 Qualitative Methods of Educational Research (-5) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics cogni-

tive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second-year doctoral standing and one course in statistics. Offered: jointly with EDPSY 587.

EDC&I 580 Technology in Context (3) Focuses on development of appropriate methods and concepts for research on technology in schools, workplaces, and other naturalistic settings. Fieldwork exercises and reading exemplary studies from multiple disciplinary perspectives. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, or permission of instructor.

EDC&I 581 Cognitive Systems Design (3) Covers the design of applied technology-based learning systems, informed by current views of learning, technology, and cognition. Emphasizes synthesizing students' knowledge of technology, learning and research in collaborative settings. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, EDC&I 580, or permission of instructor.

EDC&I 582 Design Experimentation and Implementation in Context (3) Introduces theoretical, methodological, and practical issues involved with studying the designed use of learning technologies in real world settings. Focuses on engaging in empirical study of the designed system through partnerships involving education researchers, educators, and technologists. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, EDC&I 580, EDC&I 581, or permission of instructor.

EDC&I 583 Message Design (3) Research and theory on design of instructional messages in various modalities (visual, auditory), and in various formats (pictorial, verbal, graphic). Prerequisite: EDC&I 480 or permission of instructor.

EDC&I 584 Instructional Graphics for Microcomputers (3) Study of current research on instructional uses of computer graphics. Development, selection, and application of design principles for graphically-based instructional and training programs. Prerequisite: EDC&I 436, EDC&I 481.

EDC&I 585 Technology and the Culture of Education (3) Social impact of technology on education in the United States and elsewhere: social, political, and cultural factors affecting educational communication and technology; roles and relationships among instructors and learners; appropriate technology in developing countries; technology's long-term influence on thought and values. Prerequisite: EDC&I 480 or permission of instructor.

EDC&I 586 Current Issues for Computers in the Classroom (1, max. 6) Addresses many of the current topics in computer-related education. Issues and research related to computer uses in curriculum, instruction, and management of instruction.

EDC&I 587 Design and Application of Interactive and Immersive Instructional Systems (3) Theoretical and empirical questions involved in design of interactive instructional systems using such technologies as virtual reality and CAI. Specific problems inherent in design of complex learning environments: immersion, control, structure, sequence of experiences, navigation, learner guidance. Educational uses of systems. Prerequisite: EDC&I 481 or EDC&I 583, EDC&I 436, or permission of instructor.

EDC&I 588 Seminar: Computers in Education (3) Provides opportunity for graduate students to analyze, discuss, and design research in areas of computers in education. Includes historical development of research in this area as well as a platform for the development of research proposals and refinement of ongoing research. Prerequisite: EDC&I 434 or EDC&I 436.

EDC&I 589 Current Issues in Educational Communications (1, max. 9) Discussion of problems and issues of current interest and importance in the field of educational communications. Serves also as a forum for discussion of doctoral research. Designed for master's and doctoral candidates in educational communications. Credit/no credit only. Prerequisite: graduate standing.

EDC&I 590 Seminar in Elementary Education (3) Exploration of the philosophy, history, purposes, curriculum, methods, and school organization of elementary education. Prerequisite: elementary-school teaching experience, EDC&I 556.

EDC&I 591 Seminar in Curriculum Research (3) Analysis of past and current empirical, historical, ethnographic research, and philosophical analysis of the curriculum field. Studies considered include research in curriculum development, the curriculum plan, contextual characteristics, and factors related to curriculum participants. Group and individual analyses focus on theory generation and practical applications of research. Prerequisite: EDC&I 559 or permission of instructor.

EDC&I 592 Seminar in Secondary Education (3) Research and study of secondary education. Primary focus on factors involving change in secondary-school curriculum and organization. Prerequisite: EDC&I 558.

EDC&I 593 Seminar in Curriculum: Theory and Practice (3) Investigation of curriculum theory and practice. Consideration is given to theoretical writings that address the relationships between various curricular variables. Theoretical positions are related to curricular practices and innovations. Prerequisite: EDC&I 559.

EDC&I 594 Seminar in Curriculum: Issues, Systems, Models (3) Emphasis on the current approaches to curriculum and curriculum innovation. Attention is given to major educational issues as they affect curricular activity. Prerequisite: EDC&I 559.

EDC&I 595 Seminar in Analysis of Teaching (3) Investigation of the ways in which classroom teaching has been analyzed from a variety of disciplinary perspectives. Focus on methods, findings, and implications of research on teaching. Prerequisite: teaching experience.

EDC&I 596 Seminar in Strategies of Instruction (3) Various instructional models applicable to all levels of schooling. Theoretical and philosophical bases for these instructional models are considered.

EDC&I 597 Curriculum Evaluation Seminar (3, max. 6) Focuses on the evaluators' roles, evaluation theory and models, and selected curricular evaluations. Examples are drawn from the several disciplines commonly offered in the elementary and secondary schools. Students are expected to identify an evaluation problem and to develop an evaluation design that can be implemented as a practical solution to the problem. Prerequisite: EDC&I 559 and permission of instructor.

EDC&I 599 Independent Studies in Education (*) Independent studies or readings of specialized aspects of education. Prerequisite: permission of instructor.

EDC&I 600 Independent Study or Research (*) Prerequisite: permission of instructor.

EDC&I 601 Internship (1-10, max. 10) Credit/no credit only. Prerequisite: graduate standing and permission based on approval of proposal submitted during quarter preceding the internship.

Educational Leadership and Policy Studies

EDLPS 444 Constitution and American Public Education (3-6, max. 6) I&S Emphasis on the principles, processes, and content of constitutional law in an effort to provide new insights and new tools with which school administrators and teachers may examine questions involving political and civil rights in the United States, especially as these affect the conduct of education. Specific topics on constitutional freedom include the obligation to go to school; legal controls over curriculum, teachers, and students; and racial integration and equal financing of public schools. Open to law students and to nonlaw students enrolled as graduate students or as upper-division undergraduates. Credit/no credit only. Offered: jointly with LAW 444.

EDLPS 458 History of American Education to 1865 (3) I&S Development of American education in cultural context; colonial period, influence of Enlightenment, and common school movement. Offered: jointly with HSTAA 458.

EDLPS 459 History of American Education Since 1865 (3) I&S Development of American education in cultural context; progressive education, recent criticism, continuing issues and trends. Offered: jointly with HSTAA 459.

EDLPS 479 Crucial Issues in Education (3) Selected educational issues, policies, and contexts. Evolution of the American education enterprise, legal issues, professionalism, finance, and other vital educational concerns.

EDLPS 496 Workshop: Education Programs and Problems (1-6, max. 12) Study of such topics as planning, development, supervision, organization, operation, or evaluation of current or emerging programs or problems in education.

EDLPS 499 Undergraduate Research (*) 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.

EDLPS 501 Introduction: Leadership Beyond the Classroom (3-6, max. 6) First course in principal certification program; explores Washington state laws, legal principles, context of public schools, multicultural issues, changing population. Essential skills of leadership: communication, human relations, strategies for shared decision making, and dealing with conflict. (Open only to students admitted to the EDLPS Principal/Program Administrator Preparation Program.)

EDLPS 502- Leadership Core ([3-6, max. 6]-) Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

EDLPS -503- Leadership Core (-[3-6, max. 6]-) Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on

diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

EDLPS -504 Leadership Core (-[3-6, max. 6]) Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

EDLPS 505 Transition to Leadership (3-6, max. 6) Development and administration of systems for selection, evaluation and clinical supervision of certificated and classified personnel. Focuses on leadership models and transition to a leadership role, including opening a school or program and dealing with student/school crises. (Only for students admitted to the EDLPS Principal/Program Administrator Program.)

EDLPS 507 Reflective Seminar (1-6, max. 6) Integration of theory and internship experience; group process laboratory and peer feedback and review of written work, oral presentations, and journals. Reading and discussion of crucial issues. (Only for students admitted to the EDLPS Principal/Program Administrator Preparation Program.) Credit/no credit only.

EDLPS 509 Planning, Organizing, and Decision Making (3) Application of principles utilized in planning, organizing, and decision making in districts and schools. Formation of policy and procedures; formal and informal organization; power, authority, and responsibility; utilization of people, time, and space.

EDLPS 510 School Finance (3) Financial practices and problems in districts and schools considered, including state and federal support plans, school plant planning, school business management, resource allocation, and budgeting and educational accountability.

EDLPS 511 School-Community Relations (3) 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.

EDLPS 512 Seminar in Personnel Administration and Development (3) Major emphasis on the analysis of factors to be considered in the selection and evaluation of teachers and administrators and considerations in staff development.

EDLPS 513 Seminar in Instructional Development and Supervision (3) Theory of the process of supervising instructionally effective school personnel, including an analysis of the techniques of supervision, theory of leadership and group process, interpersonal relations, and evaluation of teacher effectiveness.

EDLPS 514 Washington School Law (3) Overview of Washington State specific legal provisions affecting the operations and management of public schools, including school organization and operations, school finance, separation of church and state, school employment, student conduct, discipline and

rights, equity, intergovernmental agreements, and student health and safety.

EDLPS 515 Management of Labor Relations in Education (3) 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.

EDLPS 516 Special Education and the Law (3) Overview of major state and federal laws affecting the operation and management of special education programs in public schools. Emphasis upon procedural and substantive rights of children with disabling conditions. Offered: jointly with EDSPE 504; W.

EDLPS 517 Seminar in Administration: Facilities (3) Contemporary issues, problems, and techniques of educational facility administration. Emphasis placed on such factors as planning, financing, development, design, construction, operation, liabilities, property management, state regulation. Credit/no credit only.

EDLPS 518 Reflective seminar: The Superintendency (1-6, max. 6) Integration of theory and internship experience. Readings and discussion of crucial issues, presentations by local school superintendents: district budgeting processes, personnel, staff relations and collective bargaining, superintendent-board relations, bond issues, facilities planning, superintendent as instructional leader. Credit/no credit only.

EDLPS 519 Special Topics in Educational Leadership (1-6, max. 15) Readings, lectures and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues of particular concern to K-12 administrators and other educators in leadership roles in districts and schools. Topics vary; check Time Schedule for topic(s) to be covered.

EDLPS 520 Education as a Moral Endeavor (3) An exploration of fundamental questions that have faced educational leaders in the past and most likely will continue to face them in the future. Foundational studies in history, philosophy, and sociology provide the basis for discussion and writing about these fundamental questions. Credit/no credit only.

EDLPS 521 Philosophy of Education (3) 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.

EDLPS 522 Contemporary Philosophies of Education (3) Intensive study of the writings of selected contemporary philosophers of education.

EDLPS 523 Analysis of Educational Concepts (3) Selected concepts central to conduct and understanding of education.

EDLPS 524 Seminar in Philosophy of Education (3, max. 6) Philosophical examination of ways in which education might be studied. Uses and limits of conventional scientific approaches in education inquiry. Consideration of alternatives.

EDLPS 525 Educational Inquiry (3) General survey of epistemological issues underlying the several schools of thought or families of inquiry. Overview of various methods used in conduct of educational inquiry, examples of ways those methods are typically used, and exploration of strengths and weaknesses of those methods. Discussion throughout is in terms of assumptions regarding the nature of knowl-

edge and purposes of inquiry. Must be taken in sequence. Credit/no credit only. Prerequisite: doctoral status in education.

EDLPS 526 Educational Inquiry (3) General survey of epistemological issues underlying the several schools of thought or families of inquiry. Overview of various methods used in conduct of educational inquiry, examples of ways those methods are typically used, and exploration of strengths and weaknesses of those methods. Discussion throughout is in terms of assumptions regarding the nature of knowledge and purposes of inquiry. Must be taken in sequence. Credit/no credit only. Prerequisite: doctoral status in education.

EDLPS 530 History of Education (3) Historical survey of education. Emphasis on relationship between idea and practice. Topics include education and colonialism, formation of state school systems, progressive education, equal educational opportunity, changes in textbooks and curricula, education and social structure, and education in the history of cultures.

EDLPS 531 History of American Higher Education (3) Examination of the historical development of the American higher education enterprise, including pre-colonial origins. Includes attention to the colonial colleges, the rise of new institutions in the nineteenth century, and the further development of American colleges and universities in the twentieth century. Leaders in these developments are identified.

EDLPS 532 Seminar: American Education in the Twentieth Century (3, max. 6) Selected problems in American education over the last century, with special emphasis on contemporary issues and trends.

EDLPS 533 Seminar in Educational Classics (3) Analysis in depth and in the context of the relevant history of several major works in educational thought from Plato to Dewey.

EDLPS 534 History of the Modern University (3) Growth of the modern university with attention to intellectual trends as well as organizational and curricular changes. Special attention is given to nine American universities in the twentieth century.

EDLPS 535 Historical Inquiry in Education Research (3, max. 6) Methods and critique of historical research in education. Examination of landmark works in education history and historiography. Hands-on experience framing historical questions, finding historical sources, using historical evidence, substantiating historical claims, and addressing issues in the history of education.

EDLPS 536 Historical Analysis of Educational Issues (3) Analysis and interpretation of the history of education in its broadest sense: the transfer of culture across generations. Examination of the problems of evidence and interpretation with which the authors of exemplary works in the history of education struggled.

EDLPS 540 Sociology of Education (3) Examination of education and educational institutions by using the major conceptual tools of sociology. Emphasis on sociological thought and findings that have particular bearing on the understandings and judgments of educators.

EDLPS 541 Topics in Comparative Education (3, max. 6) International efforts in education, including the role of the United States in overseas programs. Analysis of the relation of education and society in foreign areas, stressing social change and conflict. Regions of the world considered in the course vary from one offering to another.

EDLPS 542 Seminar in Educational Sociology (3) Application of sociological principles to school prob-

lems; individual problems and investigations. For teachers, administrators, and those using educational sociology as a field for advanced degrees.

EDLPS 543 Seminar: Research in Educational Sociology (3) Theory, concept, and method of sociological inquiry as applied to problems in education.

EDLPS 544 Comparative Education: Introduction to Concepts and Methods (3) Introduction to research methods used in comparative education studies. Considers ways to study familiar and unfamiliar contexts, identifies the common pitfalls of international comparisons. Reviews ethnomethodological tools of interview construction, cross-cultural observation strategies, documentary analysis. Education policy and practice is primary focus; useful for comparing other public policy issues internationally.

EDLPS 549 Special Topics in Educational Studies (1-6, max. 15) Readings, lectures, and discussions pertaining to significant and enduring ideas in the philosophy, history and sociology of education. Specific topics are critically examined in light of contemporary problems in education. Topics vary; check Time Schedule for topic(s) to be covered.

EDLPS 550 The Dynamics of Educational Organizations (3) Exploration of the literature in organizational theory and leadership, the assumptions that underlie the development of various approaches to organizational theory and how these approaches are applied, and an acquaintance with different conceptual frames that can be used to determine how to improve and change organizations. Credit/no credit only.

EDLPS 551 Foundational Studies in Complex Organizations (3) Examination of conceptual and theoretical bases for complex organizations, characterized by problematic goals, knotty decision-making processes, and fluid participation. Impact of information, power, beliefs, resources, organizational structure, and environment. Although issues discussed are generic, examples focus on educational organizations.

EDLPS 552 Organizational Change in Education (3) Change and innovation in educational organizations. Theoretical approaches include sociopsychological, rational planning, political perspectives, and those associated with notion of organized anarchies. Specific topics related to change and innovation (e.g., roles of beliefs, symbols and norms, diffusion of innovations, and research issues).

EDLPS 553 Human Resources in Educational Organizations (3) Analysis of factors involved in human resource problems related to operation of educational organizations. Motivation, perception, communication, role analysis, and dynamics of groups are studied through use of cases and seminal literature.

EDLPS 560 Perspectives on Policy and Policy Making in Education (3) This course introduces a variety of theoretical perspectives that can be used to analyze policy content, processes and outcomes. Includes a consideration of the power and limits of policy and a discussion of the many ways people in different positions in organizations can influence policy. Credit/no credit only.

EDLPS 561 Education Policies and Leadership in Political Context (3) Systematic consideration of the structure and function of educational policies and problems of research in political context.

EDLPS 562 American School Law (3) Examination of persistent legal issues, including an analysis of how these issues are manifest in public policy debates.

EDLPS 563 Education, The Workforce, and Public Policy (3, max. 6) Examination of policy issues involving education, training, the economy, and the development of the nation's human resources. Relationship between education, training, and work, underutilized workers, race and gender discrimination issues, and the role of education and training in economic development. Offered: jointly with PB AF 571.

EDLPS 564 Seminar in Economics of Education (3) Current problems in school finance, including costs, ability to support schools, and financial implications of educational principles. The economics of public education. Problems of federal, state, and local school support. Financing capital outlay, research, and public relations.

EDLPS 565 Power and Politics in Organizational Leadership and Decisionmaking (3) Focuses on conceptual frameworks that can be used to analyze power-influence processes in complex organizations and research methods that are well-suited to the study of these processes. Opportunities to design studies of power relations and political processes are provided.

EDLPS 566 Education Policy Serving Disenfranchised Groups (3) This seminar examines programs and policies aimed at ameliorating conditions that face disenfranchised groups in contemporary K-12 schooling. Seminar members critically analyze the assumptions, design, and likely impact of these programs and policies on institutions and individuals. Designed for advanced doctoral students. Others admitted with permission of instructor.

EDLPS 567 Education Policy and the Improvement of Teaching and Learning (3) Examines connections between policies and classroom practice, in P-12 and higher education settings. Of particular concern is the capacity of policy to improve the quality of curriculum and instruction. Students design and critique policies, drawing on research and feedback from policymakers.

EDLPS 568 Policy Evaluation in Education (3) Examination of methods for evaluating educational policies across the educational continuum. Students design and conduct a policy evaluation which draws on the policy evaluation literature. Examination of the uses of policy evaluation information in shaping organization-decision making is also included.

EDLPS 579 Special Topics in Organizational and Policy Analysis (1-6, max. 15) Readings, lectures and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues related to the analysis of educational organizations, policies, and policy making. Topics vary; check Time Schedule for topic(s) to be covered.

EDLPS 580 The American College and University (3) 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.

EDLPS 581 Principles and Practices of Adult and Continuing Education (3) History and development of adult and continuing education in the United States: component parts of the field; issues, theory, and research; program planning for adults; professionalization of the field.

EDLPS 582 Seminar in the History and the Organization of Higher Education (3) Advanced seminar in the history and the organization of higher education.

EDLPS 583 Higher Education and the Law (3) Legal implications of university operations and an explanation of the legal and constitutional rights of students, faculty, and staff within the university. Special attention given to faculty employment and termination decisions; student protections, including due process; and university liabilities.

EDLPS 584 Academic Governance and Collective Bargaining in Higher Education (3) Explores the concept and operation of collective bargaining in higher education: its origin; the reasons for its growing popularity as a governance mechanism; the legal framework within which it operates; the rights, powers, and duties subsumed under its operation; and its relationship to the traditional form of faculty governance mechanisms.

EDLPS 585 Resource Allocation in Higher Education (3) After attention to the basic tools of economic analysis, focus is on application of those tools to specific topics in higher education (e.g., access, budgeting, finance and policies, and funding alternatives).

EDLPS 587 Seminar in Teaching and Learning in Higher Education (3, max. 9) Theory and practice of instruction and learning in higher education.

EDLPS 588 Seminar in Administration of Community Colleges (3) For students preparing for administrative positions in community colleges. Principles and practices in organization and administration of community colleges.

EDLPS 589 The Community College (3) Intensive study of the community college—its history and present and future status. Curriculum, instruction, financial, and governance issues are also discussed.

EDLPS 590 Student Populations and Experiences in Higher Education (3) Examines foundational literature dealing with students in higher education. Primary focus is on how students change during college, how they make choices and decisions, what roles institutional climate and structure play in the students' experiences, and what impact college has on students.

EDLPS 591 Higher Education and Public Policy (3) Covers public policy processes affecting higher education. Issues examined vary, but typically include fiscal context of higher education policy, access, equity, distance learning, and accountability policies.

EDLPS 598 Special Topics in Higher Education (1-6, max. 15) Readings, lectures, and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues related to education in community colleges, four-year colleges and universities. Topics vary; check for topic(s) to be covered.

EDLPS 599 Independent Studies in Education (1-10, max. 10) 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 Leadership and Policy Studies in the College of Education. Prerequisite: permission of instructor.

EDLPS 600 Independent Study or Research (*) 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 Leadership and Policy Studies in the College of Education. Credit/no credit only. Prerequisite: permission of instructor.

EDLPS 601 Internship (1-4, max. 12) Name of faculty member responsible for supervising the student

should be indicated on program of studies. Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

Educational Psychology

EDPSY 304 Educational Psychology (5) Human learning in the educational setting. Cognition, development, learning, motivation, affective processes, and socialization. Emphasis on skills in influencing classroom learning and discipline. Open to students in the Music Education program or by permission of instructor. Offered: A.

EDPSY 431 Strategies for Classroom Research and Evaluation (5) Techniques and strategies for the design and implementation of studies of classroom instruction. Directed toward classroom teachers as consumers of instructional research and as evaluators in their own classrooms. Credit/no credit only.

EDPSY 447 Principles of Guidance (3) Study of guidance programs in elementary and secondary schools. Attention is given to the roles of specialists with emphasis on the role of the classroom teacher in school guidance programs. This course is designed for teachers, administrators, and prospective teachers.

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.

EDPSY 471 Neuropsychology of School Learning and Behavioral Problems (5) The microstructure, macrostructure, and structural and functional development of the brain are reviewed with a focus on the educational relevance of developmental neuropsychology. Four areas are covered: Hemispheric differences and integration; neurological soft signs, attention deficit, and hyperactivity; language, reading, and learning disabilities; and medical syndromes. Credit/no credit only. Offered: Sp.

EDPSY 490 Basic Educational Statistics (3) Measures of central tendency and variability, point and interval estimation, linear correlation, hypothesis testing. Offered: AWSp.

EDPSY 495 Introduction to Educational Measurement (3) Practical understanding of test reliability, validity, and derived scores as they apply to external educational assessments; concepts of criterion and norm-referenced testing; review of group administered norm-referenced and criterion-referenced tests and/or testing programs; test interpretation; issues and ethics in large scale assessment. Prerequisite: EDPSY 490. Offered: W.

EDPSY 499 Undergraduate Research (*) 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. Offered: AWSp.

EDPSY 500 Field Study (*) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor must be filed in the Office of Educational Psychology in the College of Education. Offered: AWSp.

EDPSY 501 Human Learning and Educational Practice (3) Systematic examination of current research about human learning in educational settings, including the study of behavioral, information

processing, social construction, and the developmental perspectives on learning. Offered: AWSp.

EDPSY 502 Developmental Foundations of Early Learning (3) Perceptual-motor, language, and overall cognitive development in children from birth through primary-school age. Emphasis on Piagetian and Vygotskian approaches to development with a special focus on the connections between learning and development. Field-based course projects may be required. Prerequisite: EDPSY 501 or permission. Offered: Sp.

EDPSY 503 Theories of Intelligence (3) Reading and discussion of theoretical and research papers from the extensive literature on Piagetian, psychometric, and information processing conceptions of intelligence. A historical approach to the topic is followed by analysis of current writings on intelligence and its measurement. Credit/no credit only. Prerequisite: EDPSY 501 and graduate status in education or psychology. Offered: alternate years; W.

EDPSY 506 Instructional Theory (3) Sources, current state, and utility of prescriptive instructional theories with emphasis upon theories having a potential for guiding the design of instruction. Prerequisite: EDPSY 501 or equivalent.

EDPSY 507 Reading, Writing, and Arithmetic: Educational Assessment and Consultation (5) Students administer and interpret tests of reading, writing, arithmetic, and related developmental skills; integrate test, observational, interview, and portfolio information in staffings and written reports; and consult with teachers regarding educational interventions. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: A.

EDPSY 508 Clinical Supervision-Practicum (2-6, max. 12) Practicum in supervising counseling, group counseling, diagnostic activities, and remedial academic therapy. Prerequisite: advanced graduate standing. Offered: AWSp.

EDPSY 509 Educational Issues in Human Development (5) Human development theories and models. Educational implications of theory, methodology, and application. Current research complements the historical antecedents of current practice. Age range covered varies as function of current issues in professional literature. Prerequisite: 15 credits in educational psychology or psychology. Offered: alternate years; W.

EDPSY 510 Cognition in the Context of the School Curriculum (3) Contemporary issues and trends in human learning, with a focus on reasoning within subject-matter areas such as mathematics, history, and science. Prerequisite: EDPSY 501 or equivalent. Offered: alternate years.

EDPSY 511 Seminar in Applied Educational Psychology (1, max. 6) Designed for graduate students in educational psychology. Applications of theoretical constructs to particular problems encountered in school counseling, practice.

EDPSY 512 Classroom Assessment Strategies (3) Development and evaluation of traditional, observational, essay, performance-based, portfolio assessments and grading models as they are used in classroom assessment; some review of current research on classroom-based assessment; classroom assessment ethics.

EDPSY 513 Instrument Development (3) Instrument development techniques including construct development, test and item specifications, item writing, planning for reliability and validity studies; ethics in test administration and interpretation. Intended for doctoral or masters students to develop

instruments for their own research. Prerequisite: EDPSY 490 or equivalent.

EDPSY 518 Assessment and Diagnosis of Reading Disabilities (3) Techniques for individual assessment of students with reading difficulties (K-12) including formal assessment using standard assessment tools and informal diagnostic teaching. Appropriate for classroom teachers, reading specialists, and school psychologists. Includes conducting and analyzing case studies. Prerequisite: EDC&I 460, EDC&I 462, other reading courses, or permission of instructor. Offered: alternate years; Sp.

EDPSY 519 Communication and Language in Young Exceptional Children (3) Review and discussion of theories of language acquisition as they relate to communication and language in young children. Review of research of language environments that relate to early literacy and education and how to use this information to modify environments for special needs children. Offered: jointly with EDSPE 521; W.

EDPSY 520 Psychology of Reading (3) Reviews current empirical research on cognitive processes in reading, including word and sub-word processes, syntax and comprehension, reading and perception, word recognition, concept development and meaning in reading, psychology of reading interests and skills. Prerequisite: EDPSY 501 or equivalent.

EDPSY 521 Psychology of Writing (3) Examines writing as a cognitive process and reviews current empirical research on writing, emphasizing primarily studies from a psychological perspective. Explores both developmental differences and individual differences in writing skills, together with instructional implications. Prerequisite: EDPSY 501 or equivalent.

EDPSY 522 Reading Disability Clinic (3-5) Supervised practicum in diagnosis and remediation of reading disabilities. Prerequisite: EDTEP 532, EDTEP 533 or equivalent; EDC&I 460 or permission of instructor.

EDPSY 524 Problem Solving and Critical Thinking in Education (3) Study of the classic and contemporary research literature concerned with human problem solving and critical thinking with emphasis upon applications to educational practice and further research. Prerequisite: EDPSY 501 or equivalent.

EDPSY 525 Creativity and Education (3) Study of the classic and contemporary research literature about creativity with emphasis upon applications to educational practice, evaluation of strategies to promote creativity in the schools, and further research. Prerequisite: EDPSY 501 or equivalent.

EDPSY 526 Seminar on Metacognition (3) Students read and discuss theoretical and research papers from the extensive literature on metacognition. Focuses on defining the concept of metacognition, establishing its range of applicability to educational matters, and becoming familiar with excellent examples of metacognitive research. Prerequisite: graduate status in education or psychology and permission of instructor.

EDPSY 527 Transfer of Teaching (3) Students read and discuss a representative sample of theoretical and research papers from extensive literature on teaching to promote transfer of what students learn to non-teaching environments. Historical approach to the topic is followed by analysis of current writings on transfer. Credit/no credit only. Prerequisite: EDPSY 501 and graduate status in education or psychology.

EDPSY 528 Achievement Motivation in Education (3) Critical review of current research and major theories of achievement motivation in schools and other educational settings. Emphasis on the relationship of theories to the contexts and practice of education.

Prerequisite: EDPSY 501 or permission of instructor. Offered: W.

EDPSY 531 Socialization of School-Age Children (3) Study of personal social development and behavior from preschool ages through adolescence. Developmental theory and research are reviewed on the socialization influences of parents and peers and on such topics as aggression, emotional regulation, and social cognition. Prerequisite: EDPSY 501 or equivalent. Offered: W.

EDPSY 532 Adolescence and Youth (3) Developmental processes and patterns examined with major theoretical and current research themes from behavioral sciences as applied to middle school and senior high students. Educational issues, social problems associated with adolescence in Western culture. Prerequisite: EDPSY 501 or equivalent.

EDPSY 533 Current Research in Adolescence (3) Contemporary trends and patterns of adolescent research are examined with emphasis upon theoretical foundations, contrasting methodologies, and implications for further research. Exemplary studies and integrative reviews of research on adolescence are featured. Prerequisite: EDPSY 532 and EDPSY 591 or equivalents.

EDPSY 534 School Problems of Adolescence (3) Study of the classic, contemporary, and emerging school problems of school age youth with emphasis upon problem solving strategies for educators and associated youth service personnel. Includes problems of academic achievement, interpersonal relations, and social deviancy in the schools. Prerequisite: EDPSY 532 or equivalent.

EDPSY 535 Education and the Highly Capable Learner (3) Examination of major issues and problems in study and nurturance of highly capable children and youth in the educational setting. Emphasis placed on contributions of theory and research to educational problem solving for multiple aspects of advanced human capacity. Prerequisite: EDPSY 501 or equivalent.

EDPSY 536 Learning Variables of Minority Children: Instructional Implications (3) Provides students with data base regarding (1) four variables (language/dialect, cognitive style, locus of control, and motivational systems) that affect learning among minority students, and (2) teaching strategies appropriate for these cultural socioeconomic variables. No credit given for students who have completed EDC&I 425.

EDPSY 540 School Psychological Assessment (5) Study of assessment of human intelligence with supervised training in the administration, scoring, and interpretation of individual intelligence tests with emphasis on Stanford-Binet and Wechsler scales. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: A.

EDPSY 541 Group Tests in Counseling (5) Emphasis on the utilization of objective measures in counseling. Prerequisite: EDPSY 490 or equivalent. Offered: Sp.

EDPSY 542 Career Development (3) Emphasis on vocational development theory and research. Psychological, social, and economic determinants of vocational development and choice are examined as a basis for vocational counseling. Prerequisite: graduate standing or permission of instructor.

EDPSY 543 Facilitating Career Development (3) Theory and practice in exploring, self-identified strengths, interests, resources, and other considerations when developing career plans. Emphasizes career development in the schools. Offered: Sp.

EDPSY 544 Counseling (5) Emphasis on the theory and practice of counseling.

EDPSY 545 Prepracticum (3) Competency-based skills training for beginning counseling and school psychology students. Attending, listening, focusing, and intervening behaviors for use with adults and children. Introduction to theories of helping. Prerequisite: enrolled in school counseling or school psychology or permission of instructor. Offered: A.

EDPSY 546 Counseling Practicum (3-5) Supervised practice in counseling. Prerequisite: EDPSY 545 or permission of instructor. Offered: WSp.

EDPSY 548 Educational Implications of Personality Theory (5) Study of personality development and personality theories with continuous attention to the meaning of these in educational practice, testing, and counseling. Prerequisite: 15 credits of psychology or educational psychology. Offered: A.

EDPSY 549 Seminar in Consultation Methods (3) Theory and practice of process consultation in educational settings. Field practice in teams with clients. Offered: W.

EDPSY 550 Family Counseling (3) Introduction to family counseling theory and practice, emphasizing family dynamics and communication analysis. Prerequisite: permission of instructor. Offered: W.

EDPSY 551 Group and Behavioral Intervention (3) Introduction to competency-based skills for beginning school psychology students. Includes basic processes of group management skills with children including group process in social skills training, problem-solving techniques, behavioral principles, and parent training. Prerequisite: EDPSY 545 or course in counseling techniques or permission of instructor. Offered: Sp.

EDPSY 552 Multicultural Issues in School Counseling and School Psychology (3) Examination of multicultural issues as they relate to the delivery of services provided by school counselors and school psychologists. Theoretical and applied aspects emphasized and case study format utilized. Offered: Sp.

EDPSY 555 Seminar in Counseling Specialty (1-2, max. 6) Oriented toward the role of a counselor as a professional worker. Credit/no credit only. Offered: ASp.

EDPSY 561 Group Process Laboratory (3) Explores the theoretical concepts of group process with a special emphasis in how to conduct group process in school and agency settings. Offered: A.

EDPSY 562 Group Counseling in Schools (3) Provides students with the opportunity to co-facilitate groups in elementary, middle, and secondary schools, supplemented by weekly didactic presentations of counseling and guidance models. Prerequisite: EDPSY 561 or permission of instructor. Offered: W.

EDPSY 564 Practicum in School Psychology (1-6, max. 6) Practicum in assessment and consultation, emphasizing diagnosis of behavior and learning disabilities, and focusing on techniques acquired in 507 and 540. Offered: W.

EDPSY 566 Case Study Seminar (1-6, max. 6) Integrating theoretical concepts with practice/service issues. Cases selected for discussion represent a wide range of problems found in schools. Activities include group supervision and peer review. Offered: AWSp.

EDPSY 568 Seminar in Professional Issues and Ethics (2) Professional ethics codes and cases, history of counseling or school psychology, legal prob-

lems, credentialing issues, conditions of practice, continuing education, publishing, and presenting research papers. Credit/no credit only. Offered: W.

EDPSY 569 Seminar in Counseling Psychology Research (2) Methodological and professional issues related to research in counseling and psychological services. Counseling psychology research literature with focus on content and methods. Prerequisite: EDPSY 591 or equivalent.

EDPSY 570 Introduction to School Psychology (2, max. 4) Current issues in professional psychology practice and research. Limited to graduate students in school psychology. Offered: A.

EDPSY 571 Educational Applications of Neuropsychology: Assessment and Intervention (5) Students observe and administer neuropsychological tests and plan and carry out educational interventions for children with neuropsychological disorders. Content focuses on various neuropsychological disorders for which school psychologists can provide assessment and consultation. Prerequisite: EDPSY 540 or equivalent course in individual testing, and EDPSY 471 or permission of the instructor.

EDPSY 572 Social-Emotional Assessment (3) Techniques in social-emotional assessment of school-aged children. Diagnostic systems including DSM IV presented in conjunction with assessment techniques. Emphasis on integrative method for understanding social emotional assessment batteries and reliability and validity of their test score interpretation. Prerequisite: school psychology or counseling student or permission of instructor. Offered: A.

EDPSY 573 Psychological Assessment of Preschool Children (3) Students learn to give and interpret tests of intellectual development to assess language, play, and social/emotional functioning, and to write psychological assessment reports for infants, toddlers, and preschoolers. Credit/no credit only. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: Sp.

EDPSY 575 Structural Equation Modeling (3) Theory and data analysis using linear structural equation models. Application to data in educational research. Prerequisite: EDPSY 594 or equivalent. Offered: alternate years.

EDPSY 576 Hierarchical Linear Models (3) Theory and data analysis for research models where random factors are nested, such as multi-level data, growth curve analysis, and meta-analysis. Prerequisite: EDPSY 593 or equivalent. Offered: alternate years.

EDPSY 580 Seminar: The Emergence of Educational Psychology (3) Examination of documents by selected contributors to the field of educational psychology. Special focus on period from mid-nineteenth century to the later twentieth century. Prerequisite: graduate standing.

EDPSY 581 Seminar in Educational Psychology (1-5, max. 15) Advanced seminar on selected topics in educational psychology. A critical appraisal of current research. Prerequisite: advanced degree work in educational psychology. Offered: AWSp.

EDPSY 582 Seminar in Development and Socialization (3, max. 15) Advanced seminar on selected topics concerned with human development and socialization processes. Emphasis placed upon empirical research and its theoretical underpinnings in such areas as cognitive development, moral development and education, self-concept development, and related concerns.

EDPSY 583 Seminar in Learning and Thinking (3, max. 15) Seminar in the psychology of learning language and language learning. Each seminar is

offered with predesignated emphasis in one of the following topics: linguistics, phonology, pragmatics, psycholinguistics, semantics.

EDPSY 584 Seminar in Quantitative Methods (3, max. 15) Seminar on such topics as measurement techniques, research design, psychometrics, and statistics.

EDPSY 586- Qualitative Methods of Educational Research (5-) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second year doctoral standing and one course in statistics, and permission of instructor. Offered: jointly with EDC&I 578; A.

EDPSY 587- Qualitative Methods of Educational Research (5-) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: EDPSY 586/EDC&I 578; second-year doctoral standing and one course in statistics. Offered: jointly with EDC&I 579; Sp.

EDPSY 588 Survey Research Methodology and Theory (3) Survey research, research, theory, and methodology. Probability theory, sampling, human subjects considerations, instrumentation, and analysis techniques. Review and critique by students of theoretical issues in survey research and development of a survey instrument. Prerequisite: EDPSY 490 or equivalent. Offered: A.

EDPSY 589 Scholarly Writing in Education and Psychology (3) Introduction to the demands and expectations for technical writing in education and psychology, including aspects of the culture of scholarship. Designed for competent writers. Does not address basic grammar and composition. Credit/no credit only. Prerequisite: doctoral standing, and permission of instructor.

EDPSY 590 Computer Utilization in Educational Research (3) Computer utilization in solution of research problems, data reduction to forms amenable to computer solution, appropriate framing of problems for solutions by computer. Using an interactive system, editors, and program packages. Prerequisite: EDPSY 490. Offered: A.

EDPSY 591 Methods of Educational Research (3) Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and interpretation. Prerequisite: EDPSY 490. Offered: AWSp.

EDPSY 592 Advanced Educational Measurements (3) Theory of measurement; an examination of assumptions involved in test theory, errors of measurement, factors affecting reliability and validity, and item analysis and standards for educational and psychological tests. Prerequisite: EDPSY 490. Offered: Sp.

EDPSY 593 Experimental Design and Analysis (5) Experimental design with emphasis on the analysis of variance. Prerequisite: EDPSY 490 or equivalent. Offered: W.

EDPSY 594 Advanced Correlational Techniques (5) Multivariate analysis, including regression and multiple correlation; matrix algebra; factor analysis. Prerequisite: EDPSY 490 or equivalent. Offered: Sp.

EDPSY 595 Item Response Theory Models of Testing (3) In depth exploration of IRT models and their roles in the development of large scale educational and psychological tests. Prerequisite: EDPSY 490 or equivalent, EDPSY 592, EDPSY 594.

EDPSY 596 Program Evaluation (3) Advanced course in evaluation research emphasizing nontraditional designs, especially those that impose severe ecological constraints on the evaluators. Prerequisite: EDPSY 593, EDPSY 594, EDC&I 597, or permission of instructor.

EDPSY 597 Technical Requirements of Large Scale Tests (3) Theoretical and practical understanding of the quantitative aspects of large-scale tests, including: scaling, norms development, and the development of derived and interpretive scores, evidence for validity and reliability. Prerequisite: EDPSY 490 or equivalent, EDPSY 592, EDPSY 595.

EDPSY 599 Independent Studies in Education (*) Independent studies or readings of specialized aspects of education. Offered: AWSp.

EDPSY 600 Independent Study or Research (*) Prerequisite: permission of instructor. required. Offered: AWSp.

EDPSY 601 Internship (3-10, max. 10) Offered: AWSp.

Special Education

EDSPE 404 Exceptional Children (3) *Edgar, Rodriguez* Children with disabilities studied from the point of view of education. Offered: AWS.

EDSPE 414 Introduction to Early Childhood Special Education (3) *Schwartz* Provides students with a comprehensive overview of major aspects of the field of early childhood special education. Theoretical foundations and program development and implementation are presented in an approach that integrates theory, research, and practice. Offered: A.

EDSPE 419 Interventions for Families of Children with Disabilities (3) *Rodriguez* Upper-division course for professionals and paraprofessionals working with families of children with disabilities. Offered: SpS.

EDSPE 420 Classroom Management of the Physical Problems of Individuals with Severe or Profound Disabilities (3) Overview of physical management of pupils with severe or profound disabilities in educational settings. Principles of normal motor development, positioning, and handling are applied to the development of classroom strategies. Effects of abnormal motor development on educational programming. Offered: WS.

EDSPE 496 Workshop in Special Education (1-10, max. 15) Demonstration, observation, and/or participation with groups of disabled children in laboratory or controlled classroom settings. Offered: AWSpS.

EDSPE 499 Undergraduate Research (2-5, max. 5) 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. Offered: AWSpS.

EDSPE 500 Field Study (1-6, max. 6) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor. Offered: AWSpS.

EDSPE 502 Collaboration: Working with Parents and Professionals (3) *Sandall* Provides students with knowledge and skills for working collaboratively with other professionals, family members, and paraprofessionals. Focus is on the role of the special educator in forming and sustaining school, family, and community partnerships. Offered: W.

EDSPE 504 Special Education and the Law (3) *Brown* Overview of major state and federal laws affecting the operation and management of special education programs in public schools. Emphasis on procedural and substantive rights of children with disabling conditions. Offered: jointly with EDLPS 516; W.

EDSPE 505 Curriculum Development of Students with Moderate to Severe Disabilities (3) Addresses issues and practices in the development of appropriate curricula for students with moderate to severe or profound disabilities. Includes curriculum models, methods for the selection of appropriate skills for inclusion in Individualized Education Plans, and establishing priorities for instruction. Offered: W.

EDSPE 507 Instructional Methods for Students with Moderate to Severe Disabilities (3) *Billingsley* Details a systematic instructional process for the education of students with moderate to severe or profound disabilities. Includes instructional methods and materials designed to promote the development of skills that are required in school, home, and community settings, and to reduce challenging behaviors. Offered: A.

EDSPE 510 Behavioral Measurement and Management in the Classroom (3) *White* Response measurement in the classroom; use of data analysis for instructional decisions and behavior management for children with disabilities. Offered: A.

EDSPE 511 Methods of Applied Behavior Analysis Research (3) *Billingsley, White* Characteristics of applied behavior analysis are presented: direct, daily measurement, and the systematic investigation of important variables. Representative studies from various applied situations are discussed in terms of dependent and independent variables, research design, reliability, validity, and data analysis. Prerequisite: EDSPE 510 or equivalent preparation. Offered: WSp.

EDSPE 513 Principles of Clinical Appraisal for Teachers of Exceptional Children (3) *Jenkins, Troia* Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical and measurement considerations are used to buttress practical experiences in appraisal related to eligibility and intervention. Offered: AS.

EDSPE 514 Fundamentals of Reading for Children with Disabilities (3) *Jenkins* Emphasis on basic pre-reading and reading skills, such as phonics and structural analysis, specifically for the disabled child. Acquisition of comprehension skills by the disabled. Diagnosis of reading problems, published materials appropriate for children with disabilities, material modification. Offered: WS.

EDSPE 515 Problems and Issues in Special Education (3, max. 9) *Edgar* Intensive examination of the issues pertinent to special education, such as legislation, interdisciplinary functions, and the role of special education in general education and placement practices. Offered: Sp.

EDSPE 517 Practicum in Research Design and Analysis in Special Education (1-4, max. 10) Critical analysis of current research in special education and related fields serves as background for designing applied research projects. Projects are examined, evaluated, and revised in seminar discussion. Prerequisite: EDPSY 490 and EDSPE 591 or equivalent and permission of instructor. Offered: AWSpS.

EDSPE 518 Seminar in Special Education Research (1-3, max. 9) Designed for doctoral students in special education during their first year of residency. Each candidate selects a dissertation problem and submits a proposal. Topics such as the procurement of subjects, the reporting and commu-

nication of research findings, and the evaluation of research are stressed. The seminar leads to the evolution of a viable dissertation proposal. Credit/no credit only. Offered: AWSp.

EDSPE 520 Seminar in Applied Special Education (1-12, max. 12) *Jenkins, Rodriguez, Sandall, Schwartz, Troia* Designed for graduate students in special education. Focus on contemporary topics relating to the application of the theoretical constructs to special education. Offered: AWSp.

EDSPE 521 Communication and Language in Young Exceptional Children (3) *Schwartz* Review and discussion of theories of language acquisition as they relate to communication and language in young children with special needs. Review of research of language environments that relate to early literacy and education and how to use this information to modify environments for children with special needs. Offered: jointly with EDPSY 519; W.

EDSPE 522 Seminar on the Education of Students with Severe Disabilities (3) *White* Advanced graduate seminar arranged to study and discuss the essential components of providing a comprehensive approach to the identification and education of infants, children, adolescents, and young adults with severe disabilities. Offered: Sp.

EDSPE 523 Specific Numeracy Techniques for Elementary Students with Mild Disabilities (3) *Neel* Provides the teacher with specific techniques for teaching numeracy to elementary students with mild disabilities in inclusive settings. Prerequisite: EDTEP 522 or equivalent. Offered: SpS.

EDSPE 525 Educating Students with Autism or Severe Behavior Disorders (3) *Schwartz* Consideration of the identification, etiology, education, and outcomes of individuals with autism or other severe behavior disorders. Offered: Sp.

EDSPE 526 Techniques for Instructing Social Behaviors for Elementary Students with Mild Disabilities (3) *Cheney, Troia* Provides prospective and practicing teachers with foundational theory and knowledge to select specific techniques to promote social competency in elementary children with mild disabilities. Discusses research related to use of these techniques and interventions. Develops schoolwide, classroom, and individual plans for teaching social skills. Offered: ASpS.

EDSPE 541 Education of Children with Behavior Disorders (3) *Cheney, Neel* Introductory course covering characteristics of and educational practices for children with emotional/behavioral disabilities. Reviews theory, definitional issues, models, assessment, and instructional methods for educating children with emotional and behavioral disorders. Students develop a working knowledge of educational approaches for teaching students with emotional/behavioral disabilities. Offered: alternate years; W.

EDSPE 545 Instructional Modifications for the Education of Children with Mild Disabilities (3) *Lovitt, Troia* In-depth analysis and application of several modifications of instructional techniques necessary for the education of students with mild disabilities. Offered: WS.

EDSPE 546 Seminar in Educating Children with Behavior Disorders (3, max. 9) *Cheney, Neel* Advanced-level seminars focus on contemporary research topics relating to the effective education of children with serious behavior disorders. Students analyze and review research pertinent to the chosen topics and prepare a scholarly manuscript for dissemination. Offered: alternate years; W.

EDSPE 548 Special Topics in the Education of the Learning Disabled (3, max. 12) In-depth analysis of

empirical findings in the specialty of learning disabilities with focus on the synthesis of research findings and their application to the educational environment. A paper suitable for publication required. Prerequisite: course in learning theory, introductory course in learning disabilities, or equivalent preparation.

EDSPE 561 Educational Assessment of Young Children with Special Needs (3) *Sandall* Special standardized and educational measurement and evaluation procedures for use with young children with a variety of disabling conditions. Observation, ecological assessment, and programming strategies are discussed in combination with practical application of the skills within an educational framework. Offered: A.

EDSPE 562 Curricula for Preschool Children with Disabilities (3) *Sandall* Basic theoretical models and approaches to curricula for preschoolers with disabilities. Promote specific preschool curricula and develop skills to assist students in critiquing and evaluating curricula. How to adapt materials for specific populations and to plan a program for exceptional preschoolers. Offered: Sp.

EDSPE 563 Issues in Working with Families of Young Children with Special Needs (3) *Rodriguez* Adjustment of parents to the presence of a young child with disabilities, transactions that occur between parents and their children, procedures that facilitate the child's development through these interactions, and strategies to promote relationships among families and professionals. Offered: W.

EDSPE 565 Seminar: Early Childhood Education for Children with Disabilities (3, max. 9) *Rodriguez, Sandall, Schwartz* Advanced seminar on early childhood education for infants and young children with disabilities. Historical and current research from special education and related fields reviewed with regard to their application to the education of young children with disabilities.

EDSPE 566 Current Research in Early Childhood Special Education (2, max. 6) Introduces students to theory and current research related to early intervention with infants and toddlers and how to evaluate research articles. Selected topics cover typical and atypical development in the areas of cognitive, social communication, and social development, as well as issues in assessment, curricula, and intervention strategies.

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. Offered: AWSpS.

EDSPE 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed. Offered: AWSpS.

EDSPE 601 Internship (1-10) Prerequisite: graduate standing and permission based on prearrangement of internship placement and approval by adviser. Offered: AWSpS.

Teacher Education Program

EDTEP 501 First Quarter Field Experience—Elementary (2) Field experience and use of reflective process in small group discussions accompanying the first quarter of study in the Elementary Teacher Education Program. Field experience during the quarter in supervised school placements.

Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 502 Second Quarter Field Experience—Elementary (3) Field experience and use of reflective process in small group discussions accompanying the second quarter of study in the Elementary Teacher Education Program. Field experiences during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 503 Third Quarter Field Experience—Elementary (4) Field experience and use of reflective process in small group discussions accompanying third quarter of study in Elementary Teacher Education Program. Observe school-year opening full-time in late August through September; field experiences during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 505 Portfolio: Tool for Reflection—Elementary (2) Group discussions fostering integration of course work and field experience through reflection. Using program goals and targets, students illustrate their learning through multiple forms of evidence. Final portfolio is presented to an audience. Related field experiences may be arranged. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 511 School and Society (3) Exploration of issues regarding schooling and society, such as matters of value and value tension in American schools. Consideration of social values such as equality, opportunity, pluralism, and community; historical and contemporary evidence of values in schooling; and how values can conflict in policy and practice. Prerequisite: elementary TEP student.

EDTEP 521 Teaching and Learning in Numeracy I (3) Focus on mathematics from the perspective of the learner and on the meaning of understanding a mathematics concept. Examination of cultural aspects of the development of these concepts. Prerequisite: elementary TEP student.

EDTEP 522 Teaching and Learning in Numeracy II (3) Focus on pedagogy of mathematics. In conjunction with field experience, students extend understanding of mathematics and successfully integrate mathematics as a tool for learning science and art. Prerequisite: elementary TEP student.

EDTEP 523 Teaching and Learning in Science (3) Science teaching in a manner consistent with how young children learn science concepts and skills. Opportunities are provided for work on science activities similar to those used with elementary school children and to experience many of the problems and successes of preadolescents. Prerequisite: elementary TEP student.

EDTEP 531 Teaching and Learning in Literacy I (3) Investigation of the multiple natures of literacy development. Students study the impact of culture and family on literacy development by reading and discussing a variety of texts while also experiencing the development of their own learning through literature study, the writing process, and oral presentations. Prerequisite: elementary TEP student.

EDTEP 532 Teaching and Learning in Literacy II (3) Introduces participants to the content and process of literacy learning in elementary school. Study of abilities needed for effective literacy use, instructional strategies to help children acquire these abilities, and assessment strategies to evaluate student progress. Prerequisite: elementary TEP student.

EDTEP 533 Teaching and Learning in Literacy III (3) Introduces participants to the content and process of literacy learning in elementary school.

Study of abilities needed for effective literacy use, instructional strategies to help children acquire these abilities, and assessment strategies to evaluate student progress. Prerequisite: elementary TEP student.

EDTEP 541 Dilemmas of Teaching and Learning in Elementary School (4) Covers human learning in the elementary school setting with emphasis on discipline-specific cognition and cognitive development. Prerequisite: elementary TEP student.

EDTEP 542 Meeting the Needs of All Students-Elementary (3) Overview of physical, cognitive, and social development of elementary school age children. Discussion of ways in which differences in development may affect children in school. Provides elementary teachers with understanding of how to facilitate the success of all children in general education classrooms. Prerequisite: elementary TEP student.

EDTEP 543 Teaching and Learning in Social Studies.(3) Introduction to objectives, content, and teaching strategies of social studies and the arts as taught in elementary school.

EDTEP 551 Multicultural Teaching (3) Concepts, theories, and strategies that constitute major dimensions of multicultural education. Focus on racial and ethnic groups, social class, and gender. Dimensions of multicultural education examined include content integration, knowledge construction process, prejudice reduction, equity pedagogy, and empowering school culture and social structure. Prerequisite: TEP student.

EDTEP 552 Assessment in Elementary Education (3) Emphasis on methods of assessment that reinforce understanding of the various disciplines. Includes performance assessments, assessments of student projects and papers, traditional exams, and observational exams. Prerequisite: elementary TEP student.

EDTEP 561 Dilemmas of Teaching and Learning (5) Study of human learning in an educational setting, with an emphasis on learning of school subjects. Topics include nature of learning, knowledge and teaching, motivation, culture, and cognition. Prerequisite: secondary TEP student.

EDTEP 562- Adolescent Development and Education I (3-) Overview of trends and issues of adolescent development and behavior in relation to contemporary secondary schooling. Psychological perspectives on adolescent identity, interpersonal relationships, academic engagement, and social deviancy in schools examined with special attention to classroom management and accommodating differences. Prerequisite: secondary TEP student.

EDTEP -563 Adolescent Development and Education II (-3) Overview of trends and issues of adolescent development and behavior in relation to contemporary secondary schooling. Psychological perspectives on adolescent identity, interpersonal relationships, academic engagement, and social deviancy in schools examined with special attention to classroom management and accommodating differences. Prerequisite: secondary TEP student.

EDTEP 564 Working in Secondary Schools (3) Organizational, personal, and interpersonal aspects of working as a teacher in a secondary school. Preparation for membership and leadership in a learning community and for continuing professional growth. Credit/no credit only. Prerequisite: secondary TEP student

EDTEP 565 Planning and Teaching an Integrated Curriculum (3) Introduction of models for integrating curriculum, congruent instructional and assessment strategies, and team planning skills. Provides direct and experiential learning activities and results in production of team-planned curricular units based on two different models of curriculum integration. Prerequisite: secondary TEP student.

EDTEP 571 Topics and Tensions in School and Society (3) Exploration of issues of value and value tension in American schools. Consideration of social values of equality, opportunity, pluralism, and community, historical and contemporary evidence of values in schooling, and how values can conflict in policy and practice. Prerequisite: secondary TEP student.

EDTEP 573 Assessment in Secondary Education (3) Strong emphasis on methods of assessment that reinforce understanding of the various disciplines, including performance assessments, assessments of student projects and papers, traditional exams, and observational exams. Prerequisite: secondary TEP student.

EDTEP 580-Teaching English and Language Arts in Secondary School I (5-) Teaching of English and Language Arts in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP -581 Teaching English and Language Arts in Secondary School II (-3) Teaching of English and Language Arts in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 582- Teaching Mathematics in the Secondary School I (5-) Teaching of mathematics in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP -583 Teaching Mathematics in the Secondary School II (-3) Teaching of mathematics in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 584- Teaching Social Studies in the Secondary School I (5-) Developing, teaching, and evaluating social studies courses on the middle, junior, and senior high school levels. Prerequisite: secondary TEP student.

EDTEP -585 Teaching Social Studies in the Secondary School II (-3) Developing, teaching, and evaluating social studies courses on the middle, junior, and senior high school levels. Prerequisite: secondary TEP student.

EDTEP 586-Teaching Science in the Secondary School I (5-) Teaching of science in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP -587 Teaching Science in the Secondary School I (-3) Teaching of science in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 588- Teaching World Languages I (5-) Introduction to currently used foreign language teaching methods and approaches, including learning and teaching strategies and techniques for the four skills—reading, writing, speaking, listening—and culture. Current and future trends in pedagogy and technology. Prerequisite: secondary TEP student.

EDTEP -589 Teaching World Languages II (-3) Introduction to currently used foreign language teaching methods and approaches, including learning and teaching strategies and techniques for the four skills—reading, writing, speaking, listening—and culture. Current and future trends in pedagogy and technology. Prerequisite: secondary TEP student.

EDTEP 591 First Quarter Field Experience—Secondary (3) Field experience and small group discussions accompanying the first quarter of study in the Secondary Teacher Education Program. Observe school year opening full-time for approximately one month in August and September and two weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 592 Second Quarter Field Experience—Secondary (3) Field experience and small group discussions accompanying the second quarter of study in the Secondary Teacher Education Program. Three weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 593 Third Quarter Field Experience—Secondary (3) Field experience and small group discussions accompanying third quarter of study in Secondary Teacher Education Program. Four weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 595 Portfolio: Tool for Reflection—Secondary (3) Group discussions fostering integration of course work and field experience through reflection. Using program goals and targets, students illustrate their learning through multiple forms of evidence. Final portfolio is presented to an audience. Related field experience may be arranged. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 600 Independent Study or Research (1, max. 6) Registration must be accompanied by a study prospectus endorsed by the Director of Teacher Education and the faculty adviser for the work proposed. Credit/no credit only.

EDTEP 601 Fourth Quarter Field Experience (2-10, max. 15) Field experience during the fourth quarter of study in the Teacher Education Program. Full-time student teaching in supervised school placements. Prerequisite: TEP student.

College of Engineering

Dean

Denice D. Denton
371 Loew

Associate Deans

Mary E. Lidstrom
Chen-Ching Liu



General Catalog Web page:

www.washington.edu/students/genocat/academic/College_Engineering.html



College Web page: www.engr.washington.edu

Engineering is an increasingly critical societal enterprise. More than ever before, the engineer is challenged both to design products whose value is high by social and economic measures and to provide for efficient manufacture of such products within the constraints of environmental protection and diminishing raw-material resources. Requirements imposed on the transportation system and other elements of society's physical infrastructure pose analogous challenges. At the same time, reductions in computer costs and increases in sophistication are dramatically influencing both the products and processes designed by the engineer and the actual practice of engineering.

The primary goal of the College of Engineering educational programs is to prepare students for a professional career in engineering by providing the technical foundation required for success in industry, government, or academia. Other goals of the College are to instill within its students the highest ethical standards, the capability for lifelong learning, and a curiosity about the world. Excellence in undergraduate and graduate academic programs remains the College's highest priority.

The College offers active educational and research programs, both departmental and interdisciplinary, at the graduate levels. (See Interdisciplinary Engineering Studies Program for interdisciplinary undergraduate and graduate programs.)

The College of Engineering has been a major unit of the University since 1899. The first engineering degrees were authorized in mining engineering and metallurgical engineering in 1898. Degrees were added for civil engineering (1901), electrical engineering (1902), mechanical engineering (1906), chemical engineering (1907), ceramic engineering (1919), aeronautical engineering (1929), bioengineering (1983), industrial engineering (1986), and computer engineering (1987). A degree program in technical communication was implemented in 1991. In 1999, 1,566 upper-division undergraduate majors and 1,407 graduate students were enrolled in engineering programs taught by a faculty of 195 members.

College Facilities

Teaching and research activities of the College are conducted in thirteen major campus buildings (and portions of others), which contain the College's offices, classrooms, and research and teaching laboratories. The Engineering Library, a branch of the University Libraries, provides outstanding collections of books, periodicals, technical reports, and patents of interest to engineers. Computers and terminals are available in all departments and at the University's Academic Computer Center.

Student Organizations and Activities

All of the major professional engineering societies have student chapters on campus, and all engineering students are encouraged to join the chapter that represents his or her field of interest. The College also has student chapters of the Society of Women Engineers, American Indian Science and Engineering Society, National Society of Black Engineers, and the Society of Hispanic Professional Engineers. The Pre-Engineering Student Association (PESA) is the major College-wide organization for all students enrolled in a pre-engineering course of study but not yet admitted to a department. The Engineering Student Council, comprising student representatives from all departments and professional societies, is the major College-wide student organization and participates actively in College affairs. Honor societies open to engineering students are Tau Beta Pi and Sigma Xi.

Students serve with faculty members on engineering policy committees which make recommendations concerning instructor evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

Educational Outreach



Engineering Professional Programs:

www.engr.washington.edu/~uw-eppl/



Education at a Distance for Growth and

Excellence: www.engr.washington.edu/edge/

Fulfilling a commitment to lifelong learning, the College of Engineering offers courses, workshops, and conferences to respond to the professional development needs of practicing engineers and related technical professionals worldwide. Through Engineering Professional Programs (EPP) and Education at a Distance for Growth and Excellence (EDGE) thousands of practicing engineers update their technical knowledge or pursue advanced degrees each year. For more information contact Engineering Professional Programs at 206-543-5539, or Education at a Distance for Growth and Excellence at 206-685-2242.

Special Facilities

Office of Engineering Research

Coordinator, Mary Heusner
372 Loew, Box 352180



www.engr.washington.edu/research/

The Office of Engineering Research promotes, stimulates, and coordinates research in all fields of engineering. Its primary role is to coordinate interdisciplinary research programs and national research initiatives. The Office of Research also reviews grant and contract proposals, tracks awards, and provides information on funding opportunities. This office allocates limited matching funds to College units to increase the quality of research in the College of Engineering.

Interdisciplinary Engineering Studies Program

356 Loew

The College of Engineering directly administers non-departmental undergraduate and graduate degree programs. Some engineering fundamentals and writing courses required for admission to the departments are managed by specific engineering departments.

Graduate Programs

The College also offers graduate programs leading to the Master of Science in Engineering and Master of Science degrees, without designation of a specific major.

Approved programs lead to the M.S.E. degree in civil, mechanical, electrical, chemical, and interengineering, and approved programs lead to the M.S. degree in civil engineering, interengineering, and materials science and engineering. Admission requires a B.S. degree in engineering, mathematics, or physical science, and evidence of aptitude for graduate study. Submission of scores on the Graduate Record Examination is required.

Master of Science in Engineering

The Interengineering Master of Science in Engineering (M.S.E.) and Master of Science (M.S.) program is intended for students whose desired course of study includes two or more engineering departments and may also include study in departments outside the College of Engineering. Applications and files of students entering the M.S./M.S.E. option are handled in the Office of Organizational Infrastructure. Admission to the interengineering option requires a statement describing the applicant's objectives. This statement should state why the student wants to enter the M.S./M.S.E. program rather than one of the traditional engineering graduate programs. Applicants to the M.S./M.S.E. program must have well-defined educational objectives which cannot be satisfied by established engineering programs. Graduation and entrance requirements, which differ for the various programs, may be obtained from the Office of Organizational Infrastructure, College of Engineering, 206-543-8590.

Program in Engineering and Manufacturing Management—PEMM Fellows

For students interested in a career in manufacturing management, PEMM offers a two-year (24-month) joint degree program leading to both M.B.A. (Master of Business Administration) and M.S.E. (Master of Science in Engineering) degrees. PEMM applicants must apply to the M.B.A. program as well as the M.S.E. Interengineering/PEMM program. Prospective students must take the GMAT examination before applying. The Graduate Program Office in the School of Business must receive all M.B.A. applications by March 1. The deadline for submitting the PEMM application to the College of Engineering is March 1. Graduation and entrance requirements may be obtained from the Program in Engineering and Manufacturing Management (PEMM) at 206-543-5349 or 206-685-8047 or via email at pemm@u.washington.edu.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

ENGR 498 Special Topics in Engineering (1-5, max. 6) Offered: AWPoS.

ENGR 499 Special Projects in Engineering (1-3, max. 6) Offered: AWPoS.

Courses for Graduates Only

ENGR 598 Seminar Series in Engineering (1, max. 12) Kalonji, Reed Graduate seminar series on topics of interest to all engineering students.

Aeronautics and Astronautics



General Catalog Web page:
www.washington.edu/students/genecat/academic/Aeronautics_Astro.html



Department Web page:
www.aa.washington.edu

206 Guggenheim

Aeronautics and Astronautics deals with the design and analysis of air and space vehicles and a broad spectrum of related engineering science, such as aerodynamics, structural mechanics, automatic controls, flight mechanics, space dynamics, propulsion, plasma dynamics, and related topics. Established in 1930, the department is the only one of its kind in the Pacific Northwest, a region whose vast aerospace industry is a major contributor to the technological development, economic vitality, and security of the United States. Educators and researchers in the department have contributed profusely to all major areas of aerospace engineering. Graduates at all degree levels have been successful and valued at local, national, and international industries, as well as at government organizations and institutions of higher learning. The department is unique at the University of Washington, in terms of its specific technological applications, its capacity for multidisciplinary integration of complex systems, and its long-term interaction with local industry.

Graduate Program

Graduate Program Coordinator
206 Guggenheim, Box 352400
206-616-1113
gradadvising@aa.washington.edu

The Department of Aeronautics and Astronautics offers programs that provide a foundation in the engineering sciences and study in various engineering applications. These lead to the degrees of Master of Science in Aeronautics and Astronautics, Master of Aerospace Engineering, or Doctor of Philosophy.

Master of Science in Aeronautics and Astronautics (M.S.A.A.)

The M.S.A.A. is a traditional research-oriented master's degree program intended for students who are interested in research and development careers in industry or government, or who plan to continue graduate studies toward a Ph.D.

The M.S.A.A. program of study is tailored to the needs and interests of the student. Each program must be approved by the department graduate committee and must provide breadth through a variety of subjects, depth through extensive study of a specialized field, and analytical strength. Minimum programs consist of either 13 courses, or 10 courses and a 9-credit thesis.

Master of Aerospace Engineering (M.A.E.)

The M.A.E. program is intended for recent graduates or engineers who wish to expand their knowledge in multidisciplinary areas while also learning other aspects of aerospace engineering, such as business, management, manufacturing, or technical communication. The student must complete a minimum of 37 credits of course work and 8 credits of independent or team project work in a program approved by the department graduate committee. The Master of Aerospace Engineering (M.A.E.) program is structured to permit completion of the degree requirements as a full-time or part-time student. The M.A.E. is a terminal degree and is not intended for those seeking a Ph.D.

Doctor of Philosophy (Ph.D.)

The doctoral program consists of lectures, seminars, discussions, and independent study, enabling the student to master and to make original contributions to a particular field. In addition to the formal steps for obtaining the degree listed in the Graduate School section of this catalog, the student must complete an approved program of study consisting of 30 credits of course work beyond that required for the Master of Science in Aeronautics and Astronautics.

Research Activities

Research facilities include the Kirsten 8x12-foot low-speed wind tunnel, a 3x3-foot low-speed wind tunnel, a water tunnel, a small supersonic blow-down tunnel, a hypervelocity projectile accelerator (ram accelerator), material and structural test machines, a composite-material laboratory, an unmanned aerial vehicle (UAV) laboratory, a controls laboratory, various plasma and fusion-research and engineering physics laboratories, and a development laboratory for small satellites. A variety of computer facilities is available, including 17-computer parallel cluster for a computational fluid dynamics research. The Aerospace and Energetics Research Program, which conducts interdisciplinary research in the Aerospace and Engineering Research Building, is also part of the Department of Aeronautics and Astronautics.

Externally funded research is carried out by faculty members and students on such topics as buoyant flows, flow separation control, combustor mixing, shear layers, computational fluid dynamics, internal flows, reacting flows, ram accelerators, space energy systems, space system design, control system design and engineering, robust and optimal control, wing optimization, impact mechanics, composite material structure and fracture, plasma dynamics, space propulsion, and fusion research.

Special Facilities/Programs

Aerospace and Energetics Research Program (AERP)

120 Aerospace and Engineering Research Building

The Aerospace and Energetics Research Program is directed toward high-technology engineering research and teaching through research. The program anticipates and tries to outpace the nation's critical technology needs. It therefore emphasizes those engineering skills that both match the requirements of the present and future, and develop in students a broad understanding of the impact of technology on

society. Suitable programs are designed to develop the student's imagination and a willingness to respond to the complex and rapidly changing future of engineering. This directs the faculty's efforts and creates within the principal investigators, research faculty, and students the concept of engineering as an adventure.

The program covers many fields, usually centered on energy or aerospace systems. Currently the program is active in plasma engineering related to fusion power and space propulsion, ram accelerators for direct space launch, and research on new terrestrial energy conversion and vehicle propulsion technologies.

University of Washington Aeronautical Laboratory (UWAL)

Kirsten Aeronautical Laboratory

The primary facility that UWAL operates is the Kirsten Wind Tunnel, a subsonic, closed-circuit, double-return tunnel with an 8x12-foot test section. Undergraduate students, usually from the Department of Aeronautics and Astronautics, are employed at UWAL to run tests for University research, commercial customers, and for instructional uses, such as student projects. UWAL provides departmental support for research projects such as the unmanned aerial vehicle (UAV) project.

Admission

Students who have earned a baccalaureate degree in an accredited program of aeronautics and astronautics or closely related field are eligible for the M.S.A.A. and M.A.E. programs. Backgrounds in related fields require review on a case-by-case basis and may require preparatory courses, depending on the student's educational objectives and previous studies. Admission is competitive, with the equivalent of a 3.00 GPA a minimum standard. Submission of verbal, quantitative, and analytical scores on the Graduate Record Examination is required. Entrance-requirement details, application deadlines, application forms, and advising literature may be obtained from the department office or the department's Web page (www.aa.washington.edu).

Admission to the Doctor of Philosophy program requires a master's degree, preferably in aerospace or mechanical engineering, with a minimum GPA of 3.35 and satisfactory performance on a departmental qualifying examination.

Additional Information

Students who intend to work toward advanced degrees must apply for admission to the Graduate School. Most students are financially supported by the department as teaching or research assistants, or by their employers. For further information on this or other aspects of department programs, contact the Graduate Program Coordinator, 206 Guggenheim, Box 352400, or visit the department's Web site at www.aa.washington.edu.

Faculty

Chair

Adam Bruckner

Professors

Breidenthal, Robert E. * 1980; PhD, 1979, California Institute of Technology; turbulence, entrainment, mixing, vorticity.

Bruckner, Adam * 1972; PhD, 1972, Princeton University; space systems, propulsion, hypervelocity accelerators, energy conservation astrobiology.

Christiansen, Walter H. * 1967, (Emeritus); PhD, 1961, California Institute of Technology; gas dynamics and gas physics, high-power gas lasers and their application, energy conversion.

Clark, Robert N. * 1957, (Emeritus); PhD, 1969, Stanford University; automatic control systems, fault detection in dynamic systems.

Decher, Reiner * 1973, (Emeritus); PhD, 1968, Massachusetts Institute of Technology; aircraft propulsion, fluid mechanics, energy conversion.

Eastman, Fred 1974, (Emeritus); MS, 1929, Massachusetts Institute of Technology; aeronautics and astronautics.

Fyfe, Ian M. * 1959, (Emeritus); PhD, 1957, Stanford University; dynamics, wave propagation in solids and fluids.

Hertzberg, Abraham * 1966, (Emeritus); MAeE, 1949, Cornell University; energy systems, space systems, fusion, aeronautical systems.

Hoffman, Alan Lowell * 1989; PhD, 1967, California Institute of Technology; plasma physics and magnetic confinement fusion.

Holsapple, Keith A. * 1965; PhD, 1965, University of Washington; solid mechanics, continuum mechanics, structure waves, finite element methods.

Jarboe, Thomas R. * 1989; PhD, 1974, University of California (Berkeley); plasma physics and controlled fusion, magnetic reconnection and relaxation.

Joppa, Robert G. * 1947, (Emeritus); PhD, 1972, Princeton University; aircraft flight mechanics, stability and control, V/STOL testing, airplane design, flight testing.

Kurosaka, Mitsuru * 1987; PhD, 1968, California Institute of Technology; propulsion, turbo machinery, thermo-fluid mechanics, heat transfer and acoustics.

Lin, Kuen-Yuan * 1984; PhD, 1977, Massachusetts Institute of Technology; composite materials, structural mechanics, finite element methods.

Parmeter, R. Reid * 1963, (Emeritus); PhD, 1963, California Institute of Technology; structures, solid mechanics, fracture mechanics.

Russell, David A. * 1967, (Emeritus); PhD, 1961, California Institute of Technology; fluid mechanics and gas physics, aerodynamics, shock processes and laser fluid dynamics.

Street, Robert E. 1948, (Emeritus); PhD, 1939, Harvard University; aeronautics and astronautics.

Vagners, Juris * 1967; PhD, 1967, Stanford University; optimal control and estimation theory, applications to aircraft systems.

Winglee, Robert M. * 1991, (Adjunct); PhD, 1984, University of Sydney (Australia); space plasma physics, numerical simulation of space plasmas.

Associate Professors

Devasia, Santosh 2000, (Adjunct); PhD, 1993, University of California (Santa Barbara); control theory and applications: nanotechnology, distributed systems, and biomedical systems.

Eberhardt, David Scott * 1986; PhD, 1985, Stanford University; computational fluid dynamics, numerical analysis.

Livne, Eli * 1990; PhD, 1990, University of California (Los Angeles); multidisciplinary design, aeroelasticity, aeroservoelasticity, optimization, structural dynamics.

Ly, Uy-loi * 1988; PhD, 1983, Stanford University; robust controls, parameter optimization, model reduction, digital control, design integration.

Mattick, Arthur T. * 1975; PhD, 1975, Massachusetts Institute of Technology; gas physics, gas lasers, energy conversion, propulsion.

Slough, John T. * 1992; PhD, 1981, Columbia University; plasma physics, nuclear fusion and space propulsion.

Assistant Professors

Anderson, Todd A. * 2000; PhD, 1999, University of Arizona; composite materials, structural mechanics, rapid prototyping.

Campbell, Mark E. * 1997, (Affiliate); PhD, 1996, Massachusetts Institute of Technology; precision controlled structures, autonomous aerospace vehicles, smart materials.

Dabiri, Dana * 2002; PhD, 1992, University of California (San Diego); fluid dynamics, turbulent and vortical flows, thermal transport.

Mesbahi, Mehran 2002; PhD, 1996, University of Southern California (Los Angeles); distributed space systems, system and control theory, optimization, complex dynamical systems.

Morgansen, Kristi A. 2002; PhD, 1999, Harvard University; nonlinear controls, sensor design, biologically inspired locomotion and communication networks.

Rysdyk, Rolf * 2001; PhD, 1998, Georgia Institute of Technology; nonlinear adaptive control, robust nonlinear control, autonomous flight, fault-tolerant flight control.

Shumlak, Uri 1994; PhD, 1992, University of California (Berkeley); computational fluid dynamics, parallel computing, plasma physics, magneto-hydrodynamics.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsclat/.

A A 400 Gas Dynamics (3) Introduction to kinetic theory and free molecule flow. Review of thermodynamics. One-dimensional gas dynamics: one-dimensional wave motion, combustion waves. Ideal and real gas application. Prerequisite: PHYS 123; CHEM E 260. Offered: W.

A A 402 Fluid Mechanics (3) Inviscid equations of motion, incompressible potential flows, small perturbation flows, bodies of revolution, viscous equations, exact solutions, laminar boundary-layer equations, similar solutions, integral methods. Compressibility, instability, turbulent boundary layers. Prerequisite: MATH 324; A A 300. Offered: Sp.

A A 405 Introduction to Aerospace Plasmas (3) Development of introductory electromagnetic theory including Lorentz force and Maxwell's equations. Plasma description. Single particle motions and drifts in magnetic and electric fields. Derivation of plasma fluid model. Introduction to plasma waves. Applications to electric propulsion, magnetic confinement, and plasmas in space and Earth's outer atmosphere. Prerequisite: PHYS 123; MATH 324. Offered: A.

A A 406 Gas Discharges for Plasma Processing and Other Applications (3) Lectures and demonstrations on direct-current and radio-frequency electrical discharges for sputtering, plasma etching and other plasma processing applications. Prerequisite: either MATH 136 or MATH 307; PHYS 122.

A A 409 Computer Tools for Aerospace III (2) Computer-aided drawing basics, three-dimensional drawing, projections, views. Computer-aided design and analysis tools for stress and heat transfer calculations. Offered: A.

A A 410- Aircraft Design I (4-) Conceptual 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. Offered: W.

A A -411 Aircraft Design II (-4) 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. Prerequisite: A A 410. Offered: Sp.

A A 419 Aerospace Heat Transfer (3) Fundamentals of conductive, convective, and radiative heat transfer with emphasis on applications to atmospheric and space flight. Prerequisite: PHYS 123; MATH 307. Offered: W.

A A 420- Spacecraft and Space Systems Design I (4-) Design of space systems and spacecraft for advanced near-Earth and interplanetary missions. Astrodynamics, space environment, space systems engineering. Mission design and analysis, space vehicle propulsion, flight mechanics, atmospheric entry, aerobraking, configuration, structural design, power systems, thermal management, systems integration. Oral presentations and report writing. Design topics vary. Offered: W.

A A -421 Spacecraft and Space System Design II (-4) A continuation of 420. Course content varies from year to year and is dependent on the design topic chosen for 420. Prerequisite: A A 420. Offered: Sp.

A A 430 Finite Element Structural Analysis (3) Introduction to the finite element method and application. One-, two-, and three-dimensional problems including trusses, beams, box beams, plane stress and plane strain analysis, and heat transfer. Use of finite element software. Prerequisite: CEE 220. Offered: A.

A A 432 Composite Materials for Aerospace Structures (3) Introduction to analysis and design of aerospace structures utilizing filamentary composite materials. Basic elastic properties and constitutive relations of composite laminates. Failure criteria, buckling analysis, durability, and damage tolerance of composite structures. Aerospace structure design philosophy and practices. Prerequisite: A A 332. Offered: W.

A A 441 Flight Test Engineering (3) Determination in flight of performance, stability, and control characteristics of aircraft; and comparison with predicted and wind tunnel results. Prerequisite: A A 311. Offered: Sp.

A A 448 Control Systems Sensors and Actuators (3) Study of control systems components and mathematical models. Amplifiers, DC servomotors, reaction mass actuators. Accelerometers, potentiometers, shaft encoders and resolvers, proximity sensors, force transducers, piezoceramic materials, gyroscopes. Experimental determination of component models and model parameters. Two 3-hour laboratories per week. Prerequisite: either A A 450 or E E 446. Offered: jointly with E E 448; W.

A A 449 Design of Automatic Control Systems (4)

Design problems for aerospace vehicles, systems with unstable dynamics, lightly damped modes, non-minimum phase, nonlinear dynamics. Computer-aided analysis, design and simulation, with laboratory hardware-in-the-loop testing. Team design reviews, oral presentations. Prerequisite: either A A 450, E E 446, or M E 471. Offered: jointly with E E 449; Sp.

A A 450 Control in Aerospace Systems (4)

Overview of feedback control. Linearization of nonlinear models. Model properties: stability, controllability, observability. Dynamic response: time and frequency domain techniques. Frequency response design techniques. Design of aerospace control systems via case studies. Prerequisite: M E 230; MATH 308. Offered: A.

A A 461 Advanced Propulsion (3)

Physical characteristics and components of rockets. Nozzle gasdynamics and non-ideal flow effects. Solid and liquid propulsion systems, components, and design. Aerodynamics of airbreathing engine components: inlets, compressors, turbines, afterburners, nozzles. Engine design methodology. Prerequisite: A A 360. Offered: A.

A A 480 Systems Dynamics (3)

Equations of motion and solutions for selected dynamic problems; natural frequencies and mode shapes; response of simple systems to applied loads. Prerequisite: A A 312. Offered: Sp.

A A 497 Aerospace Industry Tour (1)

Tours to local aerospace facilities to see how aerospace vehicles and systems are built, designed, and tested. Credit/no credit only. Offered: W.

A A 498 Special Topics in Aeronautics and Astronautics (0-1, max. 10)

Lectures and discussions on topics of current interest in aviation and space engineering. Three quarters required for credit. Offered: AWSp.

A A 499 Special Projects (1-5, max. 10)

Investigation on a special project by the student under the supervision of a faculty member. A maximum of 6 credits may be applied toward senior technical electives. Offered: AWSpS.

Courses for Graduates Only**A A 501 Physical Gasdynamics I (3)**

Equilibrium kinetic theory; chemical thermodynamics; thermodynamic properties derived from quantum statistical mechanics; reacting gas mixtures; applications to real gas flows and gas dynamics. Offered: odd years; A.

A A 502 Physical Gasdynamics II (3)

Introduction to vibrational relaxation and nonequilibrium chemistry. Nonequilibrium physics applied to flow. Brief introduction to nonequilibrium kinetic theory. Application to a variety of research and development areas such as high-temperature energy systems and gas lasers. Prerequisite: A A 501 or permission of instructor. Offered: even years; W.

A A 503 Kinetic Theory/Radiative Transfer (3)

Boltzmann and Collisionless Boltzmann (Vlasov) equations. Instabilities in homogeneous and inhomogeneous plasma, quasi-linear diffusion, wave-particle interaction, collisional (Fokker-Planck) equation. Introduction to radiative non-equilibrium, scattering and absorption processes. Integral equation of radiative transfer. Prerequisite: A A 501 or permission of instructor. Offered: even years; Sp.

A A 504 Fluid Mechanics (3)

Review of thermodynamics; vectors and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions; integrals of the equations of motion. Boundary conditions and discontinuity surfaces in fluids. Exact solutions. Dimensional analysis. Vorticity

dynamics. Highly viscous flows. Rotational flows. Offered: A.

A A 505 Fluid Mechanics of Inviscid Flow I (3)

Ideal incompressible flow; potential and stream functions. Airfoil theory and lifting line theory. Introduction to nonsteady flow; sound waves and surface waves; special topics. Offered: even years; W.

A A 506 Fluid Mechanics of Inviscid Flow II (3)

Ideal compressible flow; supersonic airfoils; shock waves; slender-body theory; lifting surface theory; approximate methods. Transonic flow; similarity; special topics. Prerequisite: A A 505. Offered: even years; Sp.

A A 507 Aerodynamics of Viscous Fluids I (3)

Introduction to viscous flow; exact solutions of the laminar equations of motion; approximate equations. Exact solutions for laminar boundary-layer equations. Approximate methods for compressible laminar boundary layers. Offered: odd years; W.

A A 508 Aerodynamics of Viscous Fluids II (3)

The phenomena of turbulence; transition prediction; Reynolds stresses; turbulent boundary-layer equations. Approximate methods for turbulent boundary layers. Prerequisite: A A 507 or permission of instructor. Offered: odd years; Sp.

A A 509 Computational Fluid Dynamics I (3)

Numerical approximation of the inviscid compressible equations of fluid dynamics. Analysis of numerical accuracy, stability, and efficiency. Use of explicit, implicit, and flux split methods. Discussion of splitting, approximate factorization, discrete point, and finite volume approaches. Applications to the solution of simple hyperbolic systems of equations and the Euler equations. Offered: W.

A A 510 Computational Fluid Dynamics II (3)

Numerical approximation of equations of compressible viscous flow. Mesh requirements for resolving viscous effects in high Reynolds number flows. Analysis of numerical accuracy, stability, and efficiency. Use of explicit and implicit methods, boundary condition procedures. Applications to solution of the Navier-Stokes equations. Prerequisite: A A 509 or permission of instructor. Offered: odd years; Sp.

A A 513 Gas Laser Theory and Practice (3)

Physics and fluid mechanics of gas lasers, with emphasis on performance of gas dynamic lasers, flowing chemical lasers, and gaseous electric lasers. Development of laser optics, interaction of radiation and matter, laser oscillation conditions, and methods of obtaining population inversions. Applications of high-power lasers emphasized. Offered: even years; Sp.

A A 516 Stability and Control of Flight Vehicles (3)

Static and dynamic stability and control of flight vehicles in the atmosphere. Determination of stability derivatives. Effects of stability derivatives on flight characteristics. Flight dynamic model. Responses to control inputs and external disturbances. Handling qualities. Control system components, sensor characteristics. Stability augmentation systems. Offered: A.

A A 518 Automatic Control of Flight Vehicles (3)

Specifications of flight vehicle performance. Synthesis of stability augmentation systems and autopilot control laws in the frequency-domain and using multivariable control methods. Reduced-order controller synthesis, digital design, and implementation. Use of computer-aided control design packages. Prerequisite: A A 516 and A A 548. Offered: odd years; Sp.

A A 520- Seminar (1-, max. 10)

Topics of current interest in aerospace engineering. Credit/no credit only. Prerequisite: A A major. Offered: AWSp.

A A 523 Special Topics in Fluid Physics (3)

Offered: AWSp.

A A 524 Aircraft Engine Noise (3) Description and measurement of noise, power spectra. Elementary duct acoustics, rotor-stator interaction, effect of design blade loading. Turbine noise, core noise, acoustic linings. Jet noise, Lighthill theory, scaling laws. Offered: odd years; A.

A A 525 Aerothermodynamics of Aircraft Engines Components (3)

Estimation of component performances. Inlets and nozzles. Aerodynamics of turbines and compressors. Radial equilibrium theory, through-flow theory. Offered: even years; W.

A A 526 Aerothermodynamics of Aircraft Engine Systems (3)

Aircraft gas turbine engine, cycle analysis. Component performance measures. Preliminary design of engines, including component losses. Off-design performance. Variable geometry engines. Offered: even years; Sp.

A A 527 Energy Conversion I (3)

Energy resources. Heat generation by combustion, solar collection. Analysis of power systems for space and advanced commercial power generation. High-temperature cycles. Offered: even years; A.

A A 528 Energy Conversion II (3)

Heat exchangers, energy storage. Direct conversion of heat to electricity. Electrochemical processes. Recommended: A A 527. Offered: odd years; W.

A A 529 Space Propulsion (3)

Nucleonics, and heat transfer of nuclear-heated rockets. Electrothermal, electromagnetic, and electrostatic thrusters. Power/propulsion systems. Prerequisite: permission. Offered: odd years; Sp.

A A 530 Mechanics of Solids (3)

General concepts and theory of solid mechanics. Large deformations. Behavior of elastic, viscoelastic, and plastic solids. Linear theory of elasticity and thermoelasticity. Wave propagation in solids. Offered: A.

A A 531 Structural Reliability and Damage (3)

Theory of plasticity, yield surfaces, flow rules, limit theorems. Concepts of failure and fatigue in aerospace structures, residual strength, cumulative damage, probability aspects and case histories. Prerequisite: A A 530 or equivalent or permission of instructor. Offered: odd years; W.

A A 532 Mechanics of Composite Materials (3)

Analyses and design of composite materials for aerospace structures. Micromechanics. Anisotropic elasticity. Laminated plate theory. Thermo-viscoelastic behavior and fracture of composites. Prerequisite: A A 530 or permission of instructor. Offered: odd years; Sp.

A A 535 Analysis of Shells I (3)

General development of the geometrically non-linear theory of thin elastic shells. Topics include an introduction to tensor analysis with applications to curved two dimensional spaces, theory of surfaces, Kirchhoff approximations, membrane theory and non-linear shallow shells. Offered: even years; Sp.

A A 540 Finite Element Analysis I (3)

Formulation of the finite element method using variational and weighted residual methods. Element types and interpolation functions. Application to elasticity problems, thermal conduction, and other problems of engineering and physics. Offered: W.

A A 541 Finite Element Analysis II (3)

Advanced concepts of the finite element method. Hybrid and boundary element methods. Nonlinear, eigenvalue, and time-dependent problems. Prerequisite: A A 540 or permission of instructor. Offered: Sp.

A A 546 Mathematical Foundations of Systems Theory (4)

Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear

operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with CHEM E 510/E 510/M E 510; A.

A A 547 Linear Systems Theory (3) Transfer-function and state-space description. Solution of the state equation; state transition matrix. Controllability and observability. Zeros and poles of multivariable systems; the Smith-McMillan form. Systems norms. Systems invertibility. State feedback. Outback feedback with observers. Prerequisite: graduate standing or permission of instructor. Offered: jointly with E E 584/ME 575 A.

A A 548 Linear Multivariable Control (3) Single loop feedback control theory; poles, zeros, Nyquist stability; performance, robustness of multivariable systems; multivariable control synthesis: Linear-Quadratic-Gaussian methods, loop transfer recovery, Youla parameterization, H-infinity techniques, parameter optimization design. Prerequisite: E E 584 or M E 575; E E 446 or A A 448 or M E 471 or equivalent. Offered: jointly with E E 548/M E 548; W.

A A 549 Estimation and System Identification (3) Review of system models, model structure, model parameterization; review of stochastic processes; state estimation: observers, the Kalman-Bucy filter, numerical issues in filter design and implementation; system identification: linear regression, least squares, maximum likelihood, instrumental variable techniques. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: A A/E E/M E 548. Offered: jointly with E E 549/M E 549; Sp.

A A 550 Nonlinear Optimal Control (3) Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with E E 550/M E 550; odd years; A.

A A 553 Vibrations of Aerospace Systems (3) Continuous and discrete systems, natural frequencies, and modal analysis; forced vibrations and motion-dependent forces. Structural damping; control augmented structures. Measurements for structural dynamic testing. Prerequisite: A A 571 or equivalent. Offered: odd years; Sp.

A A 554 Aeroelasticity (3) Static and dynamic aeroelasticity, unsteady aerodynamics, aeroservoelastic modeling, and active control. Offered: even years; Sp

A A 556 Space and Laboratory Plasma Physics (3) Discussion of waves, equilibrium and stability, diffusion and resistivity, basic plasma kinetic theory, and wave-particle interactions. Prerequisite: either A A 405, ESS 515, or GPHYS 505, or permission of instructor. Offered: jointly with ESS 576; Sp.

A A 557 Physics of Fusion Plasmas (3) Review and comparison of single particle and fluid descriptions of plasmas. MDH equilibrium, flux surfaces, and basic toroidal description. Collisional processes including physical and velocity space diffusion. Introduction to island formation, stochasticity, and various plasma instabilities. Prerequisite: A A 405 or GPHYS 505. Offered: even years; W

A A 558 Plasma Theory (3) Equilibrium, stability, and confinement. Classical transport, collisionless and resistive skin depths. Ideal MHD equations formally derived and properties of plasmas in the ideal limit are studied. Straight and toroidal equilibrium. Linear stability analysis with examples. Taylor minimum energy principle. Prerequisite: either A A 405, A A

556, A A 557, ESS 576, or GPHYS 537. Offered: even years; Sp.

A A 559 Plasma Science Seminar (1, max. 10) Current topics in plasma science and controlled fusion with presentations by invited speakers, on-campus speakers, and students. Students expected to give a seminar once or twice a year with instructor reviewing the method of presentation and material used for the presentation. Credit/no credit only. Offered: AWSp.

A A 565 Fusion Reactor Fundamentals (3) Introduction to basic engineering features of fusion power plants. Brief description of basic fusion physics and discussion of power plants for leading thermonuclear concepts. Engineering problems; blanket, shield neutronics; materials, thermal hydraulics; tritium, superconducting systems. Prerequisite: completion of or concurrent enrollment in A A 405 or permission of instructor. Offered: odd years; W.

A A 571 Principles of Dynamics I (3) Systems of particles, rotating axes, rigid-body dynamics; calculus of variations. Lagrangian mechanics. Hamilton's principle. Kane's equations. Periodic and quasiperiodic motion. Stability of dynamical systems. Offered: A.

A A 575 Continuum Mechanics (3) General foundations of the fundamental concepts of motion, stress, energy, and electromagnetism for a continuum. General equations of conservation of mass, momentum, and energy. Linear and nonlinear elastic, viscous, and inelastic materials. Offered: jointly with CEE 508; even years; W.

A A 581 Digital Control I (3) Discrete-time and sampled-data systems, difference equations, and z-transform. Frequency response. Nyquist stability criterion. Gain and phase margins. Limitations of sampling. Sample rate selection. Controller design via discrete-time equivalents to continuous-time controllers, by direct-digital root locus and by loop shaping. Prerequisite: M E 471 or equivalent; recommended: M E 575 or equivalent. Offered: jointly with E E 581/M E 581; W.

A A 582 Digital Control II (3) Controller design via state feedback and observers. Introduction to discrete-time stochastic processes. Quantization effects. Introduction to parameter identification using noisy measurements. LQR optimal control. Kalman filter design. LQG optimal control. Prerequisite: A A 581 or permission of instructor. Offered: jointly with E E 582/M E 582; Sp.

A A 591 Robotics and Control Systems Colloquium (1, max. 3) Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with CHEM E/E E/M E 591; AWSp.

A A 597 Aerospace Industry Tour (1) Tours to local aerospace facilities to see how aerospace vehicles and systems are built, designed, and tested. Credit/no credit only. Offered: W

A A 599 Special Projects (1-5, max. 15) Investigation on a special project by the student under the supervision of a faculty member. Offered: AWSpS.

A A 600 Independent Study or Research (*) Offered: AWSpS.

A A 700 Master's Thesis (*) Offered: AWSpS.

A A 800 Doctoral Dissertation (*) Offered: AWSpS.

Bioengineering

309 Harris Hydraulics Laboratory



General Catalog Web page:
www.washington.edu/students/genocat/academic/Bioengineering.html



Department Web page:
depts.washington.edu/bioe/

Bioengineering encompasses a wide range of activities in which the disciplines of engineering and biological or medical science intersect. Such multidisciplinary endeavors are yielding new discoveries and major advances that are revolutionizing the health-care system. The Department of Bioengineering, housed jointly in the School of Medicine and the College of Engineering, provides a comprehensive, multidisciplinary program of education and research, and is recognized as one of the finest bioengineering programs in the world. Programs of study lead to the Bachelor of Science, Master of Science, and Doctor of Philosophy degrees. Major areas of research and education include distributed diagnosis and home healthcare (D2H2), molecular bioengineering and nanotechnology, engineered biomaterials and tissue engineering, medical imaging and image-guided therapy, and computational bioengineering. Detailed information on Bioengineering appears in the Interschool or Intercollege Programs section of this catalog.

Chemical Engineering

105 Benson



General Catalog Web page:
www.washington.edu/students/genocat/academic/Chemical_Eng.html



Department Web page:
depts.washington.edu/chemeng/

Chemical engineering is concerned with processes for transforming raw materials into energy and consumer products, such as gasoline, electronic materials, pulp and paper, fertilizers, rubber, polymers and composites, and pharmaceuticals. Chemical engineering research explores the fundamental properties of these, the processes for making them, and the design and operation of chemical plants and equipment. Important issues include societal and environmental impact, safety, and production efficiency. Few other professions can match the diversity of job opportunities available to chemical engineering graduates.

Graduate Program

Graduate Program Coordinator
105 Benson, Box 351750
206-543-2250

The department offers studies leading to the degrees of Doctor of Philosophy, Master of Science in Chemical Engineering, and Master of Science in Engineering. The doctoral degree is centered on the dissertation with a foundation in course work; it is generally completed in four to five years beyond the baccalaureate degree.

In the master's program primary emphasis is placed on course work, and the degree generally requires 21 months of study. Thesis and non-thesis options are available.

The program of study includes basic subjects of importance to all chemical engineers, such as thermodynamics, transport phenomena, kinetics, and applied mathematics. In addition, students are invited to take more-specialized courses in chemical engineering or in other departments. Students usually take three courses during their first quarter. In subsequent quarters, less time is spent on course work, and more on research and independent study.

The department has about seventy full-time graduate students, most of whom are working toward a doctorate. They study and collaborate with faculty members in an atmosphere that is informal, friendly, and intellectually vigorous. Faculty interests are broad, so students become familiar with a variety of areas while receiving individual guidance in a specialty.

Research Facilities

The department is fortunate to have outstanding facilities. Benson Hall contains classrooms, offices, stockrooms, a machine shop, laboratories, and a variety of specialized research equipment. Each graduate student is provided desk space in a small laboratory or office as well as access to larger laboratories in the building. Students also may use the services of the Academic Computer Center, instrument-making shops, research centers (e.g., biomaterials, nanotechnology, chemical analysis), and the Chemistry and Engineering Libraries.

Admission Requirements

A student is accepted for admission to the Graduate School as a chemical engineering major by joint action of the Graduate School and the department after consideration of a formal application. Most students applying for graduate admission have a Bachelor of Science degree in chemical engineering. If a student has an undergraduate degree in chemistry, physics, mathematics, or another branch of engineering, he or she may obtain a graduate degree in chemical engineering by meeting certain additional requirements.

Financial Aid

The department has various sources of support for qualified graduate students. Those interested in applying for admission and support should visit the department's Web site at depts.washington.edu/chemeng/. The completed forms and reference letters should be received in the department office by January 15. Offers of admission with financial support are usually made in January through March.

Faculty

Chair

Eric M. Stuve

Professors

Allan, G. Graham * 1966; PhD, 1955, University of Glasgow (UK), DSc, 1970, University of Strathclyde (UK); creativity and innovation.

Babb, Albert L. * 1956, (Emeritus); MS, 1949, PhD, 1951, University of Illinois; reactor engineering, bioengineering.

Baneyx, Francois * 1992; PhD, 1991, University of Texas (Austin); biotechnology, protein technology, biochemical engineering.

Berg, John C. * 1964; PhD, 1964, University of California (Berkeley); interfacial phenomena, surface and colloid science.

Bowen, J. Ray * 1981, (Emeritus); PhD, 1963, University of California (Berkeley); combustion.

David, Morton 1983, (Emeritus); DEng, 1950, Yale University; chemical engineering.

Davis, E. James * 1983; PhD, 1960, University of Washington; transport in porous media, microparticle physics and chemistry, surface and colloid science.

Finlayson, Bruce A. * 1967; MS, 1963, Rice University, PhD, 1965, University of Minnesota; modeling of chemical engineering problems.

Garlid, Kermit L. * 1960, (Emeritus); PhD, 1961, University of Minnesota; nuclear fuel cycles, radioactive waste management.

Gustafson, Richard Roy * 1986, (Adjunct); PhD, 1982, University of Washington; process modeling and optimization, fiber composites.

Heideger, William J. * 1957, (Emeritus); PhD, 1959, Princeton University; biomedical transport phenomena.

Hodgson, Kevin T. * 1991, (Adjunct); MS, 1980, Mellon University, PhD, 1986, University of Washington; surface and colloid science, papermaking chemistry, secondary fiber recycling.

Hoffman, Allan S. * 1970; MS, 1955, DSc, 1957, Massachusetts Institute of Technology; synthesis, characterization, and biological interaction of biomaterials, mechanics of natural tissue.

Horbett, Thomas A. * 1973; PhD, 1970, University of Washington; interfacial proteins, cell interactions, foreign body reaction, nonfouling surfaces.

Jenekhe, Samson A. * 2000; MS, 1980, PhD, 1985, University of Minnesota; polymer science and engineering, optoelectronic/photonic materials.

Johanson, Lennart N. * 1983, (Emeritus); PhD, 1948, University of Wisconsin; chemical engineering.

Lidstrom, Mary E. * 1995; MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.

McKean, William T. * 1979; PhD, 1968, University of Washington; pulp and paper science, chemical engineering.

Morgan, Michael S. * 1974, (Adjunct); DSc, 1972, Massachusetts Institute of Technology; applied respiratory, physiology and inhalation toxicology.

Moulton, R. Wells 1941, (Emeritus); MS, 1934, PhD, 1938, University of Washington; chemical engineering.

Pilat, Michael J. * 1967, (Adjunct); PhD, 1967, University of Washington; air resources engineering (design of air-pollution-control equipment).

Ratner, Buddy D. * 1972; PhD, 1972, Polytechnic Institute of Brooklyn; synthesis and characterization of polymeric biomaterials.

Ricker, Neil L. * 1978; MS, 1972, PhD, 1978, University of California (Berkeley); process control and optimization.

Schwartz, Daniel T. * 1991; MS, 1985, PhD, 1989, University of California (Davis); electrochemical and environmental engineering.

Seferis, James C. * 1977; PhD, 1977, University of Delaware; polymers and their composites, manufacturing, scaling, and team concepts.

Sleicher, Charles A. * 1960, (Emeritus); PhD, 1955, University of Michigan; fluid mechanics, heat transfer.

Stuve, Eric M. * 1985; MS, 1979, PhD, 1983, Stanford University; electrochemical surface science, fuel cell engineering.

Woodruff, Gene L. * 1965, (Emeritus); PhD, 1965, Massachusetts Institute of Technology; reactor physics, fusion engineering, neutron spectroscopy, energy studies.

Yager, Paul * 1987, (Adjunct); PhD, 1980, University of Oregon; physical chemistry, applications of biomembranes, biosensors, microfluidics, biomedical diagnostics.

Associate Professors

Castner, David G. * 1986, (Research); PhD, 1979, University of California (Berkeley); polymer surfaces, metal-organic interfaces, catalytic materials.

Holt, Bradley R. * 1984; PhD, 1984, University of Wisconsin; process design and control.

Krieger-Brockett, Barbara * 1976; MS, 1972, PhD, 1976, Wayne State University; reaction engineering, chemical kinetics and catalysis simulation.

Overney, Rene M. * 1996; MS, 1989, PhD, 1992, University of Basel (Switzerland); nanoscale surface science and polymer rheology.

Assistant Professors

Adler, Stuart B. 2001; PhD, 1993, University of California (Berkeley); electrochemical engineering, solid-state electrochemistry.

Hayes, Brian * 1992, (Research); PhD, 1997, University of Washington; polymers and fiber-reinforced composites in aerospace and sporting goods industries.

Jiang, Shaoyi * 1999; PhD, 1993, Cornell University; molecular simulation, statistical mechanics, and scanning probe microscopy.

Senior Lecturer

Baratuci, William B. 1998; PhD, 1990, Case Western Reserve University.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CHEM E 435 Transport Processes III (4) Mass transfer, basic principles, and applications to equipment design. Physical separation processes. Prerequisite: CHEM E 326; CHEM E 340. Offered: A.

CHEM E 436 Chemical Engineering Laboratory I (3) Lectures on experimental design, instrumentation, laboratory safety, and report writing; laboratory experiments on fluid mechanics and heat transfer. Emphasis on experimental planning, procedures, and report writing. Prerequisite: CHEM E 326; CHEM E 340 which may be taken concurrently; T C 231; recommended: T C 333. Offered: Asp.

CHEM E 437 Chemical Engineering Laboratory II (3) Continuation of 436. Laboratory investigation of chemical engineering principles applied to equipment design with emphasis on mass transfer operations and chemical reactors. Prerequisite: CHEM E 435; CHEM E 436; CHEM E 465. Offered: W.

CHEM E 445 Fuel Cell Engineering (3) Introduction to electrochemical fuel cells for use in transportation and stationary power applications. Topics covered include types of fuel cells, single cell operation, stack engineering, overall system design, and safety, with

emphasis on proton exchange membrane and solid oxide fuel cells. Prerequisite: CHEM E 330.

CHEM E 450 Solid State Materials and Chemical Processes (3) *Seferis* Fundamentals of solid state including process analysis, mechanical properties; heterogeneity; anisotropy; liquid/solid transformations; rate processes; thermal analysis; viscoelasticity; microscopy; molecular characterization techniques. Application of fundamentals in examining polymers, metals and ceramics as used in the electronics and aviation industries. Prerequisite: CHEM E 340; CHEM E 465. Offered: W.

CHEM E 455 Surface and Colloid Science Laboratory (1/3, max. 3) *Berg* Laboratory techniques, equipment, and underlying fundamentals in surface and colloid science. Experiments in the measurement of surface tension, adsorption, wetting and spreading, colloid properties, emulsion preparation and stability, electrophoresis, and interfacial hydrodynamics. Recommended: CHEM E 326; CHEM E 330; CHEM 461. Offered: Sp.

CHEM E 458 Surface Analysis (3) Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with BIOEN 492; W.

CHEM E 461 Electrochemical Engineering (3) *Schwartz* Explores role of thermodynamics, charge transfer kinetics, and mass transfer on behavior of electrochemical systems. Includes cell thermodynamics, faradaic and non-faradaic rate processes, ionic transport, nucleation and growth theories. Applications to chemical sensors, batteries, corrosion, thin film deposition. In-class demonstrations to illustrate concepts. Offered: W.

CHEM E 462 Application of Chemical Engineering Principles to Environmental Problems (3) Environmental problems in chemical engineering. Team taught; topics vary from year to year. Includes: geo-media, flow and dispersion through porous media water flow in dry soils, chemistry of radioactive waste, in situ site cleanup, ex situ site cleanup, colloid and surface science. Prerequisite: CHEM E 330. Offered: Sp.

CHEM E 465 Reactor Design (4) 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: CHEM E 326; CHEM E 340. Offered: A.

CHEM E 467 Biochemical Engineering (3) *Baneyx* Application of basic chemical engineering principles to biochemical and biological process industries such as fermentation, enzyme technology, and biological waste treatment. Rapid overview of relevant microbiology, biochemistry, and molecular genetics. Design and analysis of biological reactors and product recovery operations. Prerequisite: CHEM E 340; either CHEM 223, CHEM 237, or CHEM 335; recommended: CHEM E 465. Offered: jointly with BIOEN 467; W.

CHEM E 468 Air-Pollution Control Equipment Design (3) Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particular pollutants. Actual case studies. Offered: jointly with CEE 494/M E 468; W.

CHEM E 470 Chemistry of Wood (3) Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives; wood as a raw material for the chemical industry. Prerequisite: either CHEM 220, CHEM 238, or CHEM 336. Offered: A.

CHEM E 471 Pulping and Bleaching Processes (3) Conversion of wood to mechanical and chemical pulps. Kraft, sulfite, and semichemical pulping processes. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered: jointly with PSE 476; W.

CHEM E 472 Papermaking Processes (3) Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Offered: jointly with PSE 477; A.

CHEM E 473 Pulp and Paper Laboratory (2) Laboratory experiments in chemical and semichemical pulping of wood. Bleaching of chemical and high-yield pulps. Physical and chemical characteristics of pulp fibers. Prerequisite: PSE 476. Offered: jointly with PSE 478; Sp.

CHEM E 480 Process Dynamics and Control (4) Analysis of the dynamics of simple chemical process units and systems; applications to stability, control, and instrumentation of such processes. Weekly two-hour laboratory included. Majors only. Prerequisite: CHEM E 435; CHEM E 465. Offered: W.

CHEM E 481 Process Optimization (3) Concepts and techniques of optimizing chemical engineering processes and systems, including classical and direct methods of search, linear and nonlinear programming, dynamic programming, statistical experimental design, and evolutionary operation. Offered: Sp.

CHEM E 482 Advanced Topics in Process Control (3) *Holt, Ricker* Current topics in process control design and analysis. Possible topics include robustness analysis and design, time delay compensation, modern frequency response techniques, discrete control, adaptive control, model-based control, and nonlinear control. Prerequisite: CHEM E 480.

CHEM E 485 Process Design I (4) Applied economics in chemical engineering design and operations; market survey and plant location; introduction to plant and process design. Prerequisite: CHEM E 480 which may be taken concurrently. Offered: W.

CHEM E 486 Process Design II (5) 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: CHEM E 485. Offered: Sp.

CHEM E 490 Engineering Materials for Biomedical Applications (3) *Hoffman* Combined application of the principles of physical chemistry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include considerations of the selection of materials, the design and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lung) and artificial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered: jointly with BIOEN 490; W.

CHEM E 491 Controlled Release Systems-Principles and Applications (3) *Hoffman* Mechanisms or controlled release of active agents and the development of useful systems for this purpose. Release mechanisms include diffusive, convective, or erosive driving forces. Applications to the biomedical, agricultural, forestry, and oceanography fields. Some special case studies covered in detail. Offered: jointly with BIOEN 491; even years; W.

CHEM E 497- Special Projects in Chemical Engineering Design ([1-6]- max. 12) Chemical engineering design instruction and experience in special projects, such as industrially motivated, timely, or interdisciplinary projects. Project subject and content varies. Majors only. Prerequisite: CHEM E 340.

CHEM E 498 Special Topics in Chemical Engineering (1-4, max. 12) Topics of current interest in the field. Subject matter changes from year to year.

CHEM E 499- Undergraduate Research ([1-6]-, max. 12) Independent research projects in chemical engineering. Offered: AWSpS.

Courses for Graduates Only

CHEM E 510 Mathematical Foundations of Systems Theory (4) *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/E E/M E 510; A.

CHEM E 511 Biomaterials Seminar (1) *Hoffman, Horbett, Ratner* Presentation of student research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with BIOEN 511; AWSp.

CHEM E 512 Methods of Engineering Analysis (3) Applications of mathematics to problems in chemical engineering; vector calculus; properties and methods of solution of first and second order partial differential equations; similarity transforms, separation of variables, Laplace and Fourier transforms. Prerequisite: MATH 205, MATH 307 or AMATH 351, MATH 324 or permission of instructor. Offered: jointly with AMATH 512; A.

CHEM E 523 Seminar in Chemical Engineering (1) Topics of current interest in chemical engineering. Credit/no credit only. Offered: AWSp.

CHEM E 525 Chemical Engineering Thermodynamics (4) Review of principles of thermodynamics. Applications to problems in multiphase and multicomponent systems; theories of solutions. Prerequisite: undergraduate thermodynamics. Offered: A.

CHEM E 526 Topics in Thermodynamics (3) Classical and molecular thermodynamics of phase equilibria, solution theory, thermodynamic stability, and critical phenomena. Prerequisite: CHEM E 525 or permission of instructor.

CHEM E 530 Momentum, Heat, and Mass Transfer I (4) Derivation of the differential equations for mass, energy, and momentum transport. Principles of fluid mechanics; creeping flow, turbulence, boundary-layer theory. Offered: A.

CHEM E 531 Momentum, Heat, and Mass Transfer II (3) Continuation of 530. Flows of fluid-particle systems; convective heat transfer, natural convection. Prerequisite: CHEM E 530. Offered: W.

CHEM E 554 Nanoscale Science I: Contact Mechanics and Rheology on the Nanoscale (3) *Overney* Introductory nanoscale science with emphasis on contact mechanics, principle and concept of forces, scanning force microscopy, tribology (friction, wear, lubrication), rheology, ultrathin organic films, physical properties of polymers, and computer simulation.

CHEM E 556 Principles and Applications of Colloidal Materials (3/4) *Berg, Hoffman* Preparation, stabilization, properties, and destruction of important colloidal materials. The theory and structure of the electrical double layer, electrokinetics. Includes selected case studies pertinent to air and water pol-

lution, biological fluids, industrial processes. Offered: odd years.

CHEM E 557 Research in Interfacial and Colloid Science (1) *Berg* Weekly research seminar and discussion of scientific literature pertaining to interfacial and colloid science. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

CHEM E 558 Surface Analysis (3) *Ratner* Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with BIOEN 592; W.

CHEM E 559 Thin Film Science, Engineering, and Technology (3) *Stuve* The physics, chemistry, and engineering aspects of thin film deposition and technology. Vapor phase deposition emphasized. Topics include reactor types, vapor phase transport and hydrodynamics, surface and mass transport limited kinetics, nucleation and growth, homoepitaxy, heteroepitaxy, and thin film characterization. Prerequisite: permission of instructor. Offered: jointly with MSE 559.

CHEM E 560 Reactions at Solid Surfaces (3) *Stuve* Fundamental studies of adsorption systems and reactions that occur at surfaces with application toward heterogeneous catalysis, electrochemistry, etching, and corrosion. Analysis of reaction poisons and promoters, acid-base theory of metal surfaces, jellium theory of metals, and water and ion adsorption, plus other topics of current interest. Recommended: CHEM E 558 or CHEM 560.

CHEM E 562 Hazardous Air Pollution (3) Control of emission of hazardous or toxic air pollutants. Government regulations, determination of needed control efficiency. Emission control by thermal incineration, catalytic incineration, flares, condensation, carbon adsorption, and adsorption (wet and dry). Hazardous waste incinerators. Case studies. Offered: jointly with CEE 556; W.

CHEM E 565 Kinetics and Catalysis (3) *Finlayson, Krieger, Stuve* Homogeneous and heterogeneous systems with emphasis on chemical engineering principles applied to industrial reactor design. Prerequisite: CHEM E 525. Offered: W.

CHEM E 566 Control of Gaseous Air Pollutants (3) *Pilat* Physical and chemical processes used to control gaseous air pollutants. Absorption into liquids. Aqueous spray dryer scrubbers. Adsorption beds. Control of sulfur oxide and nitrogen oxide. Case studies of control systems. Prerequisite: CHEM E 435 or CHEM E 468 or permission of instructor. Offered: jointly with CEE 558; even years; Sp.

CHEM E 567 Control of Particulate Air Pollutants (3) *Pilat* Processes used to control emissions of particulate air pollutants. Use of settling chambers, cyclones, fabric filters, wet scrubbers, and electrostatic precipitators to control aerosol particles. Case studies of particulate air-pollutant control systems. Prerequisite: CHEM E 468 or permission of instructor. Offered: jointly with CEE 559; odd years; A.

CHEM E 570 Chemistry of High Polymers (3, max. 6) *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. Offered: W.

CHEM E 571 Polymer Physics and Engineering (3) *Seferis* Description and analysis of methods for processing polymeric materials. Introduction to solid polymer physics with emphasis on the coupling of structure morphology and properties. Development of structure-property models for quantitative description and control of properties in synthetic and natural polymers and composite materials. Offered: A.

CHEM E 572 Advanced Polymeric Composites (3) *Seferis* Design, manufacture, and properties of organic and inorganic particle and fiber-reinforced polymers. Advanced techniques for characterization of processing and properties, including anisotropic elasticity/viscoelasticity theory, polymerization and network formation of matrices, theory of reinforcement, environmental and chemical effects. Prerequisite: CHEM E 571 or MSE 423 or permission of instructor. Offered: Sp.

CHEM E 575 Nonlinear Analysis in Chemical Engineering (3) *Finlayson* Comparison of numerical techniques: similarity, perturbation, finite difference, Galerkin, orthogonal collocation methods as applied to nonlinear chemical engineering problems.

CHEM E 588 Research in Applied Microbiology (1) *Lidstrom* Weekly research seminar and discussion of scientific literature pertaining to applied microbiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with MICROM 588; AWSpS.

CHEM E 590 Advanced Topics in Biomaterials (3) Major, controversial issues in application of synthetic materials to medical problems. Blood compatibility, bioadhesion, intraocular lenses, contact lenses, polyurethanes, biodegradation, protein adsorption, corrosion, bone fixation, new materials, artificial heart, medical device regulation. Prerequisite: CHEM E 490 or BIOEN 490. Offered: jointly with BIOEN 590; odd years; Sp.

CHEM E 591 Robotics and Control Systems Colloquium (1, max. 3) Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with A/A/E/E/M E 591; AWSp.

CHEM E 598- Effective Teaching of Chemical Engineering ([1/2]-, max. 3) *Finlayson* Topics/activities include: curriculum development: outlining a course, comparing textbooks, preparing lectures, use of lectures versus quiz sections, microteaching, other modes of instruction, e.g., self-paced, use of design problems. Tests: creating and grading. Role of computers, review of engineering software, diversity, international teaching assistants, sexual harassment, assessment of teaching, resume. Offered: WSp.

CHEM E 599 Current Topics in Chemical Engineering (1-3, max. 12) Readings or lectures and discussions of topics of current interest in the field of chemical engineering. Subject matter changes from year to year. Prerequisite: permission of instructor.

CHEM E 600 Independent Study or Research (*) Offered: AWSpS.

CHEM E 700 Master's Thesis (*) Offered: AWSpS.

CHEM E 800 Doctoral Dissertation (*) Offered: AWSpS.

Civil and Environmental Engineering

201 More



General Catalog Web page:
www.washington.edu/students/genocat/academic/Civil_Engineering.html



Department Web page:
www.ce.washington.edu

Civil and environmental engineering is a profession which interfaces closely with society in the planning, design, construction, and management of facilities serving the needs of people. These activities include all transportation modes: highways, aerospace, rivers, and harbors; water resources, hydraulics, and coastal engineering; structures, mechanics, and geotechnical engineering; surveying, mapping, and photogrammetry; urban planning and development; water supply, wastewater treatment, and water-quality management; solid- and hazardous-waste disposal; and quality control and management of the air resources.

A civil engineer may specialize in one or several of these activities and may further specialize in a particular function, such as design or management. The work frequently provides close associations with the legal profession, urban and regional planners, economists, public officials, biologists, chemists, financial consultants, architects, and system analysts. Education and practice require a consideration not only of the technological-science aspects of a particular problem but also of its relationship to social, economic, political, and environmental constraints.

To accommodate these wide interests, the department is organized into six academic areas: construction management; transportation engineering; geotechnical engineering; structural engineering and mechanics; environmental engineering; and water resources, hydrology, and hydraulic systems.

Graduate Program

Graduate Program Coordinator
309 More, Box 352700
206-543-2574

The Department of Civil and Environmental Engineering offers courses leading to the degrees of Master of Science in Civil Engineering and Doctor of Philosophy. The department also provides authorized options leading to the College-wide Master of Science and Master of Science in Engineering degrees.

The three master's programs are intended to accommodate the needs of three categories of students: the M.S.C.E. degree is for those who have completed an undergraduate degree in civil engineering and plan to continue with their professional training; the College-wide M.S.E. degree is for other engineering graduates who wish to do graduate work in civil and environmental engineering; and the College-wide M.S. degree 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 and environmental engineering. The non-engineer may be required to take additional course work to obtain an M.S.E. degree.

Graduate work is offered in most fields of civil and environmental engineering, including construction

management; transportation engineering; geotechnical engineering; structural engineering and mechanics; environmental engineering; and water resources, hydrology, and hydraulic systems.

Priority for admission is based on an applicant's apparent ability to progress satisfactorily in a graduate degree program. The applicant's scholastic record is of major importance; usually, at least a "B" or 3.00 GPA in the junior and senior years is required. Consideration is also given to Graduate Record Examination scores and other information.

Degree Requirements

The master's degree requires a minimum of 42 credits. A student may choose between a thesis and a course-work-only master's degree. The thesis option requires 30 course-work credits, 3 seminar credits, and 9 thesis credits. The course-work-only master's degree requires 39 course-work credits and 3 seminar credits. Both master's degrees require 3 credits outside the major field of study, 5 credits minimum of 400- and 500-level courses in Civil and Environmental Engineering, and a minimum of one-half of the course-work credits in courses numbered 500 and above. Students working for the Ph.D. degree must complete an approved program of studies and research normally requiring an additional two or three years beyond the master's degree.

Financial Aid

Research and teaching assistantships are available on a competitive basis. The number of positions depends upon the current level of funding. Additionally, there are a limited number of fellowships, scholarships, and traineeships.

Research Facilities

More Hall and Wilcox Hall have structural, concrete, bituminous materials, soil mechanics, computer, water-quality, solid-wastes, and air-quality laboratories as well as an air-monitoring station and equipment for fieldwork in the construction, water, air, and solid-waste programs. Facilities for experimental studies in hydraulics and coastal engineering and in fluid mechanics are located in the Harris Hydraulics Laboratory.

Faculty

Chair

G. Scott Rutherford

Professors

Benjamin, Mark M. * 1977; MS, 1973, MS, 1975, PhD, 1979, Stanford University; chemistry of natural waters, chemical and biological treatment of water and wastewater.

Bogan, Richard H. * 1954, (Emeritus); DSc, 1954, Massachusetts Institute of Technology; water and air resources, environmental engineering.

Brown, Colin B. * 1969, (Emeritus); PhD, 1962, University of Minnesota; structural engineering and systems.

Burges, Stephen J. * 1970; PhD, 1970, Stanford University; surface and ground water hydrology, water resource systems analysis and design.

Carlson, Dale A. * 1955, (Emeritus); PhD, 1960, University of Wisconsin; water resources and solid-waste management.

Colcord, J. E. * 1949, (Emeritus); MSCE, 1949, University of Minnesota; surveying engineering.

Covert, David S. * 1975, (Adjunct Research); MS, 1971, PhD, 1974, University of Washington; atmospheric chemistry; aerosol physics, chemistry, optics, and instrumentation.

Elias, Ziad * 1969, (Emeritus); DSc, 1963, Massachusetts Institute of Technology; engineering mechanics.

Evans, Roger J. * 1966, (Emeritus); PhD, 1965, University of California (Berkeley); engineering mechanics, structural engineering.

Ferguson, John F. * 1974; PhD, 1970, Stanford University; chemical and biological processes in water and waste treatment and in natural water systems.

Hammer, Vernon B. 1981, (Emeritus); MS, 1941, Harvard University; solid-waste management.

Hartz, Billy J. * 1983, (Emeritus); PhD, 1955, University of California (Berkeley); engineering mechanics, structural mechanics.

Hodge, David C. * 1975, (Adjunct); MS, 1973, PhD, 1975, Pennsylvania State University; urban geography, urban transportation geography, equity, gender.

Holtz, Robert Dean * 1988; PhD, 1970, Northwestern University; geotechnical engineering.

Karr, James * 1991, (Adjunct); PhD, 1970, University of Illinois; stream and watershed ecology, tropical forest ecology, conservation biology, environmental policy.

Kramer, Steven * 1984; PhD, 1984, University of California (Berkeley); soil mechanics, foundation engineering, geotechnical earthquake engineering.

Larson, Timothy * 1970; PhD, 1976, University of Washington; airborne particles, air quality modeling, and instrument development.

Lettenmaier, Dennis P. * 1973; PhD, 1975, University of Washington; systems analysis and water resources planning.

Mahoney, Joseph P. * 1978; PhD, 1979, Texas A&M University; construction materials, pavement systems, airport design.

Manning, Fred L. * 1986, (Affiliate); PhD, 1983, Massachusetts Institute of Technology; traffic flow theory, networks, econometric methods, equilibration in transportation markets.

Mar, Brian W. * 1967, (Emeritus); PhD, 1958, University of Washington; system engineering, environmental management, interdisciplinary management.

Mattock, Alan * 1964, (Emeritus); PhD, 1955, University of London (UK); structural behavior and design.

Miller, Gregory * 1983; PhD, 1984, Northwestern University; structural materials, solid mechanics, nonlinear dynamics.

Morgan, Michael S. * 1974, (Adjunct); DSc, 1972, Massachusetts Institute of Technology; applied respiratory, physiology and inhalation toxicology.

Nece, Ronald E. * 1959, (Emeritus); DSc, 1958, Massachusetts Institute of Technology; hydraulic and coastal engineering.

Nihan, Nancy L. * 1973; PhD, 1970, Northwestern University; transportation planning and systems analysis.

Palmer, Richard * 1979; PhD, 1979, Johns Hopkins University; civil engineering systems, computer methods, water resources planning and management.

Pilat, Michael J. * 1967; PhD, 1967, University of Washington; air resources engineering (design of air-pollution-control equipment).

Reed, Dorothy * 1983; MSE, 1977, PhD, 1980, Princeton University; structural and wind engineering.

Richey, Eugene 1982, (Emeritus); MS, 1947, MSCE, 1948, California Institute of Technology, PhD, 1955, Stanford University; hydraulic engineering.

Roeder, Charles W. * 1977; PhD, 1977, University of California (Berkeley); structures and materials.

Rossano, August T. 1981, (Emeritus); MS, 1941, ScD, 1954, Harvard University; air resources.

Rutherford, G. Scott * 1981; PhD, 1974, Northwestern University; transportation planning and engineering, transit planning, demand forecasting.

Sawhill, Roy 1983, (Emeritus); MEng, 1952, University of California (Berkeley).

Schneider, Jerry * 1967, (Emeritus); PhD, 1966, University of Pennsylvania; metropolitan area and regional planning, transportation and other urban models.

Seabloom, Robert * 1954, (Emeritus); MSCE, 1956, University of Washington; water-quality and solid-waste management.

Stahl, David A. 2000; MS, 1975, PhD, 1978, University of Illinois (Urbana).

Stanton, John F. * 1978; PhD, 1978, University of California (Berkeley); structural engineering, analysis and design.

Stensel, H. David * 1983; PhD, 1971, Cornell University; biological wastewater treatment, fixed film reactors, mass transfer mechanics, modeling.

Strand, Stuart E. * 1982, (Adjunct Research); MS, 1975, Ohio State University, PhD, 1982, Pennsylvania State University; forest biotechnology, environmental pollution control.

Sylvester, Robert O. 1947, (Emeritus); MS, 1941, Harvard University; water resources.

Terrel, Ronald L. 1967, (Emeritus); MSCE, 1961, Purdue University, PhD, 1967, University of California (Berkeley).

Welch, Eugene B. * 1968, (Emeritus); PhD, 1967, University of Washington; water resources and aquatic biology.

Wenk, Edward 1970, (Emeritus); MS, 1947, Harvard University, PhD, 1950, Johns Hopkins University.

Yeh, Harry H. * 1983; PhD, 1983, University of California (Berkeley); fluid mechanics, water wave motions, coastal and hydraulic engineering.

Zabinsky, Zeldia * 1985, (Adjunct); PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.

Associate Professors

Booth, Derek B. * 1980, (Research); PhD, 1984, University of Washington; environmental geology, particularly human influences on hillslopes, runoff, and rivers.

Brett, Michael T. * 1997; PhD, 1990, University of Uppsala (Sweden); eutrophication and food web and nutrient regulation of algal biomass and secondary production.

Chenoweth, Harry H. 1979, (Emeritus); MSCE, 1957, University of Washington; engineering mechanics and hydraulic engineering.

Dailey, Daniel J. * 1982, (Adjunct Research); MS, 1982, PhD, 1988, University of Washington; time series modeling of physical phenomena, optimization, distributed computing, networking.

Eberhard, Marc O. * 1989; PhD, 1989, University of Illinois; structural analysis and design, reinforced concrete, earthquake engineering, nondestructive testing.

Goldblatt, Steven M. 1982, (Adjunct); JD, 1977, Golden Gate University; construction law, labor relations, and accounting.

Horner, Richard R. * 1981, (Adjunct Research); PhD, 1978, University of Washington; effects of human activities on water resources in urban areas.

Jacoby, Jean M. * 1994, (Affiliate); PhD, 1986, University of Washington; applied aquatic ecology and restoration; water quality management.

Janssen, Donald J. * 1985; PhD, 1985, University of Illinois; construction materials, pavements.

Jessup, Andrew T. * 1990, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; applications of remote sensing to air-sea interaction.

Kent, Joseph C. *, (Emeritus); PhD, 1952, University of California (Berkeley); hydraulic engineering.

Korshin, Gregory * 1991; PhD, 1983, Chemical Engineering Institute (Russia); environmental chemistry and engineering, aquatic chemistry.

MacRae, Gregory Anthony * 1994; PhD, 1990, University of Canterbury (New Zealand); design of structures to withstand earthquakes.

Massmann, Joel W. * 1991; PhD, 1987, University of British Columbia (Canada); groundwater hydrology, subsurface contaminant transport, site remediation, applied decision analysis.

Miller, William * 1983, (Emeritus); MSCE, 1952, University of Washington; materials.

Nemati, Kamran M. * 1998, (Adjunct); PhD, 1994, University of California (Berkeley); civil engineering materials, concrete technology, mechanical behavior of concrete.

Spyridakis, Dimitris * 1970, (Emeritus); PhD, 1965, University of Wisconsin; soil and water chemistry.

Strausser, Howard * 1955, (Emeritus); MSEng, 1950, Johns Hopkins University; hydraulic engineering.

Turkiyyah, George * 1991; PhD, 1990, Carnegie Mellon University; computer-aided engineering, finite element modeling.

Waddell, Paul A. * 1997, (Adjunct); PhD, 1989, University of Texas (Dallas); urban policy, regional planning, growth management, land use, transportation, GIS.

Assistant Professors

Arduino, Pedro * 1997; PhD, 1996, Georgia Institute of Technology; mechanics of porous media, constitutive modeling of soils, numerical methods of geomechanics.

Lowes, Laura N. 2000; PhD, 1999, University of California (Berkeley); structural engineering, numerical modeling.

Petroff, Catherine * 1993, (Affiliate); PhD, 1993, California Institute of Technology; sediment transport,

coastal engineering, and environmental fluid mechanics.

Shankar, Venkataraman * 1999; PhD, 1997, University of Washington; modeling of transportation infrastructure and civil engineering systems.

Zeitler, Teresa Taylor * 1992, (Affiliate); PhD, 1988, Washington State University; geotechnical/geological engineering, physical modeling, centrifuge modeling.

Senior Lecturer

Bucknam, Ronald E. 1985; PhD, 1964, University of Illinois; Professional Engineering Practice Liaison (PEPL).

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CEE 405 Construction Planning and Scheduling (3) Principles of construction planning and scheduling, including network analysis of construction activities, examination of arrow and precedence diagrams, time-cost tradeoffs, resource leveling, resource allocation, PERT, integrated cost/schedule systems, computer applications, and a CPM project.

CEE 406 Construction Engineering II (3) Heavy construction equipment. Equipment economics, contractor equipment policies, equipment specifications, selection and performance of equipment, estimating productivity of construction equipment, and engineering support for construction operating. Prerequisite: CEE 306.

CEE 407 Contracts and Specifications (3) Construction industry, forms of organizations, real property laws, and bidding procedures. Basic elements of contracts, types of specifications, general conditions of standard construction contracts, legal disputes related to construction contract provisions, surety bonds and construction insurance. Prerequisite: CEE 306.

CEE 410 Traffic Engineering Fundamentals and Surveys (3) General review of the fundamentals of traffic engineering, including their relationship to transportation operations management and planning, with special emphasis on traffic engineering field surveys and data analysis. Prerequisite: CEE 320. Offered: A.

CEE 416 Urban Transportation Planning and Design (3) Brief review of major issues in urban transportation planning. Planning process discussed and transportation models introduced. Uses a systems framework, including goals and objectives, evaluation, implementation, and monitoring. A design term project, individual or small groups, utilizes material presented on a contemporary problem. Prerequisite: CEE 320. Offered: A.

CEE 418 Computer-Aided Planning of Urban Systems (3) Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigations of hardware/software tradeoffs; human factors in man-computer systems design theory as it relates to problem-solving activity. Offered: jointly with URBDP 429.

CEE 421 Pavement Design (3) Current and developing procedures for the structural thickness design of pavements. Bituminous and concrete pavements for highways, airports, and special heavy loading.

Elastic layered systems, slab theory. Performance evaluation for maintenance and overlay design. Offered: ASP.

CEE 422 Construction Materials II (4) Types, sources, uses, performance behavior from construction point of view of aggregates; asphalt products and mixtures; Portland cement, concrete, and other materials the civil engineer is responsible for selecting and manufacturing on job site. Includes laboratory work. Prerequisite: CEE 363. Offered: A.

CEE 423 Heritage of Civil Engineering (3/4) I&S Contribution of civil engineering to civilization based on the lives and projects of prominent engineers and cultures. Incidents and individuals from prehistory to the nineteenth century give the student an awareness of the profession and its influence on society. Industrial archaeology and historic sites are considered. An additional 1 credit may be earned by participating in a special project. Emphasis on the control of elements and the methodology, planning, objectives, and reasons for the project. May be used as social science distribution. Offered: W.

CEE 431 Seismology and Earthquake Engineering (3) NW Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures; reviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: jointly with ESS 465.

CEE 436 Foundation Design (3) Design considerations for foundations and retaining structures. Subsurface investigations and determination of soil properties for design. Design of shallow and deep foundations and retaining structures. Foundations and soil considerations for waterfront structures.

CEE 437 Engineering Geology I (3) General overview of engineering geology and its importance to civil engineers. Topics include geologic processes, hazards, origin and classification of geologic materials, data synthesis, and natural construction materials.

CEE 440 Design Seminar (2) Fundamentals of integrated civil engineering design, professional services marketing, project management, team dynamics, total quality management, value engineering, professional liability, and applied ethics in engineering practice. Emphasis on written and oral communications and on ethical, social, and economic factors.

CEE 441 Highway and Traffic Engineering-Geometric Design (4) Factors and elements in geometric design of arterials, intersections, freeways, interchanges, including problem solution. Prerequisite: CEE 320; CEE 440 which may be taken concurrently.

CEE 442 Structural Geotechnical Design Project (4) Comprehensive team design project focusing on structural and geotechnical engineering. Requires design drawings, written reports, and oral presentations interfacing with related fields such as aesthetics and architecture, mechanical systems, traffic, environmental planning. Prerequisite: CEE 440; two courses from CEE 436, CEE 451, CEE 452, CEE 453, CEE 454, or CEE 457.

CEE 443 Design of Subsurface Remediation Activities (4) Technologies for cleaning sites with subsurface contamination, including groundwater extraction, vapor extraction, groundwater containment, and in-situ treatment. Analytical tools and methods for making design calculations are emphasized. Comprehensive design project involving design and evaluation of site remediation activities required. Prerequisite: CEE 440.

CEE 444 Water Resources and Hydraulic Engineering Design (4) Opportunity to effect design solutions for projects or major project components in such representative areas as reservoirs and associated systems for flood control, water supply, irrigation, and hydroelectric power, surface water control systems, fisheries related projects, small harbors, and coastal engineering problems. Prerequisite: CEE 440.

CEE 445 Environmental Engineering Design Studies (4) Individual and group design studies addressing environmental engineering problems such as stormwater management, water and wastewater treatment facilities, and residual processing. Prepare proposals, engineering reports, and alternative evaluations; process equipment design, present reports on selected design problems. Prerequisite: CEE 345; CEE 482; CEE 440 which may be taken concurrently.

CEE 451 Design of Metal Structures (3) Introduction to the design and behavior of metal structures using LRFD concepts. Application of design methods and codes to columns, beams, frames, connections, and tension members. Prerequisite: CEE 380; recommended: CEE 457, CEE 458.

CEE 452 Design of Reinforced Concrete Structures (3) Fundamentals of design of buildings in reinforced concrete in accordance with current codes and practices. Prerequisite: CEE 380.

CEE 453 Prestressed Concrete Design (3) Analysis, design, and construction of prestressed concrete structures. Prerequisite: CEE 452.

CEE 454 Design of Timber Structures (3) The design and construction of timber structures, using elements made of sawn wood, glued-laminated wood, and plywood. Prerequisite: CEE 380.

CEE 455 Structural Unit Masonry (3) Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Prerequisite: CEE 380. Offered: jointly with ARCH 426.

CEE 457 Advanced Structures I (3) The displacement method in matrix form with programming applications. Fundamentals of modeling of various types of structures. Prerequisite: CEE 380.

CEE 458 Advanced Structures II (3) Introduction to stability, including a consideration of elastic and inelastic buckling with applications to beam-columns and plates. Introduction to plastic analysis. Prerequisite: CEE 379.

CEE 459 Advanced Structural Mechanics (3) Formulation and solution of the basic equations of elasticity. Applications in 2-D stress analysis, torsion, thermal stresses, and beams on elastic foundation. Plate theory optional. Prerequisite: CEE 379.

CEE 461 Biological Problems in Water Pollution (3/5) NW Ecological risk assessment of toxic chemicals and problems associated with electrical power production. Considers safety and toxicity and effects on individuals, populations, and communities. Laboratory covers simulation models of chemical exposure and community effects. Recommended: senior or graduate standing in fisheries, engineering, or related field. Offered: jointly with FISH 430.

CEE 462 Ecological Effects of Waste Water (3/5) NW Principles of aquatic ecology that relate to causes and effects of water quality problems in lakes and streams. Population growth kinetics, nutrient cycling, eutrophication; acidification, oxygen/temperature requirements, and effects of various wastes on aquatic animals. Offered: jointly with FISH 434.

CEE 464 Subsurface Contaminant Transport (3) Principles of transport through porous media used to study fate and movement of subsurface contamina-

tion. Processes include aqueous phase transport, flow of immiscible fluids, vapor transport, solid-liquid-vapor interactions. Techniques for simulating transport processes presented. Effects of subsurface heterogeneities and uncertainties are emphasized. Prerequisite: CEE 342.

CEE 472 Introduction to Hydraulics in Water Resources (3) Hydraulics related to environmental issues. Global hydrology; stratified flows; two-phase (bubble) flows; pollutant transport and mixing in reservoirs, lakes, coastal waters, and oceans; diffuser design and related case studies. Prerequisite: CEE 342; CEE 345.

CEE 473 Coastal Engineering I (3) Linear theory of water waves, wave transformations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. Prerequisite: CEE 342.

CEE 474 Hydraulics of Sediment Transport (3) Introduction to sediment transport in steady flows with emphasis on physical principles governing the motion of sediment particles. Topics include sediment characteristics, initiation of particle motion, particle suspension, bedforms, streambed roughness analysis, sediment discharge formulae, and modeling of scour and deposition in rivers and channels. Prerequisite: CEE 345.

CEE 475 Analysis Techniques for Groundwater Flow (3) Development of appropriate equations to describe saturated groundwater flow, and application of numerical methods for solving groundwater flow problems and flow to wells. Participants required to solve specific problems using numerical techniques developed during the course. Prerequisite: CEE 342.

CEE 476 Physical Hydrology (3) Global water picture, data sources and data homogeneity, precipitation, evapotranspiration, hydrographs. Hydrologic data frequency analysis. Hydrologic design: flood mitigation, drainage. Introduction to deterministic and stochastic models.

CEE 477 Open-Channel Engineering (3) Water flow in natural and constructed channels. Analysis and design of canals, transitions, energy dissipators, and similar structures. Analysis of surface profiles and effect of nonlinear alignment on flow. Introduction to river mechanics. Design-oriented problems. Prerequisite: CEE 345.

CEE 480 Air-Quality Modeling (3) Evaluation of air-quality models relating air pollution emissions to environmental concentrations. Topics include meteorological dispersion models and various "receptor" models based on chemical "fingerprinting" of sources. Emphasizes current problems. Prerequisite: either CEE 490, ATM S 458, or CHEM 458. Offered: jointly with ATM S 480.

CEE 481 Environmental Engineering Design (3) Stensel Introduction to the theory and the practice of planning and design of urban water supply distribution, pump stations, and sewage and storm-water 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: CEE 345; CEE 350.

CEE 482 Water and Wastewater Treatment (3) Fundamental mechanisms, basic design models, and applications of engineered treatment processes for water treatment, water reuse, nutrient removal, and protection of public health and the environment. Prerequisite: CEE 350.

CEE 484 On-Site Wastewater Disposal (3) Latest information on design, construction, operation, maintenance of individual and small community waste-

water disposal systems. Conventional water carriage septic tank soil absorption systems considered with new alternatives, such as mounds, evapotranspiration systems, anaerobic filters, pressure drainfields, sand filters. Nonwater carriage methods studied. Pressure and vacuum sewers introduced.

CEE 485 Aquatic Chemistry (3) Benjamin, Korshin Fundamentals of chemical equilibrium in natural water systems. Behavior of open and closed aqueous and multi-media (air/water/solids) systems. Chemistry of major species affecting the environment. Identification of key parameters for characterizing water quality and of chemical processes. Recommended: one year of general chemistry or equivalent.

CEE 486 Water-Quality Analysis (3) Introduction to water quality parameters; theory of instrumentation and methods used for the environmental analysis. Laboratory analysis of environmental samples using a variety of techniques including titrations, chromatography, and absorption and emission spectrophotometry. Recommended: one year of general chemistry.

CEE 487 Solid-Waste Disposal (3) Describes sources and handling of municipal and industrial solid waste, with examination of collection, processing, recycling and resource recovery, and disposal alternatives. Public policy issues, local agencies and solid waste facilities, the legal and regulatory framework are all addressed in context of solid waste engineering.

CEE 488 Hazardous Wastes Engineering (3) Classification of hazardous wastes; resource conservation, Recovery Act regulations; characteristics and behavior of toxic organics; superfund; groundwater contamination, solutions. Hazardous waste site remedial action; case histories; sampling; landfill design. Stabilization and processing technologies, including incineration, carbon adsorption, emerging techniques. Prerequisite: CEE 351.

CEE 489 Water and Air Quality Sampling (2) Samples collected from lakes, streams, precipitation, and air and resulting (and supplemental) data interpreted for cause-effect and statistical inference. Design for water and air quality monitoring programs. Prerequisite: CEE 462.

CEE 490 Air-Pollution Control (4) Fundamental concepts of air pollution. Emission sources, atmospheric dispersion, ambient concentrations, adverse effects, governmental regulations, emission standards, air-quality standards, processes and equipment for controlling emissions. Offered: jointly with ENV H 461.

CEE 491 Deterministic Systems (3) Development of quantitative methods for mathematical problem solving with emphasis on computer applications. Linear programming, mathematics of the simplex algorithm, sensitivity analysis, dynamic programming, systems simulation, and goal programming. Class project required. Prerequisite: CEE 390.

CEE 492 Stochastic Systems (3) Introduction to probability distributions and statistics useful in systems analysis, conditional distributions, queuing theory and applications, Monte Carlo simulation, chance-constrained mathematical programming, and stochastic dynamic programming. Emphasis on application of the techniques to civil engineering systems problems, including transportation, water resources, and structures. Prerequisite: CEE 491.

CEE 493 Air-Pollution Source Testing and Equipment Evaluation (3) Engineering evaluation of air pollutant sources and air control equipment. Air-pollutant source testing and stack sampling. Analysis of equivalence and source emissions in the field and in the laboratory.

CEE 494 Air-Pollution Control Equipment Design (3) Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particulate pollutants. Actual case studies. Offered: jointly with CHEM E/M E 468.

CEE 495 Sustainability and Design for Environment (3) *Cooper* Analysis and design of technology systems within the context of the environment, economy, and society. Applies the concepts of resource conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with ENVIR 415/M E 415; S.

CEE 498 Special Topics (1-5, max. 5) Special topics in civil engineering offered as course with lecture and/or laboratory. Maximum of 6 credits in combination of 498 and 499 may be applied toward an undergraduate degree.

CEE 499 Special Projects (1-5, max. 5) Individual undergraduate research projects. Maximum of 6 credits in combination of 498 and 499 may be applied toward an undergraduate degree. Recommended: 400-level CEE course.

Courses for Graduates Only

CEE 500 Structures Seminar (1) Credit/no credit only. Prerequisite: graduate standing in Civil and Environmental Engineering.

CEE 501 Structural Mechanics (6) *Elias, Miller, Turkiyyah* Equations of a continuum for small displacements, applications to linear elasticity. Kirchhoff plate theory, problems in advanced strength of materials. Virtual work, minimum potential energy, force and displacement methods of structural analysis. Direct stiffness method. Approximate solutions, geometric stiffness matrix. Linearized buckling. Offered: A.

CEE 502 Structural Dynamics (3) *Eberhard, MacRae, Reed* Lagrange's equations. Free vibrations of linear, single, and multiple degree of freedom systems. Damping. Mode superposition. Forced vibrations by time history and by response spectrum methods. Free and forced vibrations of continuous systems. Wave propagation in rods and beams. Prerequisite: CEE 501. Offered: W.

CEE 503 Materials Modeling (3) *Miller, Reed, Roeder* Behavior of materials used in civil engineering structures. Yield and failure surfaces. Physical and phenomenological models of plastic and viscoelastic behavior. Fracture mechanics. Fatigue models and predictions. Damping and friction. Behavior of anisotropic and composite materials.

CEE 508 Continuum Mechanics (3) *Elias, Miller* General foundation of fundamental concepts of motion, stress, and energy for a continuum. General equations of conservation of mass, momentum, and energy. Linear and nonlinear elastic, viscous, and inelastic materials. Prerequisite: CEE 501. Offered: jointly with A A 575.

CEE 511 Advanced Reinforced Concrete (3) *Eberhard, MacRae, Stanton* Behavior and design of reinforced concrete members and structures. Members subject to torsion and torsion combined with flexure and shear; members with small shear span/depth ratios, slabs. Offered: A.

CEE 512 Advanced Structural Systems (3) *Eberhard, Stanton* Prestress loss. Design of statically indeterminate prestressed concrete structures; continuous beam, frame, and slab structures (cast in

place or assembled from precast units). Prerequisite: CEE 453 or equivalent. Offered: Sp.

CEE 513 Advanced Steel I (3) *MacRae, Roeder* Factors influencing strength and serviceability of steel structures; LRFD limit state design procedures. Use of theories of plasticity and stability in development of design methods and specifications, bolted and welded connections, temperature effects, and effect of different fabrication methods on behavior of structure. Prerequisite: CEE 501, CEE 503. Offered: W.

CEE 515 Earthquake Engineering I (3) Earthquake mechanism and ground shaking, response spectra, linear elastic methods for prediction of behavior, displacement prediction methods for inelastically behaving structures, modeling and solution schemes, earthquake design philosophy, capacity design. Reinforced concrete, steel, and base-isolated structures. Prerequisite: CESM 501, CESM 502.

CEE 516 Earthquake Engineering II (3) Performance-based design, development of fragility curves, characteristics and effects of ground-shaking records, design methods, passive and active control, dynamic inelastic time history analysis, design of parts, system detailing, soil-structure interaction, repair and retrofit of structures. Prerequisite: CEE 515.

CEE 517 Fundamentals of Wind Engineering (3) Wind effects on structures, including atmospheric boundary layer flow; bluff body aerodynamics; structural dynamics and aeroelasticity; development and use of the ASCE Standards; estimation of along-wind, across-wind, and torsional response of tall buildings; design strategies for avoiding wind-induced discomfort. Fundamentals of wind tunnel testing.

CEE 518 Reliability and Design (3) Introduction to theory of structural reliability and its application to design procedures in civil engineering, including probability theory; assessment of uncertainties; code specification (first-order, second-moment format) and the related concept of risk and the influence of socioeconomic factors; loads, load combinations, and probabilities of damage.

CEE 521 Seepage and Consolidation (3) Confined and unconfined seepage through porous media, flow net solutions, consolidation, settlement, numerical solution of seepage, and consolidation problems. Prerequisite: CEE 366 or equivalent.

CEE 522 Shear Strength and Slope Stability (3) Shear strength of cohesive and cohesionless soils and slope stability analysis of natural and man-made slopes. Prerequisite: CESM 561.

CEE 523 Advanced Foundation Engineering (3) Design of shallow and deep foundations for bearing capacity and settlement. Construction considerations. Prerequisite: CEE 522 and CEE 527.

CEE 524 Lateral Earth Pressures and Retaining Structures (3) Lateral earth pressure theory. Design of temporary and permanent retaining structures including in situ reinforcement. Prerequisite: CEE 522, CEE 527.

CEE 526 Geotechnical Earthquake Engineering (3) Plate tectonics and elastic rebound theory of earthquakes and faults; characterization of ground motions; seismicity; seismic risk analysis; effect of local soil conditions on ground response; development of design ground motions; liquefaction; dynamic lateral earth pressures; seismic slope stability. Prerequisite: CEE 525 or permission of instructor.

CEE 527 Advanced Geotechnical Laboratory (4) Soil and site investigation, classification and engineering properties of soils and rock as determined by standard and advanced test procedures and

equipment. Evaluation of test data. Report writing. Prerequisite: CEE 366 or equivalent.

CEE 528 Geosynthetic Engineering (3) Identification and testing of geosynthetics. Design of geosynthetic filters, roadway stabilization, earth reinforcement, and waste containment systems. Prerequisite: CEE 522 and CEE 523.

CEE 529 Foundation Soil Improvement (3) Analysis and design of physical and chemical treatment techniques commonly applied to problem foundation soils for civil engineering structure. Prerequisite: CEE 523.

CEE 530 Engineering Geology II (3) Application of engineering geology fundamentals to: location, design and maintenance of engineered structures; policy decisions related to potential geological hazards. Case histories, governmental policy discussions, interpretation of geological maps for engineering purposes. Prerequisite: graduate standing and CEE 437 or permission of instructor.

CEE 531 Rock Engineering (3) Engineering classification, physical and mechanical properties of rocks, failure modes and initial stresses in rocks, laboratory and field testing of rocks, rock slope engineering, underground openings, foundations on rocks. Prerequisite: graduate standing and CEE 366 or permission of instructor.

CEE 540 Microbiological Process Fundamentals (3) *Stensel* Fundamental concepts for microbial processes including organic chemical structure, nomenclature and environmental properties, principles of microbial metabolism, study of specific types of bacteria important to environmental engineering and their metabolism, development of microbial kinetic equations, including substrate utilization, energetics, and stoichiometry. Prerequisite: permission of instructor.

CEE 541 Biological Treatment Systems (3) Basic reactions, design principles, current design models, and operational considerations for biological treatment systems used in environmental engineering. Applications include activated sludge design and optimization, fixed film reactors, nitrification, nitrogen removal, phosphorus removal, anaerobic treatment, and toxic organics removal. Prerequisite: CEE 550 and CEE 482 or equivalent.

CEE 542 Microbial Degradation of Toxic Contaminants (3) *Herwig, Strand* Detailed survey of current understanding of microbiology and degradative pathways of industrial organic compounds, pesticides, plastics, oil, and metals. Microbial requirements for bioremediation. Methods of scientific investigation of microbial transformations. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with ESC 518/MICROM 518; W.

CEE 543 Aquatic Chemistry (3) *Benjamin, Ferguson, Murray* Principles of chemical equilibrium applicable to natural water systems and water and waste treatment processes. Chemical thermodynamics. Characteristics of acid/base, gas/liquid, solid/liquid, oxidation/reduction, and adsorption and equilibria. Computer models for chemical speciation. Offered: jointly with OCEAN 521. Prerequisite: Graduate standing or permission of instructor.

CEE 544 Physical-Chemical Treatment Processes (4) Principles and design of major physical-chemical unit processes used in water, wastewater, and hazardous waste treatment. Processes include chemical and reactor kinetics, filtration, chemical coagulation, ion exchange, adsorption, and gas transfer. Development of mathematical models, laboratory demonstrations, and evaluation of current design practice. Prerequisite: CEE 485 or permission of instructor.

CEE 545 Advanced Environmental Chemistry (3) Behavior of controlled chemical species (heavy metals, pesticides, disinfection by-products, and endocrine disruptors) and persistent organic pollutants in the environment. Modeling of chemical interactions pertinent to environmental technologies (ozonation, advanced oxidation, photochemical transformations, halogenation, dehalogenation, application of zero-valence metals and electrochemical controls). Prerequisite: aquatic chemistry or permission of instructor.

CEE 546 Topics in Ecological Effects of Wastewater (3) Application of ecological concepts for analysis and interpretation of bioenvironmental problems and data (eutrophication, acid rain, and toxicity). Students participate in presentation and discussion of current research. Prerequisite: CEE 462 or BIOL 473 or permission of instructor.

CEE 547 Lake Management (3) Application of current techniques for lake and watershed analysis and modeling using fundamentals of limnology. Approaches to restoring eutrophic lakes, land use impacts on water quality. Practical exercises using data from real lake systems. Prerequisite: CEE 462/FISH 434, BIOL 473, or permission of instructor.

CEE 548 Industrial Waste Treatment (3) Survey of laws and regulations governing industrial waste discharge. Sources, amounts, and characteristics of wastes from various industries. Specialized treatment processes, case studies, and site visits. Prerequisite: CEE 540 or CEE 541 or permission of instructor.

CEE 549 Advanced Topics in Environmental Engineering, Chemistry, and Biology (3) Special topics of current importance in environmental engineering. Application of fundamental chemical and biological principles to the study of such phenomena as the behavior of aqueous colloids, corrosion processes, bacterial metabolism in chemically complex solutions, and acid precipitation. May be taken more than once for credit. Prerequisite: CEE 540, CEE 541.

CEE 553 Seminar-Topics in Atmospheric Chemistry (1-3, max. 6) *Charlson, Harrison* Seminar for atmospheric scientists, chemists, engineers in problems associated with the chemical composition of the atmosphere. Covers wide variety of topics, ranging from the natural system to urban pollution and global atmospheric change. Faculty lectures, student participation. Prerequisite: ATM S 301 or permission of instructor. Offered: jointly with ATM S 525.

CEE 554 Acoustics of Environmental Noise (4) Offered: jointly with M E 528.

CEE 555 Topics in Environmental Health (3) Introduction to human biology, including physiology, epidemiology, and toxicology. Study of contemporary environmental health problems and practices as they relate to radiological health, solid-waste disposal, occupational health, biometeorology, and bioengineering.

CEE 556 Hazardous Air Pollution (3) Control of emissions of hazardous or toxic air pollutants. Government regulations, determination of needed control efficiency. Emission control by thermal incineration, catalytic incineration, flares, condensation, carbon adsorption, and absorption (wet and dry). Hazardous waste incinerators. Case studies. Offered: jointly with CHEM E 562.

CEE 557 Air Resources Management (3) Technical, administrative, and legal aspects of air conservation. Current case studies involving engineering analysis, air-quality modeling, and regulatory aspects at local, state, and federal governmental levels.

CEE 558 Control of Gaseous Air Pollutants (3) Physical and chemical processes used to control

gaseous air pollutants. Absorption into liquids. Aqueous spray dryer scrubbers. Adsorption beds. Control of sulfur oxide and nitrogen oxide. Case studies of control systems. Prerequisite: CEE 468 or CHEM E 435 or permission of instructor. Offered: jointly with CHEM E 566; even years.

CEE 559 Control of Particulate Air Pollutants (3) Processes used to control emissions of particulate air pollutants. Use of settling chambers, cyclones, fabric filters, wet scrubbers, and electrostatic precipitators to control aerosol particles. Case studies of particulate air-pollutant control systems. Prerequisite: CEE 468 or permission of instructor. Offered: jointly with CHEM E 567; odd years.

CEE 560 Risk Assessment for Environmental Health Hazards (3/4) *Faustman* Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with ENV H 577/PB AF 589; A.

CEE 570 Hydrodynamics (4) Applications of the equations of motion to the flow of ideal and real fluids. Fundamentals of fluid potential motion. Viscous flows; Navier-Stokes equations and some exact solutions. Boundary-layer theory. Introduction to turbulence. Two- and three-dimensional examples, including free surface flows. Applications of field equations to problems of engineering significance. Prerequisite: CEE 342 or equivalent.

CEE 571 Hydrodynamics in Water Quality (3) Theoretical, field study, and laboratory model approaches to diffusion in transport problems of concern to water resources engineers. Prerequisite: CEE 342 or permission of instructor.

CEE 572 Water Wave Mechanics (3) Theory of water waves. Classical water wave problem and approximate solution techniques. Evolution equations for and their solutions wave systems. Viscous damping effects and mass transport. Nonlinear shallow-water waves and the Korteweg-deVries equation. Waves on beaches. Recommended: graduate-level course in fluid mechanics.

CEE 573 Advanced Computational Hydraulics (4) Review of hydrodynamic and transport equations for hydraulic engineering application; numerical solution methods; implementation and practice with existing two- and three-dimensional numerical models; numerical model calibration and verification techniques; case studies. Theoretical and civil engineering decision makers aspects. Prerequisite: CEWA 474, CEE 570, CEE 571 or permission of instructor.

CEE 575 Groundwater Transport Modeling (3) Review of equations for flow and transport in porous media; techniques for simulating transport as boundary value problems; analytical and numerical solution techniques; finite element models; field-scale applications and case histories.

CEE 576 Water Resources Planning (3) *Mar, Palmer* 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. Offered: W.

CEE 577 Water-Quality Management (3) Application of biological, ecological, and chemical processes to modeling of water quality and use of such models in appropriate management of water resource systems. Includes units on the modeling of temperature, BOD, nutrient, phytoplankton, zooplankton, and other processes in lakes, streams, and estuaries. Recommended: CEE 476, CEE 485, CEE 462/FISH 434, and CEE 491.

CEE 578 Water Resource System Management and Operations (3) *Burges, Mar, Palmer* A readings course in recent literature related to the modeling and management of water resources. Topics include drought management, expansion of existing water supplies, hydropower production, streamflow forecasting, water demand forecasting, regional water planning, climate change, and other topical issues. Recommended: 557, 558. Offered: A.

CEE 580 Urban Transportation Planning (4) *Rutherford* Introduction to transportation planning, including trends and issues, land use and transportation interaction, surveys, public involvement, demand management, technology, forecasting, impacts, and policy strategies.

CEE 581 Travel Demand Forecasting (4) *Rutherford* Application of mathematical models to forecast urban travel behavior. Introduces emerging methods, land use models, travel demand models, including trip generation, trip distribution, mode choice, and network assignment. Discusses validation and ethics.

CEE 582 Intelligent Transportation Systems (3) Application of modern computer and communication technologies to transportation systems. Benefits to public agencies, commercial companies, and travelers. Coordination between private and public sectors. Intelligent Transportation System's (ITS) social, organizational, and operational changes.

CEE 583 Airport Engineering (3) Definitions and terminology relating to airport engineering. Characteristics of aircraft, air traffic control, and resulting impact upon design process. Airport capacity, configuration, and planning associated with terminal design. Emphasis on geometric and structural design of pavements and airside. Design projects relating to airport engineering required. Prerequisite: permission of instructor.

CEE 584 Analytical Methods in Transportation I (3) *Mannerling* Application of analytical and statistical methods to transportation planning problems. Analysis of probability distributions that describe variables. Development of statistical models for predicting transportation phenomena. Elementary sampling theory hypothesis testing, regression analysis, time series analysis, applied to transportation data. Prerequisite: graduate standing or permission of instructor. Offered: Sp.

CEE 585 Analytical Methods in Transportation II (3) *Shankar* Applications of advanced econometric methods to transportation issues. Topics include, but not limited to, systems of equations, duration models, limited dependent variable approaches, and count models. Hands-on modeling, with numerous data sets, available for application. Collaborative projects. Prerequisite: CEE 584 or permission of instructor.

CEE 586 Transportation Infrastructure Management (3) *Shankar* Integrated perspective on the management of transportation infrastructure with special attention to the roadside, pavements, and bridges. Topics include needs assessment, design and construction of new facilities, management and monitoring of built systems to maintenance, rehabilitation and construction of facilities in-service. Emphasizes empirical applications.

CEE 587 Transportation Networks (3) *Mannerling, Shankar* Traffic flow, theories of traffic, user equilibrium and system-optimal assignments, and algorithms used for network assignment. Theoretical and empirical traffic assignments, multivariate characteristics of traffic flow on networks. Interactive work with network and econometric models.

CEE 588 Land Use/Transportation Models (3) Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land use, transportation, and energy

requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered: jointly with URBPD 530.

CEE 589 Transit Systems Planning (3) Planning, operational methods for urban public transportation. Review of technological, operating characteristics of vehicles and systems; financing, management, institutional aspects. Paratransit. Short-range planning, operational strategies, revenue-fare structures. Service monitoring. Mode choice, transit demand relating to service. Computer-aided methods for planning, design of transit systems. Prerequisite: graduate standing or permission of instructor.

CEE 590 Traffic Systems Operations (3) Operational planning, management of arterial and freeway traffic systems. Review of transportation system management strategies to achieve more efficient use of existing infrastructure, including improved and innovative traffic control systems and demand management policies, measures of effectiveness, impact assessment, traveler response. Introduction to use of relevant computer models and packages.

CEE 591 Freight Transportation (3)

CEE 593 Construction Labor Law (3) *Goldblatt* In-depth study of construction labor topics, including labor-management organization, legislation, and regulation, collective bargaining, and job site administration. Examines importance of labor relations in construction firms, whether in a union setting or an open shop environment.

CEE 594 Construction Automation (3) *Dunston* Motivations, methods, and technologies for developing automation and robotics in the construction industry. Examples range from computers to mechanical systems, from laboratory research to field applications. Topics include database management systems (DBMS), artificial intelligence, data collection and communications technologies, sensor technologies, and robotic mechanical systems.

CEE 597 Construction Productivity (3) Work improvement techniques applied to construction operations. Review of major contributions in behavioral science that may be applicable to the construction industry. Case studies. Innovative productivity programs successfully implemented on construction projects. Safety on construction projects, especially as influenced by managerial practices.

CEE 599 Special Topics in Civil and Environmental Engineering (1-3, max. 15) *Rutherford* Special topics in civil and environmental engineering offered occasionally by permanent or visiting faculty members.

CEE 600 Independent Study or Research (2-5, max. 5) *Rutherford* Topics covered depend on the faculty who offer the course and student interest. Prerequisite: permission of instructor.

CEE 601 Internship (2) Internship in an established program between industry, government, and the University. Prerequisite: permission of graduate program coordinator and committee chair.

CEE 700 Master's Thesis (*) Prerequisite: permission of adviser.

CEE 800 Doctoral Dissertation (*) Prerequisite: permission of adviser.

Computer Science and Engineering

114 Sieg



General Catalog Web page:
www.washington.edu/students/genocat/academic/Computer_Sci_Eng.html



Department Web page:
www.cs.washington.edu

Computer science and computer engineering are fields of unparalleled excitement and opportunity, now and for the future—fields where the smartest young men and women are choosing to study and to work. Whether your goal is graduate study and research, employment in the Northwest's vibrant information technology industry, business leadership, or public service, the UW Department of Computer Science and Engineering should be on your "short list." Ranked among the top ten research programs in the nation (along with MIT, Stanford, Berkeley and Princeton), UW CSE's focus on educational excellence was recognized in 1999 by the Brotman Award for Instructional Excellence.

Computer science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in such topics as the representation and storage of information; algorithms to access, display, edit, and transform information; programming languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead to practical developments in computer systems software, such as operating systems and compilers; in application areas, such as artificial intelligence, computer graphics, and computational biology; and also lead to theoretical investigations of computers, algorithms, and data.

Computer engineering is a closely related field that is concerned with the design and practical application of computer hardware and software systems to the solution of technological, economic, and societal problems. The computer engineer analyzes a problem and selects from a variety of tools and technologies those most appropriate for its solution. A computer engineer can expect to be involved in hardware design, software creation, and systems integration. The program provides an in-depth education in computer engineering while retaining strong foundations in traditional electrical engineering and computer science. The computer engineering program involves digital hardware, software, and architecture. Mathematics, engineering design, laboratory work, and communication-skills development are emphasized. A capstone design course is used to apply the knowledge and skills collected during the program to a major team project that must be completed during the senior year. The objective of undergraduate education in computer engineering is to develop broadly educated and competent graduates for professional careers or graduate studies. Especially important is a foundation that will endure as technology advances and changes.

Instructional and Special Research Facilities

The Computer Science laboratories provides extensive, efficient, and powerful state-of-the-art facilities for undergraduate, graduate, and faculty instruction and research. The equipment base is upgraded frequently; for an up-to-date description please see the descriptions in the online undergraduate and graduate brochures, which can be accessed through the department's Web page. The same is true for the department's software base, where there are several

modern operating systems including Windows NT, Unix, Solaris, and Linux, as well as extensive collections of software applications and development tools for each. Students have access to these resources in several laboratories in Sieg Hall and through direct modem access administered by the University. All the department's workstations provide users with full Internet access and almost all the department's courses make extensive use of the World Wide Web. In addition to general computing laboratories, the department also supports specialized laboratories for computer graphics, hardware, and embedded system design that also support more-advanced computing platforms and software.

Graduate Program

Graduate Program Coordinator
114 Sieg, Box 352350
206-543-1695
grad-admissions@cs.washington.edu

The Department of Computer Science and Engineering offers programs of study leading to the degrees of Master of Science and Doctor of Philosophy. Students can pursue full-time graduate study leading to an M.S. or Ph.D. Students can also pursue part-time graduate study in the evening, leading to an M.S. Individual programs can be designed to provide considerable breadth of knowledge, as well as depth in an area of specialization.

The department has 40 faculty and is authorized to grow over the next few years. In addition, there are nearly 40 adjunct, affiliate and emeritus faculty members. The faculty is currently conducting research in the following areas: embedded systems and reconfigurable computing; computer architecture; networking; operating systems and distributed systems; programming systems; information retrieval, database systems, and intelligent Internet systems; software engineering; computer graphics, vision, and animation; human interface to computing; artificial intelligence; theory of computation; and computing and biology.

Full-Time Graduate Program

The full-time graduate program offers both M.S. and Ph.D. degrees. An M.S. degree can usually be completed in one to two years, and a Ph.D. degree can be completed in four to five years. It is not necessary to complete an M.S. program before entering the Ph.D. program. Degree requirements are outlined in *The Computer Science and Engineering Graduate Program Brochure*, available from the department.

Application Requirements

Most entering graduate students are expected to have a solid background in computer science, including programming, machine organization, data structures, discrete mathematics, automata theory, and programming systems (i.e., the equivalent of CSE 378, 326, 321, 322, and either 401 or 451). Some exceptions to these requirements are made for otherwise-promising students. Graduate Record Examination scores are required; a GRE subject-test score (not necessarily in computer science) is recommended. Scores should be earned within the preceding five years. *The Computer Science and Engineering Graduate Program Brochure* gives full details of application procedures.

Complete applications must be received by January 1 (December 1 for international students) for autumn-quarter admission.

Assistantships

Research and teaching assistantships are available and are allocated on the basis of scholastic excel-

lence and potential. All students accepted to the program are awarded three years of funding. Students who are applying for assistantships to start in autumn quarter should have all applications to the Graduate School and the department completed by January 1 (December 1 for international students).

The application packet contains all the necessary forms for applying to the Graduate School and to the graduate program in Computer Science and Engineering and for consideration for assistantships.

Professional Master's Program

The Professional Master's degree program (PMP) is designed for active professionals in the vibrant information-technology industry who wish to further their educational and professional goals. Courses are offered in the evening and by distance to accommodate students working full-time.

To satisfy the requirements of the Professional Master's Program, students must successfully complete eight core PMP courses and other courses providing 8 additional credits. The additional credits may be earned through participation in the department's colloquium series, which features leading-edge researchers and developers in computer science from around the world. This series airs throughout the Puget Sound region on UWTV and through live Internet video. Students who take one course per quarter, plus 1 credit of colloquium, complete the program in two-and-a-half years.

Successful applicants to the program will have a bachelor's degree in computer science or a related field and professional experience in advanced computing technology. Most incoming students will have taken the following courses at the undergraduate level: data structures, discrete math, machine organization, automata theory, and programming languages, and will have programming experience.

Applications are accepted quarterly. Deadlines are July 1 for autumn quarter; November 1 for the winter quarter; and February 1 for spring quarter. For more information, see the department's Web site.

Faculty

Chair

David S. Notkin

Professors

Anderson, Richard J. * 1986; PhD, 1985, Stanford University; educational technology, algorithms.

Anderson, Thomas E. * 1997; MS, 1990, PhD, 1991, University of Washington; Internetworking, local and wide area distributed systems, operating systems, computer architecture.

Atlas, Les Eugene * 1983, (Adjunct); MS, 1979, PhD, 1984, Stanford University; time-frequency representations, digital signal processing applied to speech, audio, manufacturing.

Baer, Jean-Loup * 1969; MS, 1963, Grenoble (France), PhD, 1968, University of California (Los Angeles); computer architecture and performance evaluation.

Beame, Paul W. 1987; MS, 1982, PhD, 1987, University of Toronto (Canada); computational complexity, proof complexity.

Böhringer, Karl F. * 1998, (Adjunct); MS, 1993, PhD, 1997, Cornell University.

Borning, Alan H. * 1980; MS, 1974, PhD, 1979, Stanford University; human-computer interaction; constraint-based languages and systems.

Borriello, Gaetano * 1988; MS, 1981, Stanford University, PhD, 1988, University of California (Berkeley); invisible and ubiquitous computing, embedded and network systems.

Brinkley, James F., III * 1988, (Adjunct Research); MD, 1974, University of Washington, PhD, 1984, Stanford University; computer applications in medicine and biology; structural informatics.

De Rose, Anthony David * 1985, (Affiliate); PhD, 1985, University of California (Berkeley); computer-aided geometric design and modeling, graphical user interfaces, high resolution graphics.

Duchamp, Thomas E. * 1979, (Adjunct); PhD, 1976, University of Illinois; differential geometry.

Ebeling, William H.C. * 1986; MS, 1976, Southern Illinois University, PhD, 1986, Carnegie Mellon University; VLSI architectures, configurable computing, computer-aided design.

Eggers, Susan Jane * 1989; PhD, 1989, University of California (Berkeley); uniprocessor and parallel architectures and program behavior, back-end compiler optimizations.

Golde, Hellmut * 1959, (Emeritus); PhD, 1959, Stanford University; programming languages, programming systems, compilers, computer networks.

Green, Philip * 1994, (Adjunct); PhD, 1976, University of California (Berkeley); mathematical and computer methods for genome analysis.

Hood, Leroy E. * 1992, (Affiliate); PhD, 1968, California Institute of Technology; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution.

Karlin, Anna R. * 1996; PhD, 1987, Stanford University; online algorithms, probabilistic algorithms and probabilistic analysis.

Kehl, Theodore * 1963, (Emeritus); PhD, 1961, University of Wisconsin; hardware design (VLSI), telephony and API programming.

Kim, Yongmin * 1982, (Adjunct); MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, imaging systems, medical imaging, computer graphics, multimedia.

Ladner, Richard E. * 1971; PhD, 1971, University of California (Berkeley); design and analysis of algorithms, data compression, network algorithms, cache performance.

Lazowska, Edward D. * 1977; MSc, 1974, PhD, 1977, University of Toronto (Canada); computer systems: modeling and analysis, design and implementation, distributed and parallel systems.

Levy, Henry M. * 1983; MS, 1981, University of Washington; operating systems, distributed and parallel systems, Web systems and performance.

Noe, Jerre D. * 1968, (Emeritus); PhD, 1948, Stanford University; operating systems, computer measurement and evaluation, distributed computer networks, simulation.

Notkin, David S. * 1984; PhD, 1984, Carnegie Mellon University; software engineering, software evolution, software tools and environments.

Olson, Maynard V. 1992, (Adjunct); PhD, 1970, Stanford University; methods and applications of large-scale DNA analysis.

Ruzzo, Walter L. * 1977; PhD, 1978, University of California (Berkeley); computational biology.

Salesin, David Henry * 1992; PhD, 1991, Stanford University; computer graphics.

Shapiro, Linda G. 1986; MS, 1972, PhD, 1974, University of Iowa; computer vision, multimedia information systems, medical informatics, pattern recognition.

Shaw, Alan Cary * 1971, (Emeritus); PhD, 1968, Stanford University; operating systems, software specifications, real-time systems.

Snyder, Lawrence * 1983; PhD, 1973, Carnegie Mellon University; parallel computation, especially hardware, languages and algorithmic issues, computer fluency.

Stuetzle, Werner * 1984, (Adjunct); PhD, 1977, Swiss Federal Institute of Technology; nonparametric methods in multivariate analysis, statistical applications of computer graphics.

Tanimoto, Steven L. * 1977; MA, 1974, PhD, 1975, Princeton University; visual languages, image analysis, computer graphics, artificial intelligence, educational technology.

Tompa, Martin * 1978; MSc, 1975, PhD, 1978, University of Toronto (Canada); computational complexity, computational biology.

Weld, Daniel Sabey * 1988; MS, 1984, PhD, 1988, Massachusetts Institute of Technology; artificial intelligence, intelligent user interfaces, software agents, planning.

Zahorjan, John * 1980; MSc, 1976, PhD, 1980, University of Toronto (Canada); computer systems, performance analysis, parallel programming models, scheduling and runtime support.

Associate Professors

Bershad, Brian * 1993; MS, 1989, PhD, 1990, University of Washington; operating systems, architecture, distributed systems, parallel systems.

Chambers, Craig D. * 1991; PhD, 1992, Stanford University; programming language design, optimizing compilation, object-oriented systems.

Dekker, David B. 1948, (Emeritus); PhD, 1948, University of California (Berkeley); numerical analysis, curve fitting, numerical solutions of differential equations.

Diorio, Christopher J. * 1997; MS, 1984, California Institute of Technology; silicon learning chips, neural networks and learning algorithms.

Etzioni, Oren 1991; MSc, 1988, PhD, 1990, Carnegie Mellon University; artificial intelligence and information retrieval, natural language interfaces, software agents.

Friedman, Batya * 1999, (Adjunct); PhD, 1988, University of California (Berkeley); value-sensitive design, social-cognitive and cultural aspects of information systems.

Halevy, Alon Y. * 1998; PhD, 1993, Stanford University; database systems, artificial intelligence, data integration, peer-based data management.

Hauck, Scott * 1990, (Adjunct); MS, 1992, PhD, 1995, University of Washington; FPGAs, reconfigurable computing, VLSI/CAD, digital logic, adaptive computing.

Johnson, Ronald A. 1986, (Adjunct); MA, 1972, University of Chicago, MS, 1975, University of Southern California; information sciences.

Kalet, Ira J. * 1980, (Adjunct); PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Kautz, Henry 2000; MS, 1982, University of Toronto (Canada), PhD, 1988, University of Rochester; artificial intelligence, knowledge representation, decision-theoretic control of reasoning.

Assistant Professors

Arnstein, Lawrence 1999, (Research); MS, 1991, PhD, 1993, Carnegie Mellon University; ubiquitous computing, bioinformatics, embedded systems design.

Böhringer, Karl F. * 1998, (Adjunct); PhD, 1997, Cornell University; microelectromechanical systems (MEMS), applied microtechnology, micro spacecraft.

Curless, Brian L. 1998; MS, 1991, PhD, 1997, Stanford University; computer graphics; active machine vision.

Domingos, Pedro Morais Del 1999; MS, 1992, Instituto Superior Tecnico (Portugal), MS, 1994, PhD, 1997, University of California (Irvine); artificial intelligence, machine learning, data mining.

Fox, Dieter 2000; MS, 1993, PhD, 1998, University of Bonn (Germany); artificial intelligence and mobile robotics, probabilistic state estimation, particle filters.

Gribble, Steven 2000; MS, 1997, PhD, 2000, University of California (Berkeley); cluster computing, operating systems, Internet infrastructure and services, distributed computing.

Oskin, Mark H. * 2001; PhD, 2001, University of California (Davis); computer architecture, intelligent memory systems.

Padmanabhan, Venkata N. Z. * 1999, (Affiliate); PhD, 1998, University of California (Berkeley); Internet performance analysis, wireless networking and mobile computing.

Popovic, Zoran * 1999; MS, 1993, PhD, 1999, Carnegie Mellon University; computer graphics, character animation, physically based modeling and modeling, simulation.

Rao, Rajesh P. N. 2000; MS, 1994, PhD, 1998, University of Rochester; neural computing, machine vision and learning, robotics, computational neuroscience.

Seitz, Steven M. 2000; PhD, 1997, University of Wisconsin; computer vision, computer graphics.

Sengupta, Rimli 1999, (Research); MS, 1993, PhD, 1995, Georgia Institute of Technology; computational complexity, computational biology.

Suciu, Dan 2000; MS, 1991, University of Bucharest (Romania), PhD, 1995, University of Pennsylvania; databases, XML.

Wetherall, David James 1999; MS, 1994, PhD, 1998, Massachusetts Institute of Technology; networks and distributed systems.

Senior Lecturers

Dickey, Martin 1996; MS, 1971, University of Kentucky, PhD, 1992, Arizona State University; computer science education, computational linguistics.

Mones, Barbara 1999; MFA, 1979, Rhode Island School of Design; computer graphics, character animation.

Perkins, John H., Jr. 1998; MS, 1982, Cornell University; computer science education, programming languages and compilers.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CSE 401 Introduction to Compiler Construction (3) Fundamentals of compilers and interpreters; symbol tables; lexical analysis, syntax analysis, semantic analysis, code generation, and optimizations for general purpose programming languages. No credit to students who have taken 413. Prerequisite: CSE 322; CSE 326; CSE 341; CSE 378.

CSE 403 Software Engineering (4) Fundamentals of software engineering using a group project as the basic vehicle. Topics covered include the software crisis, managing complexity, requirements specification, architectural and detailed design, testing and analysis, software process, and tools and environments. Prerequisite: CSE 321; CSE 341; CSE 378; recommended: CSE 401; CSE 451; project experience in an academic or work setting.

CSE 410 Computer Systems (3) Structure and components of hardware and software systems. Machine organization, including central processor and input-output architectures; assembly language programming; operating systems, including process, storage, and file management. No credit to students who have completed 378 or 451. Prerequisite: CSE 373.

CSE 413 Programming Languages and Their Implementation (3) Concepts and implementation strategies for ALGOL-class languages, including Pascal, Modula, ALGOL 60, Ada. Compilers for ALGOL-class languages. Languages with late binding times, including LISP, APL, Smalltalk. No credit to students who have completed 341 or 401. Prerequisite: CSE 373.

CSE 415 Introduction to Artificial Intelligence (5) NW Principles and programming techniques of artificial intelligence: LISP, symbol manipulation, knowledge representation, logical and probabilistic reasoning, learning, language understanding, vision, expert systems, and social issues. Not open for credit to students who have completed 473. Prerequisite: CSE 373.

CSE 417 Algorithms and Computational Complexity (3) Design and analysis of algorithms and data structures. Efficient algorithms for manipulating graphs and strings. Fast Fourier Transform. Models of computation, including Turing machines. Time and space complexity. NP-complete problems and undecidable problems. Prerequisite: CSE 373. Offered: W.

CSE 421 Introduction to Algorithms (3) Techniques for design of efficient algorithms. Methods for showing lower bounds on computational complexity. Particular algorithms for sorting, searching, set manipulation, arithmetic, graph problems, pattern matching. Prerequisite: CSE 322; CSE 326.

CSE 431 Introduction to Theory of Computation (3) Models of computation, computable and noncomputable functions, space and time complexity, tractable and intractable functions. Prerequisite: CSE 322.

CSE 444 Introduction to Database Systems (3) Fundamental concepts, system organization, and implementation of database systems. Relational, hierarchical, and network data models; file organizations and data structures; query languages; query optimization; database design; concurrency control;

security; issues involving distributed database systems. Prerequisite: CSE 326.

CSE 451 Introduction to Operating Systems (4) Principles of operating systems. Process management, memory management, auxiliary storage management, resource allocation. No credit to students who have completed 410 or E E 474. Prerequisite: CSE 326; CSE 378.

CSE 457 Computer Graphics (4) Introduction to computer image synthesis, modeling, and animation. Topics may include visual perception, color theory, displays and framebuffers, image processing, affine and projective transformations, quaternions, hierarchical modeling, hidden surface elimination, shading, ray-tracing, anti-aliasing, texture mapping, curves, surfaces, particle systems, dynamics, realistic character animation, and traditional animation principles. Prerequisite: CSE 326.

CSE 458 Computer Animation (5) Introduction to basic principles of computer generated animation. Focus on the modeling and lighting of animated characters. Students from Art, CSE, and Music team up on projects to be built on commercially-available modeling and lighting packages. Prerequisite: either CSE 457, ART 380, or MUSIC 403.

CSE 461 Introduction to Computer-Communication Networks (4) Computer network architectures, protocol layers, network programming. Transmission media, encoding systems, switching, multiple access arbitration. Network routing, congestion control, flow control. Transport protocols, real-time, multicast, network security. Prerequisite: CSE 143; either MATH 390/STAT 390, STAT 391, IND E 315, or CSE 321. Offered: jointly with E E 461.

CSE 466 Software for Embedded Systems (4) Software issues in the design of embedded systems. Microcontroller architectures and peripherals, embedded operating systems and device drivers, compilers and debuggers, timer and interrupt systems, interfacing of devices, communications and networking. Emphasis on practical application of development platforms. Prerequisite: CSE 326; CSE 370; CSE 378.

CSE 467 Advanced Digital Design (4) Advanced techniques in the design of digital systems. Hardware description languages, combinational and sequential logic synthesis and optimization methods, partitioning, mapping to regular structures. Emphasis on reconfigurable logic as an implementation medium. Memory system design. Digital communication including serial/parallel and synchronous/asynchronous methods. Prerequisite: CSE 326; CSE 370.

CSE 468 Very Large Scale Integration (5) Introduction to CMOS technology and circuit design; implementation of combinational and sequential logic; VLSI design methodologies; CAD tools for layout, simulation, and validation. Students design a VLSI chip using modern CAD tools. Prerequisite: CSE 370.

CSE 471 Computer Design and Organization (4) CPU instruction addressing models, CPU structure and functions, computer arithmetic and logic unit, register transfer level design, hardware and microprogram control, memory hierarchy design and organization, I/O and system components interconnection. Laboratory project involves design and simulation of an instruction set processor. Prerequisite: CSE 370; CSE 378.

CSE 472 Introduction to Computational Linguistics (3) NW/VLPA Introduction to computer applications of linguistic theory, including syntactic processing, semantic, and pragmatic interpretation and natural language generation. Prerequisite: either ANTH 461 or LING 461. Offered: jointly with LING 472.

CSE 473 Introduction to Artificial Intelligence (3)

Principal ideas and developments in artificial intelligence: theorem proving, problem-solving methods, representation of knowledge, natural language analysis and synthesis, programming languages for artificial intelligence. Not open for credit to students who have completed 415. Prerequisite: CSE 326; recommended: CSE 341.

CSE 476 Embedded System Design (5)

System building course to provide students with a complete experience in embedded system design. Students will design, simulate, construct, debug, and document a substantial project of their choosing. Lectures will focus on case studies and emerging components and platforms. Prerequisite: CSE 451; CSE 466.

CSE 477 Digital System Design (5)

Students use laboratory to design, simulate, construct, and debug a substantial project that includes hardware, software, and communication components. Lectures focus on use of embedded processors in digital system design and interfacing techniques. Writing and debugging of real-time reactive software emphasized. Prerequisite: CSE 378; CSE 467.

CSE 481 Capstone Software Design (5)

Students work in teams to design and implement a software project involving multiple areas of the CSE curriculum. Emphasis is placed on the development process itself, rather than on the product. Prerequisite: CSE major; CSE 326; CSE 341; CSE 378 and substantial programming experience, such as in CSE 451 or 457.

CSE 490 Special Topics in Computer Science and Engineering (1-5, max. 15)

Lectures, discussions, and possibly labs on topics of current interest in computer science and engineering not covered by other CSE undergraduate courses. Offered: AWSpS.

CSE 498- Senior Project ([1-9]-, max. 9)

A report (and perhaps demonstration) describing a development, survey, or small research project in computer science or an application to another field. Objectives are: (1) integrating material from several courses, (2) introducing the professional literature, (3) gaining experience in writing a technical document, and (4) showing evidence of independent work. Work normally extends over more than one quarter, for a maximum of 6 credits for 498; 9 credits are required for 498H. Offered: AWSpS.

CSE 499 Reading and Research (1-24, max. 24)

Available in special situations for advanced computer science majors to do reading and research in field, subject to approval of undergraduate adviser and CSE faculty member. Free elective, but does not replace core course or computer science elective. Credit/no credit only. Offered: AWSpS.

Courses for Graduates Only**CSE 501 Implementation of Programming Languages (3)**

Design of compilers and run-time systems for traditional and non-traditional programming languages. Intra- and interprocedural analyses and optimization. Compile-time and run-time implementation techniques for LISP-like, functional, and object-oriented languages. Students construct an optimizing compiler. Prerequisite: CSE major and CSE 401 and CSE 505.

CSE 503 Software Engineering (3)

Specification, implementation, and testing of large, multiperson, software systems. Topics include abstraction, information hiding, software development environments, and formal specifications. Prerequisite: CSE major and CSE 322, CSE 326, and CSE 378 or equivalents.

CSE 504 Advanced Topic in Software Engineering (3)

Topics vary but may include software design and evolution, formal methods, requirements specifications, software and system safety, reverse engineering, real-time software, metrics and measurement,

programming environments, and verification and validation. Prerequisite: CSE major or permission of instructor.

CSE 505 Concepts of Programming Languages (3)

Data structures, types, control structures. Languages in the ALGOL family; functional, object-oriented, and logic programming languages. Prerequisite: CSE major, CSE 401 and a working knowledge of Pascal and LISP.

CSE 510 Advanced Topics in Human-Computer Interaction (3)

Content varies, including interface issues for networks, embedded systems, education applications, safety and critical systems, graphics and virtual reality, databases, and computer-supported cooperative work. Offered: odd years.

CSE 519 Computer Science Research Seminar (1, max. 3)

Weekly presentations on current research activities by members of the department. Only Computer Science graduate students may register, although others are encouraged to attend. Credit/no credit only. Offered: AWSp.

CSE 520 Computer Science Colloquium (1, max. 9)

Weekly public presentations on topics of current interest by visiting computer scientists. Credit/no credit only. Offered: AWSp.

CSE 521 Design and Analysis of Algorithms I (3)

Principles of design of efficient algorithms: recursion, divide and conquer, balancing, dynamic programming, greedy method, data structure selection. Correctness and analysis of algorithms. Examples drawn from problems in sorting, searching, set manipulation, pattern-matching, graphs, matrices, polynomials, and integers. Prerequisite: CSE major and CSE 326 or equivalent.

CSE 522 Design and Analysis of Algorithms II (3)

Analysis of algorithms more sophisticated than those treated in 521. Content varies and may include such topics as algebraic algorithms, combinatorial algorithms, techniques for proving lower bounds on complexity, and algorithms for special computing devices such as networks or formulas. Prerequisite: CSE major and CSE 521. Offered: alternate years.

CSE 523 Computational Geometry (3)

Algorithms for discrete computational geometry. Geometric computation, range searching, convex hulls, proximity, Voronoi diagrams, intersection. Application areas include VLSI design and computer graphics. Prerequisite: CSE major and CSE 521; recommended: CSE 457 or equivalent. Offered: alternate years.

CSE 527 Computational Biology (3)

Introduces computational methods for understanding biological systems at the molecular level. Problem areas such as mapping and sequencing, sequence analysis, structure prediction, phylogenetic inference, regulatory analysis. Techniques such as dynamic programming, Markov models, expectation-maximization, local search. Prerequisite: graduate standing in biological, computer, mathematical or statistical science, or permission of instructor.

CSE 531 Computability and Complexity (3)

Computational models including deterministic and nondeterministic Turing machines, and techniques for analyzing them. Fundamentals of computability theory and undecidability. Fundamentals of computational complexity theory and NP-completeness. Prerequisite: CSE majors only; CSE 322 or equivalent.

CSE 532 Complexity Theory (3)

Deterministic, alternating, and probabilistic Turing machines. Time and space complexity, complexity classes, complexity hierarchies, and provably intractable problems. Prerequisite: CSE major and CSE 531.

CSE 533 Advanced Topics in Complexity Theory (3)

Topics in computational complexity more sophisticated than those treated in 532. Topics are expected to vary from year to year, but might typically focus on such areas as parallel complexity, probabilistic complexity, circuit- or automaton-based complexity, or logic. Prerequisite: CSE major. Offered: alternate years.

CSE 544 Principles of Database Systems (3)

Data models and query languages (SQL, datalog, OQL). Relational databases, enforcement of integrity constraints. Object-oriented databases and object-relational databases. Principles of data storage and indexing. Query-execution methods and query optimization algorithms. Static analysis of queries and rewriting of queries using views. Data integration. Data mining. Principles of transaction processing.

CSE 546 Data Mining (3)

Methods for identifying valid, novel, useful, and understandable patterns in data. Induction of predictive models from data: classification, regression, and probability estimation. Discovery of clusters and association rules.

CSE 548 Computer Systems Architecture (3)

Notations for computer systems. Processor design (single chip, look-ahead, pipelined, data flow). Memory hierarchy organization and management (virtual memory and caches). Microprogramming. I/O processing. Multiprocessors (SIMD and MIMD). Prerequisite: CSE major and CSE 451.

CSE 549 High-Performance Computer Architectures (3)

Algorithm design, software techniques, computer organizations for high-performance computing systems. Selected topics from: VLSI complexity for parallel algorithms, compiling techniques for parallel and vector machines, large MIMD machines, interconnection networks, reconfigurable systems, memory hierarchies in multiprocessors, algorithmically specialized processors, data flow architectures. Prerequisite: CSE major and CSE 548 or permission of instructor. Offered: alternate years.

CSE 551 Operating Systems (3)

Operating system design and construction techniques. Concurrent programming, operating system kernels, correctness, deadlock, protection, transaction processing, design methodologies, comparative structure of different kinds of operating systems, and other topics. Prerequisite: CSE major and CSE 451.

CSE 552 Distributed and Parallel Systems (3)

Principles, techniques, and examples related to the design, implementation, and analysis of distributed and parallel computer systems. Prerequisite: CSE major and CSE 551.

CSE 553 Real-Time Systems (3)

Design and construction of software for real-time computer systems. Software architectures. Requirements and specification methods. Scheduling algorithms and timing analysis. Real-time operating systems. Real-time programming languages. Selected case studies. Prerequisite: CSE major and CSE 451. Offered: alternate years.

CSE 557 Computer Graphics (3)

Introduction to image synthesis and computer modeling, emphasizing the underlying theory required for undertaking computer graphics research. Topics include color theory, image processing, affine and projective geometry, hidden-surface determination, photorealistic image synthesis, advanced curve and surface design, dynamics, realistic character animation. Prerequisite: CSE major, solid knowledge of linear algebra.

CSE 558 Special Topics in Computer Graphics (3)

Advanced topics in computer graphics not treated in CSE 557. Topics vary from year to year but typically include advanced aspects of image synthesis, animation, and 3D photography. Prerequisite: CSE major

and CSE 557 or permission of instructor. Offered: alternate years.

CSE 561 Computer Communication and Networks (3) Fundamentals of data transmission: coding, message formats, and protocols. Organization of computer networks. Examples of network implementations. Prerequisite: CSE or E E major and CSE 451 or equivalent.

CSE 563 Fault Tolerant Computing (3) Faults and their manifestation, issues, theory, and techniques of reliable systems design, testing, design for testability, self-checking and fail-safe circuits, coding techniques, system-level fault diagnosis, fault-tolerant communication, reliable software design, and evaluation criteria. Prerequisite: basic knowledge of digital systems design or permission of instructor. Offered: jointly with E E 563.

CSE 567 Principles of Digital Systems Design (3) Principles of logic design, combinational and sequential circuits, minimization techniques, structured design methods, CMOS technology, complementary and ratioed gates, delay estimation and performance analysis, arithmetic circuits, memories, clocking methodologies, synthesis and simulation tools, VLSI processor architecture. Prerequisite: CSE major and basic knowledge of logic design.

CSE 568 Introduction to VLSI Systems (3) Introduction to CMOS technology and circuit design; combinational logic-design alternatives; register-design and system-clocking methodologies; datapath and subsystem design; VLSI system-design methodologies; CAD tools for synthesis, layout, simulation, and validation; design of a complex VLSI chip. Prerequisite: CSE 567 or permission of instructor. CSE majors only

CSE 573 Artificial Intelligence I (3) Introduction to computational models of thought and construction of intelligent information systems. Topics include search algorithms, data dependencies and truth-maintenance systems, approaches to knowledge representation, automated deduction, reasoning under uncertainty, and machine learning. Prerequisite: CSE 421 or equivalent; exposure to logic, LISP programming experience, CSE major.

CSE 574 Artificial Intelligence II (3) Advanced topics in artificial intelligence. Subjects include planning, natural language understanding, qualitative physics, machine learning, and formal models of time and action. Students are required to do projects. Prerequisite: CSE major and CSE 573.

CSE 576 Image Understanding (3) Overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures. Prerequisite: CSE 573 or E E 562 or equivalent or permission of instructor. Offered: jointly with E E 576.

CSE 577 Mathematical Morphology (3) Theory of mathematical morphology and its application in various commercial, industrial, medical, and research applications. Contents include binary and grayscale morphologic dilation, erosion, opening and closing, morphological sampling theorem, structuring element decomposition, thinning, skeletonizing, and relational shape description. Group project. Prerequisite: CSE 576 or E E 568 or permission of instructor. Offered: jointly with E E 577; alternate years.

CSE 578 Data Mining (4) Methods for identifying valid, novel, useful, and understandable patterns in data. Induction of predictive models from data: classification, regression, probability estimation. Discovery of clusters and association rules.

CSE 581 Parallel Computation in Image Processing (3) Parallel architectures, algorithms, and languages for image processing. Cellular array, pipelined and pyramid machines, instruction sets, and design issues. Parallel implementations of filtering, edge detection, segmentation, shape, stereo, motion, relaxation algorithms, multiresolution methods, and iconic-to-symbolic transforms. Students write and debug programs for parallel computers. Prerequisite: permission of instructor. Offered: alternate years.

CSE 582 Compiler Construction (4) Principles and practice of building efficient implementations of modern programming languages. Lexical, syntactic, and semantic analysis of programs. Intermediate program representations. Intra- and interprocedural analysis and optimization. Run-time system techniques. Related programming environment facilities such as source-level debuggers and profilers. Prerequisite: CSE majors only.

CSE 583 Programming Languages (4) A study of non-imperative programming paradigms such as functional, object-oriented, logic, and constraint programming. Programming language semantics and type theory. Prerequisite: CSE majors only.

CSE 584 Principles of Software Engineering (4) Study of major developments in software engineering over the past three decades. Topics may include design (information hiding, layering, open implementations), requirements specification (informal and formal approaches), quality assurance (testing, verification and analysis, inspections), reverse and re-engineering (tools, models, approaches). Prerequisite: CSE majors only.

CSE 585 Design and Implementation of Digital Systems (4) Overview of current implementation technologies for digital systems including custom integrated circuits, field-programmable logic, and embedded processors. Systems components such as buses and communications structures, interfaces, memory architectures, embedded systems, and application-specific devices. Focus on the design of large systems using modern CAD tools. Prerequisite: CSE majors only.

CSE 586 Computer Architecture (4) Architecture of the single-chip microprocessor: instruction set design and processor implementation (pipelining, multiple issue, speculative execution). Memory hierarchy: on-chip and off-chip caches, TLBs and their management, virtual memory from the hardware viewpoint. I/O devices and control: buses, disks, and RAID's. Prerequisite: CSE majors only.

CSE 587 Computer Operating Systems (4) A study of developments in operating systems from the 1960s to the present. Topics include operating system structure, protection, virtual memory, communication mechanisms, concurrency, lightweight threads, object-oriented systems, distributed systems, and transaction support in operating systems. Prerequisite: CSE majors only.

CSE 588 Network Systems (4) Current choices and challenges in network systems. Fundamental concepts combined with emphasis on evaluation of design/operations alternatives. Topics include: alternative link, network, and transport-layer technologies, topologies, routing, congestion control multimedia, IPv6, aTM v. IP, network management and policy issues. Prerequisite: CSE majors only.

CSE 589 Applied Algorithms (4) Principles of design of efficient algorithms with emphasis on algorithms with real world applications. Examples drawn from computational geometry, biology, scientific computation, image processing, combinatorial optimization, cryptography, and operations research. Prerequisite: CSE majors only.

CSE 590 Special Topics in Computer Science (*) Several offerings each quarter, on topics of current interest. Prerequisite: permission of instructor. Offered: AWSp.

CSE 591 Current Trends in Computer Graphics (4) Introduction to computer image synthesis, modeling, and animation emphasizing the state-of-the-art algorithm applications. Topics may include visual perception, image processing, geometric transformations, hierarchical modeling, hidden-surface elimination, shading, ray-tracing, anti-aliasing, texture mapping, curves, surfaces, particle systems, dynamics, realistic character animation, and traditional animation principles. Prerequisite: CSE majors only.

CSE 592 Applications of Artificial Intelligence (4) Introduction to the use of Artificial Intelligence tools and techniques in industrial and company settings. Topics include: foundations (search, knowledge representation) and tools such as expert systems, natural language interfaces and machine learning techniques. Prerequisite: CSE majors only.

CSE 593 Transaction Processing (4) Technology supporting reliable large-scale distributed computing, including transaction programming models, TP monitors, transactional communications, persistent queuing, software fault tolerance, concurrency control and recovery algorithms, distributed transactions, two-phase commit, data replication. Prerequisite: CSE majors only.

CSE 594 Database Management System (4) Introduction to the principles of database management systems. Topics include database system architecture, data models, theory of database design, query optimization, concurrency control, crash recovery, and storage strategies. CSE majors only.

CSE 595 Human Computer Interaction (4) Topics in human-computer interaction, including tools and skills for user interface design, user interface software architecture, rapid prototyping and iterative design, safety and critical systems, evaluation techniques, and computer supported cooperative work. Prerequisite: CSE majors only.

CSE 596 Parallel Computation (4) Survey of parallel computing including the processing modes of pipelining, data parallelism, thread parallelism, and task parallelism; algorithmic implications of memory models; shared memory and message passing; hardware implementations; bandwidth and latency; synchronization, consistency, interprocessor communication; programming issues including implicit and explicit parallelism, locality, portability. CSE majors only.

CSE 597 Performance Analysis (4) Broad introduction to computer system performance evaluation techniques and their application. Includes measurement/benchmarking, stochastic and trace driven simulation, stochastic queuing networks, and timed Petri nets. Applications of the techniques are studied using case study papers. CSE majors only. Not open for credit to students who have completed CSE 543. Offered: AWSp.

CSE 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

CSE 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

CSE 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Electrical Engineering

253 Electrical Engineering



General Catalog Web page:
www.washington.edu/students/genocat/academic/Electrical_Eng.html



Department Web page:
www.ee.washington.edu/ee.html

Electrical engineering is concerned with the understanding and utilization of electricity and with providing society useful, efficient, and economic products and services. Electrical engineering is an amazingly broad-based and rapidly growing discipline. It encompasses everything from batteries and power supplies to crystal fabrication, autonomous robots, and devices that can recognize human speech. Electrical engineers design, produce, study, and operate all manners of devices and systems that use electric and electromagnetic energy. Electrical engineers work on systems at the macro scale of electric power grids and at the micro scale of nano-technology.

Contemporary society is in the midst of an information revolution, created in large part from the fruits of electrical engineering. Rapid improvements in communication technologies, computer visualization, and information access continue to have a significant impact on manufacturing, medicine, transportation, and environmental monitoring. Dramatic advances in personal communication services, digital imaging, and network hardware and software are changing the texture of everyday life for an increasing portion of the world's population.

Graduates with a degree in electrical engineering find employment in industries such as aerospace, communications, computer manufacturing, power distribution, consumer electronics, and biomedical engineering. Positions can be found focusing on the research, design, and testing of new products; in technical sales and marketing; business consulting; and even growing areas such as intellectual property. Students who pursue graduate studies are quite successful in highly competitive programs nationally and internationally.

Graduate Program

Graduate Program Coordinator
253 EE/CSE Building, Box 352500
206-543-4924
grad@ee.washington.edu

The Department of Electrical Engineering offers graduate programs leading to the degrees of Master of Science in Electrical Engineering (M.S.E.E.) and Doctor of Philosophy (Ph.D.). Graduate courses and research programs are offered in biosystems, circuits and network theory, computational intelligence, computer networks and distributed systems, computer architecture, digital systems, software engineering, operating systems, microprocessors, VLSI design, control systems, electromagnetics (including optics and radio science), electronic materials (including devices and micro-electronics), energy systems (including power electronics and electric drives), signal and image processing, telecommunications, and virtual reality. Numerous interdisciplinary research opportunities exist, including projects relating to bio-engineering, computer engineering, and marine acoustics. The department does extensive research in coordination with the University of Washington's Applied Physics Laboratory and Washington Technology Center.

The M.S.E.E. degree may be earned in three ways, each of which requires the accumulation of 45 credits. A student may perform research and write a thesis; a student may pursue a one-quarter project as part of their studies; or a student may simply accumulate a suitable distribution of 45 credits of course work. Course work for each of the options is developed with the advice of faculty advisers as well as through the department advising staff.

The M.S.E.E. degree is also offered to part-time students employed in local industries through the Education at a Distance for Growth and Excellence (EDGE) program. Regular graduate courses are offered over cable television or by videotape to enable working engineers to participate in the program without traveling to campus.

For the Ph.D. degree, students must pass the departmental qualifying examination, pass an advanced General Examination, pursue an original research problem, and report the results of that research in a dissertation that must be a contribution to knowledge. At least one year of course work beyond the M.S.E.E. degree is usually desirable.

Research Groups

Facilities in the Department of Electrical Engineering include research laboratories for advanced digital systems, advanced power technology, applied electromagnetics, optics, remote sensing, applied signal and image processing, mechatronics and intelligent control, modern sensors, and semiconductor technology.

Admissions Qualifications

In addition to meeting Graduate School admission requirements, the Graduate Record Examination (GRE) general test is required of all students. Official test scores must be submitted, along with a formal application, a statement of purpose, and a minimum of two reference letters.

Although most applicants have baccalaureate degrees in electrical engineering, applicants with degrees in other branches of engineering, the physical sciences, computer science, or mathematics often are able to pursue graduate study in electrical engineering following some additional preparation. Such applicants are strongly encouraged to contact the department for further information.

For more information on admissions qualifications, visit the department's Web site at www.ee.washington.edu/graduate/admissions.html.

Financial Aid

Research assistantships, teaching assistantships, scholarships, and graduate fellowships are available to qualified graduate students in all areas of electrical engineering. Most awards include a monthly stipend plus payment of tuition and fees.

Faculty

Chair

Howard Jay Chizeck

Professors

Afromowitz, Martin * 1975; MS, 1966, PhD, 1969, Columbia University; microtechnology, solid-state and fiber-optics sensors, biomedical instrumentation.

Alexandro, Frank J. * 1964, (Emeritus); MSEE, 1959, DSc, 1964, New York University; control systems, stochastic estimation methods.

Allstot, David James * 1999; PhD, 1979, University of California (Berkeley); design and simulation of RF and mixed-signal integrated circuits.

Atlas, Les Eugene * 1983; MS, 1979, PhD, 1984, Stanford University; time-frequency representations, digital signal processing applied to speech, audio, manufacturing.

Baer, Jean-Loup * 1969, (Adjunct); MS, 1963, Grenoble (France), PhD, 1968, University of California (Los Angeles); computer architecture and performance evaluation.

Beach, Kirk Watson * 1976, (Adjunct Research); MSChE, 1968, PhD, 1971, University of California (Berkeley), MD, 1976, University of Washington; arterial disease in diabetes, blood flow studies with ultrasonic Doppler.

Bernard, Gary D. * 1989, (Affiliate); PhD, 1964, University of Washington; advanced sensors for manufacturing, time-frequency classification, visual information processing.

Borriello, Gaetano * 1988, (Adjunct); MS, 1981, Stanford University, PhD, 1988, University of California (Berkeley); invisible and ubiquitous computing, embedded and network systems.

Chizeck, Howard Jay * 1998; MS, 1976, Case Western Reserve University, ScD, 1982, Massachusetts Institute of Technology; biologically inspired control systems for autonomous robotics, prosthetics, and rehabilitation.

Crum, Lawrence A. * 1992; PhD, 1967, Ohio University; physical acoustics, underwater acoustics, medical ultrasound, acoustic cavitation, sonoluminescence.

Damborg, Mark J. * 1969; MSEE, 1963, PhD, 1969, University of Michigan; control systems theory, and applications, power system dynamics and control, database methods.

Darling, Robert B. * 1985; MS, 1982, PhD, 1985, Georgia Institute of Technology; semiconductor devices, solid state, optoelectronics, microelectronics.

Denton, Denise Dee 1996; MS, 1982, PhD, 1987, Massachusetts Institute of Technology; micromachining for the design and fabrication of microelectronic systems.

Dow, Daniel G. * 1968, (Emeritus); PhD, 1958, Stanford University; microwaves, physical electronics, semiconductor devices, sensors.

Dunham, Scott T. * 1999; MS, 1980, PhD, 1985, Stanford University; modeling and simulation of microfabrication processes and device behavior.

Ehrenberg, John E. * 1970, (Affiliate); PhD, 1973, University of Washington; communications, signal processing, underwater acoustics.

El-Sharkawi, Mohamed A. * 1980; MS, 1977, PhD, 1980, University of British Columbia (Canada); analysis and control of power electronics, systems, and electric drives; artificial neural networks.

Furness, Thomas A. * 1989, (Adjunct); PhD, 1981, University of Southampton (UK); display systems engineering, human factors, computer graphics, virtual reality.

Guilford, Edward C. * 1983, (Emeritus); PhD, 1959, University of California (Berkeley); electronics, computers.

Hannaford, Blake * 1989; MS, 1982, University of California (Berkeley), PhD, 1985, University of California (Berkeley); haptic interfaces, robotics, bio-

mechanics, bioengineering, controls, human-machine interaction.

Haralick, Robert M. * 1986, (Emeritus); MS, 1967, PhD, 1969, University of Kansas; computer vision, artificial intelligence, pattern recognition, image processing.

Hsu, Chih-Chi * 1958, (Emeritus); PhD, 1951, Ohio State University; control systems and cybernetics.

Huang, Xuecong D. * 1997, (Affiliate); PhD, 1989, University of Edinburgh (UK); speech recognition and synthesis, user interfaces, artificial intelligence, computational linguistics.

Hwang, Jenq-Neng * 1989; MS, 1983, National Taiwan University (Taiwan), PhD, 1988, University of Southern California; parallel architectures, signal and image processing, neural networks.

Johnson, David L. 1955, (Emeritus); PhD, 1955, Purdue University; digital design, artificial intelligence, models of learning systems.

Kim, Yongmin * 1982; MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, imaging systems, medical imaging, computer graphics, multimedia.

Kuga, Yasuo * 1991; MS, 1979, PhD, 1983, University of Washington; microwave and millimeter-wave remote sensing, optics, and electromagnetics.

Ladner, Richard E. * 1971, (Adjunct); PhD, 1971, University of California (Berkeley); design and analysis of algorithms, data compression, network algorithms, cache performance.

Lauritzen, Peter O. * 1968, (Emeritus); MS, 1958, PhD, 1961, Stanford University; power electronics, electronic devices, instrumentation.

Lewellen, Thomas * 1967, (Adjunct); PhD, 1972, University of Washington; bioengineering, electrical engineering.

Lewis, Laurel J. 1946, (Emeritus); PhD, 1947, Stanford University; circuits and systems.

Liu, Chen-Ching * 1983; MS, 1978, National Taiwan University, PhD, 1983, University of California (Berkeley); power system analysis/computing, intelligent system methodologies/applications, power electronics.

Marks, Robert * 1977; MS, 1973, Rose Hulman Institute of Technology, PhD, 1977, Texas Technological University; neural networks, computational intelligence, fuzzy systems, statistical communication theory.

Meditch, James S. * 1977, (Emeritus); MS, 1957, Massachusetts Institute of Technology, PhD, 1961, Purdue University; broadband communication networks, video and multimedia systems.

Meldrum, Deirdre R. * 1992; MS, 1985, Rensselaer Polytechnic Institute, PhD, 1993, Stanford University; laboratory automation systems, genome analysis, modeling and control of dynamic systems, robots.

Moritz, William E. * 1973, (Emeritus); PhD, 1969, Stanford University; human-powered transportation.

Noges, Endrik * 1958, (Emeritus); PhD, 1959, Northwestern University; automatic control systems, nonlinear and discontinuous control.

Ostendorf, Mari 1999; MS, 1981, PhD, 1985, Stanford University; speech synthesis and understanding; spoken document retrieval; statistical pattern recognition.

Pearsall, Thomas P. * 1989, (Affiliate); PhD, 1973, Cornell University; physics of semiconductors and the technology of semiconductor devices.

Peden, Irene Carswell * 1961, (Emeritus); PhD, 1962, Stanford University; subsurface remote sensing and applied electromagnetics.

Porter, Robert P. * 1985, (Emeritus); PhD, 1970, Northeastern University; acoustics, electromagnetics, signal processing.

Ritcey, James A. * 1985; MS, 1979, Syracuse University, PhD, 1985, University of California (San Diego); communications, signal processing, radar/sonar.

Sechen, Carl M. * 1992; MS, 1979, Massachusetts Institute of Technology, PhD, 1986, University of California (Berkeley); design and computer-aided design of digital integrated circuits and systems.

Shapiro, Linda G. 1986; MS, 1972, PhD, 1974, University of Iowa; computer vision, multimedia information systems, medical informatics, pattern recognition.

Sigelmann, Rubens A. * 1959, (Emeritus); PhD, 1963, University of Washington; bioengineering, ultrasonics, propagation, acoustics.

Soma, Mani * 1982; MS, 1977, PhD, 1980, Stanford University; computer-aided design, device modeling, I.C. technology and design, bioengineering.

Spindel, Robert C. 1987; MS, 1966, PhD, 1971, Yale University; ocean acoustics, signal processing, acoustic navigation systems, acoustic tomography.

Sun, Ming-Ting * 1996; MS, 1981, University of Texas (Arlington), PhD, 1985, University of California (Los Angeles); multimedia/video processing/networking VLSI.

Szabalya, John F. * 1984, (Affiliate); PhD, 1948, Josef Nador University (Hungary).

Tanimoto, Steven L. * 1977, (Adjunct); MA, 1974, PhD, 1975, Princeton University; visual languages, image analysis, computer graphics, artificial intelligence, educational technology.

Taya, Minoru * 1986, (Adjunct); PhD, 1977, Northwestern University; composite materials, elasticity and plasticity, impact physics, fracture theory.

Tsang, Leung * 1983; MS, 1973, PhD, 1976, Massachusetts Institute of Technology; wave propagation and scattering, remote sensing and optics.

Vagners, Juris * 1967, (Adjunct); PhD, 1967, Stanford University; optimal control and estimation theory, applications to aircraft systems.

Yee, Sinclair S. * 1966; MS, 1961, PhD, 1965, University of California (Berkeley); physical electronics, semiconductor devices, microsensors.

Yuan, Chun 1991, (Adjunct); PhD, 1988, University of Utah; magnetic resonance imaging in medical application.

Zabinsky, Zelda * 1985, (Adjunct); PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.

Zick, Gregory L. * 1974; MS, 1972, PhD, 1974, University of Michigan; multimedia and digital information management systems.

Associate Professors

Babbitt, William R. * 1993, (Affiliate); MAE, 1986, PhD, 1987, Harvard University; optical memories, processors, and optical interconnects and nonlinear optics.

Berg, Martin C. * 1986, (Adjunct); PhD, 1986, Stanford University; digital control system design, control of structurally flexible electromechanical systems.

Cho, Paul S. 1990, (Adjunct); PhD, 1989, University of California (Los Angeles); medical radiation physics.

Chou, Philip A. * 1998, (Affiliate); PhD, 1998, Stanford University; compression and recognition of video images, audio, speech and documents.

Christie, Richard Dunstan, Jr. * 1989; MSEE, 1974, Rensselaer Polytechnic Institute, PhD, 1989, Carnegie Mellon University; power systems analysis, expert systems applications, user interfaces.

Dailey, Daniel J. * 1982; MS, 1982, PhD, 1988, University of Washington; time series modeling of physical phenomena, optimization, distributed computing, networking.

Falk, Robert Aaron 1995, (Affiliate); MS, 1974, PhD, 1979, University of Washington.

Giri, Jay * 1990, (Affiliate); MS, 1971, State University of New York (Stony Brook), PhD, 1977, Clarkson University; power system analysis, software development and user interfaces for real-time power system control.

Gu, Chuang * 1999, (Affiliate); PhD, 1995, Swiss Federal Institute of Technology; video processing, video analysis and video coding.

Hauck, Scott * 1990; MS, 1992, PhD, 1995, University of Washington; FPGAs, reconfigurable computing, VLSI/CAD, digital logic, adaptive computing.

Healy, Michael J. * 1995, (Affiliate); MS, 1967, University of Idaho; formal semantics; mathematical semantic analysis and design of systems.

Helms, Ward J. * 1964; PhD, 1968, University of Washington; VLSI analog and digital circuit design, integrated circuits, acoustics and audio, silicon compilers.

Kim, Jae H. 2000; MSc, 1978, Seoul National University (Korea), PhD, 1987, University of Florida.

Liu, Hui * 1998; PhD, 1995, University of Texas (Austin); wireless system and network design: DSP and VLSI for communications, numerical computing.

Ly, Uy-Loi * 1988, (Adjunct); PhD, 1983, Stanford University; robust controls, parameter optimization, model reduction, digital control, design integration.

Mar, Monte 2000; MS, 1989, PhD, 1993, University of California (Berkeley).

Nelson, Brian A. * 1987; PhD, 1987, University of Wisconsin; fusion plasma physics, plasma processing of materials, data acquisition software.

Phillips, Ihsin Tsai-Yun * 1988, (Affiliate); PhD, 1984, University of Maryland; computer vision, document image understanding, image database, software engineering.

Redeker, Charles C. 1963, (Emeritus); MS, 1964, University of Washington.

Riskin, Eve A. * 1990; MS, 1985, PhD, 1990, Stanford University; image compression and processing, and signal processing.

Roy, Sumit * 1998; MA, 1985, MSEE, 1985, PhD, 1988, University of California (Santa Barbara); performance analysis of communications networks; statistical and numerical computing.

Sahr, John D. * 1991; PhD, 1990, Cornell University; radar remote sensing, ionospheric physics; signal processing; wireless communications.

Shi, Chuan Jin 1998; PhD, 1994, University of Waterloo (Canada); VLSI and VLSI-CAD, optimization.

Sinanan, Mika N. * 1980, (Adjunct); MD, 1980, Johns Hopkins University, PhD, 1986, University of British Columbia (Canada); surgical education, biorobotic surgical instrument development, and clinical procedure development.

Thorsos, Eric I. * 1980; PhD, 1972, Massachusetts Institute of Technology; rough surface scattering, numerical simulation and theory, underwater acoustics.

Troll, Mark 2001, (Research); PhD, 1983, University of California (San Diego).

Vivekanandan, J. 1994, (Affiliate); PhD, 1986, Colorado State University.

Wilson, Denise M. * 1999; PhD, 1995, Georgia Institute of Technology; distributed sensing systems design with emphasis on electronics interface.

Winebrenner, Dale P. * 1986; PhD, 1985, University of Washington; optical and radiowave propagation and scattering, remote sensing of planetary surfaces.

Yuan, Chun 1991, (Adjunct); PhD, 1988, University of Utah; magnetic resonance imaging in medical application.

Assistant Professors

Alilovic-Curgus, Jadranka 1997, (Affiliate); PhD, 1993, University of British Columbia (Canada).

Belcher, Edward O. * 1982, (Affiliate); MA, 1970, Stanford University, MSEE, 1973, Purdue University; signal processing, artificial intelligence, underwater acoustics.

Bilmes, Jeffrey A. * 1999; PhD, 1999, University of California (Berkeley); speech and pattern recognition, learning, audio processing, high-performance computing, human-computer.

Böhringer, Karl F. * 1998; MS, 1993, PhD, 1997, Cornell University; microelectromechanical systems (MEMS), applied microtechnology, micro spacecraft.

Bushnell, Linda 2000; MS, 1987, University of Connecticut, MA, 1989, PhD, 1994, University of California (Berkeley).

Chen, Tai-Chang 1991, (Research); MS, 1993, PhD, 1997, University of Washington.

Chinowsky, Timothy M. 2000, (Research); MS, 1997, PhD, 2000, University of Washington.

Choi, Jai Joon * 1988, (Affiliate); PhD, 1990, University of Washington; adaptive signal processing, neural networks, and fuzzy logic.

Diorio, Christopher J. * 1997, (Adjunct); MS, 1984, PhD, 1997, California Institute of Technology; silicon learning chips, neural networks, and learning algorithms.

Goldschneider, Jill * 1989, (Affiliate); PhD, 1997, University of Washington; data compression, image processing and clustering.

Jandhyala, Vikram 2000; PhD, 1998, University of Illinois; computational and applied electromagnetics, high-speed circuit applications of field solvers.

Liu, Hui * 1998; PhD, 1995, University of Texas (Austin); wireless system and network design: DSP and VLSI for communications, numerical computing.

Luby, James C. * 1979, (Affiliate); PhD, 1984, University of Washington; signal processing, under-

water acoustics, computer simulation, adaptive array processing, tracking.

Mamishev, Alexander V. * 1999; PhD, 1999, Massachusetts Institute of Technology; sensors, non-destructive testing, power, MEMS, inverse problems, optimization.

Matula, Thomas J. * 1993, (Affiliate); PhD, 1993, Washington State University.

Oh, Seho * 1987, (Affiliate); PhD, 1989, University of Washington; neural networks and fuzzy systems.

Padmanabhan, Venkata N. Z. * 1999, (Affiliate); PhD, 1998, University of California (Berkeley); Internet performance analysis, wireless networking and mobile computing.

Poovendran, Raadhakrishnan 2000; PhD, 1999, University of Maryland; communications and networking, network security, cryptography.

Senior Lecturers

Peckol, James 1994; PhD, 1985, University of Washington; real-time embedded systems, hardware/software co-design, computer architecture, digital fuzzy logic.

Yee, Hsian-Pei 1985; MS, 1989, PhD, 1992, University of Washington.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

E E 400 Advanced Topics in Electrical Engineering (1-5, max. 10) Contemporary topics at the advanced undergraduate elective level. Faculty presents advanced elective topics not included in the established curriculum. Offered: AWSp.

E E 411 Network Synthesis (4) Network representation in the complex frequency domain, realizability criteria for driving-point and singly and doubly terminated transfer function, canonical forms, Butterworth and Bessel Approximation methods, and application of the digital computer in synthesis procedures. Prerequisite: 1.0 in E E 233. Offered: A.

E E 415 Computer-Aided System Analysis and Design (3) Concepts, principles, and techniques concerned with the design, testing, and application of general-purpose problem-oriented computer programs for analyzing large-scale systems. Offered: Sp.

E E 416 Communications I: Random Signals (4) Probability and random processes in communications. Random variables, distributions, and expectation. Statistical filter design for detection and estimation. Prerequisite: 1.0 in E E 341; 1.0 in STAT 390.

E E 417 Communications II: Modulation and Coding (4) Modulation techniques for modern digital communication systems. Signal space, optimum receiver design, error performance. Energy-band width tradeoff in modulation. Error control coding for high reliability, block coding, convolutional coding. Multipath fading and its effects on performance, diversity signaling. Spread spectrum signaling and code division multiple access for wireless communications. Prerequisite: 1.0 in E E 416. Offered: W.

E E 418 Communications III: Multiple Access (3) Issues in communication systems with multiple users. Multiplexing based on time, frequency, and code. Error performance and power control in multiuser communications. Random access in networks, Aloha

protocol and carrier sensing. Queuing theory for performance analysis. Delay-throughput tradeoff. Switch architectures and performance. Prerequisite: 1.0 in E E 417. Offered: Sp.

E E 420 Design in Communications (4) Design projects in communications. Frequent projects solved by student teams. Reports and presentations. Prerequisite: 1.0 in E E 417 which may be taken concurrently. Offered: Sp.

E E 433 Analog Circuit Design (5) Design of analog circuits and systems applying modern integrated circuit technology: operational amplifiers, differential amplifiers, active filters, voltage references and regulators. Prerequisite: 1.0 in E E 332. Offered: AW.

E E 436 Medical Instrumentation (4) Introductory course in the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. For upper-division and first-year graduate students who are preparing for careers in bioengineering—both research and industrial. Offered: jointly with BIOEN 436; Sp.

E E 440 Introduction to Digital Imaging Systems (4) *Hwang* Image representation and standards, visual perception and color spaces, spatial domain image filtering and enhancement, image restoration, image transforms, image and video coding, image geometrical transformation and camera modeling. Prerequisite: E E 341. Offered: A.

E E 442 Digital Signals and Filtering (3) Methods and techniques for digital signal processing. Review of sampling theorems, A/D and D/A converters. Demodulation by quadrature sampling. Z-transform methods, system functions, linear shift-invariant systems, difference equations. Signal flow graphs for digital networks, canonical forms. Design of digital filters, practical considerations, IIR and FIR filters. Digital Fourier transforms and FFT techniques. Prerequisite: 1.0 in E E 341. Offered: W.

E E 443 Design and Application of Digital Signal Processing (5) Application of learned theories/algorithms and available computer technologies to modern image and speech processing problems. Two-dimensional signals and systems. Image transform, enhancement, restoration, coding. Characteristics of speech signals, linear predictive coding (LPC) of speech, pitch detection, and LPC speech synthesis, speech recognition, hardware designs for signal processing. Prerequisite: 1.0 in E E 442. Offered: Sp.

E E 445 Nonlinear Systems Analysis (4) Dynamic analysis of nonlinear circuits, neural networks and of other simple systems. Exact methods, graphical methods, approximate methods, including linearization and numerical and analog computer solutions. Stability. Forced oscillations. Prerequisite: 1.0 in E E 235. Offered: A.

E E 446 Control System Analysis I (4) Linear Servomechanism theory and design principles. Pole-zero analysis, stability of feedback systems by root locus and real-frequency response methods. Design methods of Bode and Nichols. Introduction to advanced topics in automatic control theory, state variable methods. Prerequisite: 1.0 in E E 233. Offered: A.

E E 448 Control Systems Sensors and Actuators (3) Study of control systems components and mathematical models. Amplifiers, DC servomotors, reaction mass actuators. Accelerometers, potentiometers, shaft encoders and resolvers, proximity sensors, force transducers, piezoceramic materials, gyroscopes. Experimental determination of component models and model parameters. Two 3-hour laboratory

ries per week. Prerequisite: either A A 450 or E E 446. Offered: jointly with A A 448; W.

E E 449 Design of Automatic Control Systems (4) Design problems for aerospace vehicles, systems with unstable dynamics, lightly damped modes, non-minimum phase, nonlinear dynamics. Computer-aided analysis, design, and simulation, with laboratory hardware-in-the-loop testing. Team design reviews, oral presentations. Prerequisite: either 1.0 in A A 450, 1.0 in E E 448, or 1.0 in M E 471. Offered: jointly with A A 449; Sp.

E E 452 Power Electronics Design (5) Electronic conversion and control of electrical power. Includes semiconductor switching devices, power converter circuits, design of magnetics, and control of power converters. Also ac/ac, ac/dc, and dc/dc power converters; circuit simulation; extensive laboratory work a four-week power converter design project. Prerequisite: 1.0 in E E 332; 1.0 in E E 351. Offered: A.

E E 453 Electric Drives (5) Elements of drive systems, speed-torque characteristics of electric motors and industrial loads, solid-state converter. Starting and braking methods of loaded motors. Speed control of electric motors. Solid-state drives. Transient analysis of loaded motors. Special forms of individual- and multimotor drives. Prerequisite: 1.0 in E E 351. Offered: W.

E E 454 Power System Analysis (4) Introduction to methods of analyzing power systems. Includes symmetrical components, calculation of line parameters, representation of transmission lines and power components, and power flow control. Prerequisite: 1.0 in E E 351. Offered: A.

E E 455 Power System Dynamics and Protection (4) Analysis of symmetrical and unsymmetrical power systems' networks, fault analysis, and stability studies. Prerequisite: 1.0 in E E 351. Offered: W.

E E 456 Computer-Aided Design in Power Systems (4) Design-oriented course in power system engineering. Students are assigned a project concerning system operation and planning, steady-state and dynamic behaviors of power systems, or distribution systems. Each involves formulation of design criteria, development of approach, application of existing software. Prerequisite: either 1.0 in E E 454 or 1.0 in E E 455. Offered: Sp.

E E 457 Electric Energy Distribution Systems (4) Introduction to electric utility distribution systems. Primary and secondary network analysis and design, distribution substation problems, distribution transformers, capacitor application, overcurrent and over-voltage protection. System planning and reliability. Prerequisite: 1.0 in E E 351. Offered: Sp.

E E 461 Introduction to Computer-Communication Networks (4) Computer network architectures, protocol layers, network programming. Transmission media, encoding systems, switching, multiple access arbitration. Network routing, congestion control, flow control. Transport protocols, real-time, multicast, network security. Prerequisite: CSE 143; either MATH 390/STAT 390, STAT 391, IND E 315, or CSE 321. Offered: jointly with CSE 461.

E E 462 Principles of Mobile Robotics (4) Design-oriented course in autonomous mobile robots. C programming, microprocessors, motors, gears, sensors, advanced sensing techniques, serial communications, PID control, algorithmic control, reactive control, multi-tasking. Laboratory exercises include design, construction, and testing of autonomous mobile robots, which compete at the end of the term. Offered: A.

E E 463 Autonomous Mobile Robots (4) Design-oriented course in autonomous mobile robots. C pro-

gramming, motors, sensors, IR and RF wireless communication, digital image processing, and robot motion control. Laboratory exercises include design, construction, and testing of autonomous mobile robots, which compete at the end of term. Offered: W.

E E 465 Fiber Optics, Devices, and Applications (4) Wave propagation in optical waveguiding structures, signal distortion, coupling of modes, modulation, sources and detectors, fabrication and measurement methods, communication and sensor systems. Prerequisite: 1.0 in E E 332; recommended: E E 361. Offered: W.

E E 467 Antennas: Analysis and Design (4) Fundamentals of antennas, analysis, synthesis and computer-aided design, and applications in communications, remote sensing, and radars. Radiation pattern, directivity, impedance, wire antennas, arrays, numerical methods for analysis, horn antennas, microstrip antennas, and reflector antennas. Prerequisite: 1.0 in E E 235; 1.0 in E E 361. Offered: Sp.

E E 471 Computer Design and Organization (5) Introduction to computer architecture, algorithms, hardware design for various computer subsystems, CPU control unit design, hardwired and microprogrammed control, memory organization, cache design, virtual memory, I/O organization, and I/O hardware design. Prerequisite: 1.0 in E E 371. Offered: ASP.

E E 472 Microcomputer Systems (5) Concepts of multi-level machines and computer systems organization. Utilizing microprocessors, digital computer studied at assembly- and high-language levels with emphasis on concepts of central processor architecture, memory organization, input/output and interrupts. Assembly language programming concepts applied to solution of various laboratory problems including I/O programming. Prerequisite: E E 371. Offered: AW.

E E 476 Digital Integrated Circuit Design (5) *Sechen* Comprehensive view of digital integrated circuit design. Topics to be covered include the design of inverters, static logic circuits, switch logic, and synchronous logic. Students design, simulate, and layout a complete digital IC using modern computer-aided design tools. Prerequisite: 1.0 in E E 331; 1.0 in E E 371. Offered: A.

E E 477 VLSI II (5) *Sechen* Provides a fairly deep understanding of how IC-based memory and datapath blocks are designed using static and dynamic CMOS technologies. Gives students extensive experience with industry-standard computer-aided design tools, including Cadence (Virtuoso, DRC, LVS) and Avanti (Hspice). Credit not allowed for both E E 477 and E E 525. Prerequisite: E E 476.

E E 478 Design of Computer Subsystems (5) Design of digital computer subsystems and systems, using SSI, MSI, and LSI digital components. Combinational logic, sequential logic, memory hardware designs, I/O hardware and interface design, system design steps, high-speed digital circuit design, noise reduction techniques, and hardware description language. One four-hour laboratory each week and design project. Prerequisite: 1.0 in E E 331; 1.0 in E E 472. Offered: WSp.

E E 480 Microwave Engineering I (4) Analysis and design of transmission lines and matching circuits. Lossy transmission lines. Mode structures in metallic and dielectric waveguides. Microwave resonators and dielectric devices. Smith chart and matching techniques. Prerequisite: 1.0 in E E 361. Offered: A.

E E 481 Microwave Electronic Design (4) Design of microwave circuits using S-parameter techniques. Measurement techniques, CAD of microwave systems. Includes design, fabrication, and evaluation of

a microwave amplifier. Prerequisite: 1.0 in E E 332; 1.0 in E E 361. Offered: W.

E E 482 Semiconductor Devices (4) Fundamentals of semiconductor theory: carrier diffusion and drift; concept of direct and indirect energy materials, effective mass of mobile carriers; device physics: homo- and heterojunctions, operating principles of bipolar, junction, and MOS field-effect transistors. Prerequisite: 1.0 in E E 332. Offered: A.

E E 484 Sensors and Sensor Systems (4) Introduction to optical and solid-state chemical and physical sensors. Topics include transduction mechanisms, design parameters, fabrication methods and applications. Offered: Sp.

E E 485 Introduction to Photonics (4) The properties, characterization, and use of photonic devices in the design of electronic circuits are studied in the laboratory through experiments and projects. Laboratory work is supplemented by classroom examination of the principles behind measures device properties. Offered: Sp.

E E 486 Fundamentals of Integrated Circuit Technology (3) Processing physics, chemistry and technology, including evaporation, sputtering, epitaxial growth, diffusion, ion implantation, laser annealing, oxidation, chemical vapor deposition, photore-sists. Design considerations for bipolar and MOS devices, materials and process characterization. Future trends. Prerequisite: either E E 482 or MSE 466. Offered: jointly with MSE 486. Offered: W.

E E 489 Integrated Circuit Laboratory (1) Hands-on experience in the building of a PMOS device, complete with oxidation, diffusion, photolithography, etching, metallization, and testing. Credit/no credit only. Prerequisite: E E 486/MSE 486, which may be taken concurrently. Offered: jointly with MSE 489; W.

E E 498 Design of Consumer Electronics (4) NW Design of consumer electronics products. Typical products include conventional audio systems, CD players, VCRs, camcorders, and FAX systems. Choice of products varies from quarter to quarter. Course includes an integrated laboratory and design project. Prerequisite: 1.0 in E E 233; recommended: E E 332. Offered: ASP.

E E 499 Special Projects (2-5, max. 10) Assigned construction or design projects carried out under the supervision of the instructor. Offered: AWSp.

Courses for Graduates Only

E E 500 Graduate Seminar (1, max. 3) Weekly seminars on current topics in electrical engineering. More than one section may be offered in a given quarter. Credit/no credit only.

E E 501 Radar Remote Sensing (3) *Sahr* General introduction to radar remote sensing of geophysical targets. Fundamentals of radar systems, range-time diagram, ambiguity function, pulse compression, spectrum estimation for underspread and overspread targets; multi-antenna correlations, interferometry, closure phases; maximum entropy source imaging; Aperture Synthesis (SAR and ISAR).

E E 502 Introduction to Microelectro Mechanical Systems (4) Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered jointly with M E 504/MSE 504.

E E 505 Probability and Random Processes (4) Foundations for the engineering analysis of random processes: set theoretic fundamentals, basic axioms of probability models, conditional probabilities and

independence, discrete and continuous random variables, multiple random variables, sequences of random variables, limit theorems, models of stochastic processes, noise, stationarity and ergodicity, Gaussian processes, power spectral densities. Prerequisite: graduate standing and understanding of probability at the level of E E 416.

E E 506 Communication Theory I (3) *Ritcey* Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: E E 505 or equivalent.

E E 507 Communication Theory II (3) *Ritcey* Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: E E 506 or equivalent.

E E 508 Stochastic Processes (3) *Ritcey* 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: E E 505 or permission of instructor.

E E 510 Mathematical Foundations of Systems Theory (4) *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/CHEM E 510/M E 510.

E E 513 Active Circuit Theory (3) *Andersen* Principles of analysis and synthesis of linear active circuits. Emphasis on general principles, including conservation theorems, invariants, performance limitations in the presence of parasitic elements and realizability conditions. Illustrative applications related to negative resistance amplifiers, feedback amplifiers, and active filters. Prerequisite: E E 341 or permission of instructor.

E E 516 Computer Speech Processing (4) *Bilmes, Kirchhoff, Ostendorf* Introduction to automatic speech processing. Overview of human speech production and perception. Fundamental theory in speech coding, synthesis and reproduction, as well as system design methodologies. Advanced topics include speaker and language identification and adaptation. Prerequisite: E E 505; E E 518.

E E 517 Statistical Language Processing (4) *Bilmes, Kirchhoff, Ostendorf* Introduction to major issues in natural language processing and human language technology, with emphasis on statistical approaches. Addresses topics in statistical parsing and tagging, dialogue systems, information extraction, and machine translation. Prerequisite: E E 505.

E E 518 Digital Signal Processing (4) *Atlas* Digital representation of analog signals. Frequency domain and Z-transforms of digital signals and systems design of digital systems; IIR and FIR filter design techniques, fast Fourier transform algorithms. Sources of error in digital systems. Analysis of noise in digital systems. Prerequisite: knowledge of Fourier analysis techniques and graduate standing, or permission of instructor.

E E 519 Stochastic Analysis of Data From Physical Systems (4) *Atlas* Computer systems for acquisition and processing of stochastic signals. Calculation of

typical descriptors of such random processes as correlation functions, spectral densities, probability densities. Interpretation of statistical measurements made on a variety of physical systems (e.g., electrical, mechanical, acoustic, nuclear). Lecture plus laboratory. Prerequisite: E E 505 or equivalent.

E E 520 Spectral Analysis of Time Series (4) *Ritcey* Estimation of spectral densities for single and multiple time series. Basic theory for nonparametric estimation of spectral density, cross-spectral density and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform in spectral estimation and computation of correlation functions. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes, and for randomly sampled processes. Techniques of robust spectral analysis. Prerequisite: one of STAT 342, STAT 390, STAT 481, E E 505, or permission of instructor. Offered: jointly with STAT 520; W.

E E 521 Multidimensional Signal Processing (3) *Marks* Multidimensional (MD) signals and systems, MD sampling theorem, sample dependence in higher dimensions, MD FIR filter design using windows and the McClellan transform, MD IIR filter stability and design. Current topics in MD signals and systems. Prerequisite: E E 442 or E E 518 or equivalent.

E E 522 Shannon Sampling and Interpolation Theory (4) *Marks* Historical overview of Shannon sampling theorem; fundamentals of the cardinal series; generalizations including those of Papoulis, Kramer, and Lagrange; effects of jitter, truncation and data noise on interpolation; continuous sampling restoration using prolate spheroidal wave functions and the Papoulis-Gerchberg algorithm. Prerequisite: E E 508.

E E 523 Computational Neural Networks (3) *Atlas, Hwang, Marks* Fundamentals of computational neural networks from perspectives of system theory and electrical engineering applications: historical review, adaptive parameter estimation, nonlinear optimization, combinatorial optimization, learning rules, neural network models, data clustering and regression, pattern classification, speech recognition, image modeling, nonlinear control, principal component analysis, probability density estimation. Prerequisite: permission of instructor.

E E 525 VLSI II (5) *Sechen* Analyzes how IC-based memory and datapath blocks are designed using static and dynamic CMOS technologies. Gives students extensive experience with industry-standard computer-aided design tools, including Cadence (Virtuoso, DRC, LVS) and Avant! (Hspice). Credit not allowed for both E E 477 and E E 525. Prerequisite: E E 476.

E E 526 VLSI III (4) *Helms, Sechen, Soma* Ultra-high speed digital logical families based on output prediction logic; high-speed division; input and output pad design; state-of-the-art latch and flip-flop design; clock distribution, including PLLs and DLLs; noise considerations in high-speed digital IC design. Prerequisite: E E 477 or E E 525.

E E 527 Solid-State Laboratory Techniques (4) *Darling* Principles and laboratory techniques used in solid-state electronics research. Basic familiarity with practices and equipment used on-campus. Laboratory safety; materials handling, storage and disposal; clean room use; photoresist characteristics; mounting, bonding, and probing; wet chemical etching; vacuum evaporation; patterning of metal films using photoresist. Extensive laboratory with limited enrollment. Prerequisite: graduate standing and permission of instructor.

E E 529 Semiconductor Optics and Optical Devices (4) *Afromowitz, Yee* Perturbations of energy states in semiconductors; direct and indirect transitions; absorption processes; optical constants; absorption spectroscopy; radiative and nonradiative transitions; processes occurring at p-n junctions; junction devices; LEDs and lasers, photovoltaics; self-electro-optic effect device; modern laser structures. Prerequisite: graduate standing or permission of instructor.

E E 531 Semiconductor Devices and Device Simulation (4) *Darling, Lauritzen, Yee* Physical principles in semiconductor devices. Generation, recombination, p-n junctions, MOS, metal-semiconductor and other interface structures. Carrier transport at low and high level injection levels. Device simulation used to demonstrate physical principles and basic device operation. Project using device simulation. Prerequisite: E E 482 or graduate standing.

E E 532 Device Modeling for Circuit Simulation (4) *Darling* Compact modeling of semiconductor devices. Analytical models, standard SPICE models, lumped-charge models using AHDL language. Emphasis on basic diodes, MOSFET, BJTs, and other models of interest, including sensor, photonic, and power models. Compact models using AHDL language model design project. Prerequisite: E E 531 or permission of instructor.

E E 533 Photodetectors and Photodetection (4) *Afromowitz, Yee* Includes both the device physics and signal processing aspects of photodetection. Photodiodes, photoconductors, photomultipliers, and solar cells are covered. Noise, signal to noise ratios and imaging considerations are also discussed. Prerequisite: E E 482 or graduate standing.

E E 534 Power Electronics (4) Detailed study of DC-to-AC inverters, pulse-width modulated and resonant DC-to-DC converter topologies; drive and protection circuits for efficient switching of semiconductor devices. Includes extensive computer-aided circuit simulation and power supply control. Prerequisite: graduate standing.

E E 536 Design of Analog Integrated Circuits and Systems (4) *Helms, Soma* Design of analog VLSI: specifications, design, simulation, layout. Covering CMOS and Bi CMOS technologies. Prerequisite: E E 433 or equivalent and graduate standing in electrical or computer engineering, or permission of instructor.

E E 537 Computation Methods for Circuit Analysis and Simulation (3) Introduction to numerical algorithms and computer-aided techniques for the simulation of electronic circuits. Theoretical and practical aspects of important analyses: large-signal nonlinear DC, small-signal AC, nonlinear transient, and large-signal steady-state. Simulation concepts applied to the modeling and characterization of various electronic devices.

E E 538 Topics in Electronic Circuit Design (1-5, max. 5) Topics of current interest in electronic circuit and system design. Course content varies from year to year, based on current professional interests of the faculty member in charge. Prerequisite: permission of instructor.

E E 539 Advanced Topics in Solid-State Electronics (1-5, max. 5) 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 of instructor.

E E 540 VLSI Testing (3) *Soma* VLSI testing and design-for-test techniques. Reliability predictions and characterizations for integrated circuits and systems. Circuits fabricated in 536 are tested as laboratory work. Prerequisite: E E 535, E E 536.

E E 541 Automatic Layout of Integrated Circuits

(4) *Sechen* Examines the algorithms behind the following commonly used physical design automation tools: floorplanning, partitioning, placement, routing, compaction, and verification. Prerequisite: E E 371; CSE 373 or CSE 326 or equivalent.

E E 543 Models of Robot Manipulation (3)

Hannaford Mathematical models of arbitrary articulated robotic (or biological) arms and their application to realistic arms and tasks, including the homogeneous coordinate model of positioning tasks, the forward and inverse kinematic models, the Jacobian Matrix, and the recursive Newton-Euler dynamic model. Prerequisite: linear algebra and graduate standing or permission of instructor.

E E 544 Advanced Robot Manipulation (4)

Hannaford, Meldrum Continuation of the analysis of robot manipulation, considering kinematic redundancy, control of robot manipulators in contact with the environment, teleoperation, and grasping with multi-fingered hands. Students will perform a project and critique a research paper in the area of the project. Prerequisite: E E 543.

E E 545 Autonomous Robots (3)

Exploration of deliberate-thinking and emergent-functionality paradigms to achieve autonomy. Exploration of hybrids incorporating elements of both of these approaches. Review of other potential approaches with assessment of successes and failures. Directed reading of current literature. Prerequisite: graduate standing or permission of instructor.

E E 546 Advanced Topics in Control System Theory (1-5, max. 5)

Topics of current interest in control system theory for advanced graduate students with adequate preparation in linear and nonlinear system theory. Prerequisite: permission of instructor. Offered when adequate enrollment develops prior to close of advance registration.

E E 547 Neural Communication and Control in Biological Systems (3)

Neural processing of the visual image and communication between levels of the central nervous system. Feedback and its role in movement by organisms. Description and analysis of the means by which electrochemical events generate, modulate, and demodulate neuronal signals, and the parallel interaction between these signals in transduction of images and other information. Prerequisite: advanced graduate standing or permission of instructor.

E E 548 Linear Multivariable Control (3)

Ly, Meldrum Single loop feedback control theory; poles, zeros, Nyquist stability, performance, robustness of multivariable systems; multivariable control syntheses: Linear-Quadratic-Gaussian methods, loop transfer recovery, Youla parametrization, H-infinity techniques, parameter optimization design. Prerequisite: E E 584 or M E 575; E E 446 or A A 451 or M E 471 or equivalent. Offered: jointly with A A/M E 548.

E E 549 Estimation and System Identification (3)

Review of system models, model structure, model parametrization; review of stochastic processes; state estimation: observers, the Kalman-Bucy filter, numerical issues in filter design and implementation; system identification: linear regression, least squares, maximum likelihood, instrumental variable techniques. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or A A 548. Offered: jointly with A A 549/M E 549.

E E 550 Nonlinear Optimal Control (3)

Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate

standing; recommended: A A 548 or E E 548. Offered: jointly with A A 550/M E 550.

E E 551 Power System Protection (4)

Liu The protection of electric power systems from overcurrents and overvoltages. Analysis and design of overcurrents resulting from faults, lightning induced or otherwise, or from excessive loads or power swings. Analysis and design of overvoltages resulting from switching transients or lightning. Principal concern is with relays and lightning arrestors as protection means. Prerequisite: E E 455 or equivalent.

E E 552 Power Systems Dynamics and Control (4)

Damborg, El-Sharkawi Advanced computer modeling and analysis of power systems. Application of modern systems and control theories. Prerequisite: E E 351 and E E 455 or permission of instructor. Offered: odd years; Sp.

E E 553 Power System Economics (4)

Christie, Damborg, Liu Economic structure of power systems. Problem formulation, optimization methods and programming for economic analysis of power system operation and planning. Economic dispatch, load forecasting, unit commitment, interchange, planning and reliability analysis. Provides background to pursue advanced work in planning and operation. Prerequisite: graduate standing or permission of instructor.

E E 554 Large Electric Energy Systems Analysis (4)

Christie, Liu Deals with problems whose solution depends upon the inversion of sparse matrices that occur in the planning and operational studies of large interconnected energy systems. Application studies include system model development, state estimation, and load flow. Prerequisite: E E 456 or permission of instructor.

E E 555 Fundamentals of Intelligent Systems (4)

Fundamentals and applications of intelligent systems and biologically inspired algorithms such as neural networks, evolutionary computations, swarm optimization and fuzzy systems. Solving complex engineering applications with a combination of these technologies as well as with more traditional approaches such as statistical system theories. Offered: Sp.

E E 559 Special Topics in Electrical Energy Systems (1-5, max. 5)

Topics of current interest in electrical power and energy devices and systems. Content varies from year to year, based on current professional interests of faculty member in charge. Prerequisite: permission of instructor.

E E 562 Artificial Intelligence for Engineers (3)

Shapiro Covers main areas of artificial intelligence (AI) without need for extensive prerequisites. Programming languages for AI; problem solving; representations; control strategies; searching strategies; predicate calculus; rule-based deduction; goal-directed planning; knowledge-based systems. Prerequisite: CSE 373 or equivalent.

E E 563 Fault-Tolerant Computing (3)

Soma Faults and their manifestation, issues, theory, and techniques of reliable systems design, testing, design for testability, self-checking and fail-safe circuits, coding techniques, system-level fault diagnosis, fault-tolerant communication, reliable software design, and evaluation criteria. Prerequisite: basic knowledge of digital systems design or permission of instructor. Offered: jointly with CSE 563.

E E 564 Parallel Computer Systems (3)

Hwang, Kim Pipelined and vector processors; interconnection network for parallel processing, array and associative processors; multiprocessors; data-flow machines; systolic arrays and impact of the VLSI technology on parallel processors and processing. Prerequisite: E E 471, permission of instructor.

E E 565 Computer-Communication Networks I (3)

Network architectures and protocols; Broadband-ISDN and Asynchronous Transfer Mode (ATM); performance modeling and analysis of packet-switched networks, digital switching systems. Prerequisite: E E 505 or equivalent.

E E 566 Computer-Communication Networks II (3)

Local area, metropolitan area, satellite, and packet radio networks; routing algorithms for wide area networks; optimal design of packet-switched networks; congestion and flow control; fast packet switching; gigabit networks. Prerequisite: E E 565 or permission of instructor.

E E 568 Image Processing Computer Systems (4)

Kim All components of digital image-processing computer systems. Two-dimensional filtering and optimal filter design as well as basic image processing operations. Selected advanced image processing topics. Individual student project. Prerequisite: permission of instructor. Offered: jointly with BIOEN 568; Sp.

E E 571 High Frequency Circuits and Antennas: Computation of Fields and Waves (4)

Planar microstrip structures are high frequency circuits and antennas used in communication, aerospace and computer industries. Examines the computation of fields and waves in such structures. How to calculate circuit parameters and radiation characteristics. Structures studied include microstrip lines, coupled lines, antennas, resonators, and discontinuities. Prerequisite: E E 482, E E 572, or equivalent.

E E 572 Electromagnetic Theory and Applications I (4)

Electromagnetic waves in layered media; complex waves, leaky and slow waves, waves in periodic structures, optical fibers, ionosphere and other guiding structures; transients and dispersive media; waveguides and cavities; beam waves; eigenfunctions and eigenvalues. Prerequisite: graduate standing or permission of instructor.

E E 573 Electromagnetic Computations and Applications I (4)

Tsang Fundamentals of computational electromagnetics, method of moments, integral equations, basis functions, iterative methods, periodic structures and Green's Functions finite difference time domain method, Yee's lattice, absorbing boundary conditions, variational principles, and finite element method. Applications in antennas, waveguides, and scattering problems. Prerequisite: E E 572 or permission of instructor.

E E 574 Electromagnetic Computations and Applications (4)

Tsang Current topics in computational electromagnetics, fast multipole multilevel method, sparse matrix canonical grid method, wavelet based methods, recursive method, spectral time domain method. Applications in large scale problems such as array antennas, radar cross section, rough surface scattering, and dense media scattering. Prerequisite: EE 573 or permission of instructor.

E E 575 Waves in Random Media (4)

Tsang Propagation and scattering of electromagnetic, optical, and acoustic waves in turbulence and random media, scattering from rough surfaces and randomly distributed particles. Atmospheric turbulence, fog, rain, smog, clear-air turbulence detection, remote sensing, terrain scattering, scattering from blood cells and tissues, scattering by ocean waves. Applications to atmospheric sciences, bioengineering, geoscience, ocean engineering. Prerequisite: graduate standing or permission of instructor.

E E 576 Image Understanding (3)

Haralick, Shapiro, Tanimoto Overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures.

Prerequisite: E E 573 or E E 562 or equivalent or permission of instructor. Offered: jointly with CSE 576.

E E 577 Mathematical Morphology (3) *Haralick* Theory of mathematical morphology and its application in various commercial, industrial, medical, and research applications. Contents include binary and grayscale morphologic dilation, erosion, opening, and closing, morphological sampling theorem, structuring element decomposition, thinning, skeletonizing, and relational shape description. Group project. Prerequisite: E E 568 or E E 576 or permission of instructor. Offered: jointly with CSE 577.

E E 579 Advanced Topics in Electromagnetics, Optics, and Acoustics (1-5, max. 5) Topics of current interest in electromagnetics, optics, and acoustics. Content varies from year to year, based on current professional interests of faculty member in charge. Prerequisite: permission of instructor.

E E 581 Digital Control I (3) *Alexandro, Berg, Ly* Discrete-time and sampled-data systems, difference equations, and z-transform. Frequency response. Nyquist stability criterion. Gain and phase margins. Limitations of sampling. Sample rate selection. Controller design via discrete-time equivalents to continuous-time controllers, by direct-digital root locus and by loop shaping. Prerequisite: E E 471 or equivalent; recommended: E E 575 or equivalent. Offered: jointly with A A 581/M E 581.

E E 582 Digital Control II (3) *Alexandro, Berg, Ly, Vagners* Controller design via state feedback and observers. Introduction to discrete-time stochastic processes. Quantization effects. Introduction to parameter identification using noisy measurements. LQR optimal control. Kalman filter design. LQG optimal control. Prerequisite: E E 581 or permission of instructor. Offered: jointly with A A 582/M E 582.

E E 583 Nonlinear Control Systems (3) Analysis and synthesis of nonlinear control systems. Assessment of stability by phase plane and describing function methods, circle and Popov criteria, Lyapunov criteria. Construction of Lyapunov functions by method of Kraasovskii and Lu're. Introduction to nonlinear control system design. Prerequisite: E E 446, E E 584, or permission of instructor. Offered: jointly with M E 583; odd years; Sp.

E E 584 Linear Systems Theory (3) *Campbell, Ly* Transfer-function and state-space description. Solution of the state transition matrix. Controllability and observability. Zeros and poles of multivariable systems; the Smith-McMillan form. System norms. System invertibility. State feedback. Output feedback and observers. Prerequisite: graduate standing or permission of instructor. Offered: jointly with M E 575 and A A 547.

E E 586 Digital Video Coding Systems (3) *Sun* Introduction to digital video coding algorithms and systems. Theoretical and practical aspects of important topics on digital video coding algorithms, motion estimation, video coding standards, systems issues, and visual communications. Prerequisite: graduate standing or permission of instructor.

E E 587 Vector Quantization and Data Compression (3) *Kim, Riskin* Introduction to data compression and information theory; vector quantization including theory, applications, design, performance criteria, variable rate systems, and reduced complexity structure including transform coding, wavelets, lossless compression algorithms, and applications of compression to images, speech, and video. Prerequisite: E E 505 or STAT 390 and computer programming experience.

E E 590 Advanced Topics in Digital Computers (2-5, max. 15) Lectures or discussions of topics of current interest in the field of digital systems. Subject

matter may vary from year to year. Prerequisite: permission of instructor.

E E 591 Robotics and Control Systems Colloquium (1, max. 3) Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with A A/CHEM E/M E 591.

E E 592 Electrical Engineering Research Survey (1) Weekly presentations on current research activities by members of the department. Credit/no credit only.

E E 595 Advanced Topics in Communication Theory (1-5, max. 5) Extension of 507, 508, 518, 519, 520. Material differs each year, covering such topics as: detection theory, decision theory, game theory, adaptive communication systems, nonlinear random processes. Prerequisite: permission of instructor.

E E 596 Advanced Topics in Signal and Image Processing (2-5, max. 5) Topics of current interest in signal and image processing. Content may vary from offering to offering. Prerequisite: permission of instructor.

E E 599 Selected Topics in Electrical Engineering (*) Prerequisite: permission of instructor. Offered: AWSp.

E E 600 Independent Study or Research (*) Offered: AWSp.

E E 700 Master's Thesis (*) Offered: AWSp.

E E 800 Doctoral Dissertation (*) Offered: AWSp.

Industrial Engineering

G-7 Mechanical Engineering Building



General Catalog Web page:
www.washington.edu/students/genocat/academic/Industrial_Eng.html



Department Web page:
depts.washington.edu/ie/

The formal definition of industrial engineering, as adopted by the Institute of Industrial Engineers, is as follows: industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, information, equipment, and energy. It draws upon specialized knowledge and skill in the mathematical, physical, and social sciences together with principles and methods of engineering analysis and design to specify, predict, and evaluate the results obtained from such systems.

Industrial engineering is set apart from other engineering disciplines by its broader scope. Industrial engineers are, by definition, specialists in designing and operating systems that make optimal use of resources when labor, materials, capital, and technology are constrained. They deal with people as well as things, looking at the "big picture" of what makes society perform best: the right combination of human resources, natural resources, and man-made structures and equipment. Bridging the gap between management and operations, they deal with and motivate people as well as determine what tools should be used and how they should be used.

Industrial engineers are the "productivity people" who must provide leadership and integrate technology. They include the human factor in finding workable, effective solutions to production problems while retaining high standards of quality. Demand for industrial

engineers has grown dramatically over the past two decades for one chief reason: the need for organizations to raise their levels of productivity through thoughtful, systematic applications. The profit-making organization must have high productivity in order to compete in the domestic and world market place. The nonprofit organization must have high productivity in order to sustain its position as a useful service unit.

Graduate Program

Graduate Program Coordinator
G7 Mechanical Engineering, Box 352650
206-543-5041
ieadvise@u.washington.edu

Industrial Engineering offers graduate programs leading to the Master of Science in Industrial Engineering (M.S.I.E.) and Doctor of Philosophy (Ph.D.). Graduate courses and research programs are offered in manufacturing, operations research, large-scale assembly, experimental statistics, production planning, quality control, reliability engineering, computer-integrated manufacturing, simulation, supply chain, human factors, virtual reality, and human interface technology.

For the M.S.I.E. degree, a minimum of 41 credits is required, with both a thesis and course-work-only option. Students pursuing the thesis option must complete a minimum of 9 credits of master's thesis (IND E 700).

For the Ph.D. degree, students must initially pass the departmental qualifying examination, followed by successful completion of an advanced General Examination and subsequent Final Examination in which the student defends his or her dissertation.

Faculty

Chair

Tony C. Woo

Professors

Furness, Thomas A. * 1989; PhD, 1981, University of Southampton (UK); display systems engineering, human factors, computer graphics, virtual reality.

Kapur, Kailash C. * 1992; PhD, 1969, University of California (Berkeley); quality/reliability engineering, system design/optimization, total quality/reliability management.

Klasterin, Theodore * 1974, (Adjunct); PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.

Moinszadeh, Kamran * 1984, (Adjunct); MS, 1982, PhD, 1984, Stanford University; operations management, production management, inventory, quality and supply chain management.

Ramey, Judith A. * 1983, (Adjunct); PhD, 1983, University of Texas (Austin); computer-assisted communication user-centered design, usability testing.

Ramulu, M. * 1978, (Adjunct); PhD, 1982, University of Washington; manufacturing processes, production engineering, applied mechanics, fatigue and fracture mechanics.

Rockafellar, R. T. * 1966, (Adjunct); PhD, 1963, Harvard University; variational analysis and optimization.

Storch, Richard L. * 1975; PhD, 1978, University of Washington; ship production, large scale assembly and manufacturing systems, statistical quality control, design.

Tuttle, Mark E. * 1985, (Adjunct); PhD, 1984, Virginia Polytechnic Institute and State University; applied solid mechanics, composite materials and structures, adhesion mechanics.

Wilson, William R. D. * 1999, (Adjunct); PhD, 1967, Queen's University of Belfast (Ireland); manufacturing and tribology, particularly metal forming.

Woo, Tony C. * 1995; MSEE, 1974, PhD, 1975, University of Illinois; graphics, imaging, robotics, design, manufacturing, differential geometry, optimization.

Zabinsky, Zeldia * 1985; PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.

Associate Professors

Atman, Cynthia J. * 1998; PhD, 1990, Carnegie Mellon University; engineering education issues and developing cognitive models of engineering design.

Drui, Albert B. * 1959, (Emeritus); MS, 1957, Washington University; industrial engineering, human factors.

Kumar, Vipin * 1988, (Adjunct); PhD, 1988, Massachusetts Institute of Technology; manufacturing, polymer processing, microcellular plastics, design theory and methodology.

Reinhall, Per G. * 1982, (Adjunct); PhD, 1982, California Institute of Technology; nonlinear dynamics, vibrations, vibration control, acoustics, biomedical engineering.

Roberts, Norman H. * 1953, (Emeritus); PhD, 1958, University of Washington; reliability and probability theory.

Assistant Professors

Beamon, Benita M. * 1999; PhD, 1994, Georgia Institute of Technology; production, material handling, and transportation systems.

Yen, Joyce Wen-Hwei * 2000; PhD, 2001, University of Michigan; operations research, stochastic programming.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

IND E 421 Statistical Quality Control (3) *Kapur, Storch* Design of quality control and assurance systems. Statistical Process Control (SPC) design and implementation. Control charts for attributes and variables. Process capability analysis and process improvement techniques. Statistical tolerance design. Quality management and recent developments. Prerequisite: IND E 315. Offered: A.

IND E 424 Simulation (4) *Beamon* Discrete-event simulation methodology emphasizing model formulation and construction with modern simulation languages and environments, statistical basis for evaluating model results, design and management of simulation projects. Application to manufacturing, retail, and service industries. Prerequisite: IND E 237, which may be taken concurrently; IND E 325. Offered: W.

IND E 426 Reliability Engineering and System Safety (3) *Kapur* Reliability and system safety meas-

ures. Life distributions and their applications in reliability. System reliability models. Design by reliability and probabilistic design. Reliability and safety analysis through FMECA and FTA. Reliability estimation and measurement by testing for binomial, exponential, and Weibull distributions. Prerequisite: IND E 315. Offered: Sp.

IND E 430 Manufacturing Scheduling and Inventory (4) *Beamon, Storch* Manufacturing scheduling and inventory control for different work organizations. Coverage of workforce scheduling, job- and flow-shop scheduling and order release, production line balancing, MRP II, Lean Production, and data management. Particular attention to computer-based aspects of management and scheduling for manufacturing and service industries. Prerequisite: IND E 237; IND E 325.

IND E 433 Introduction to Computational Manufacturing (3) *Woo* Fundamentals in computer aided design/manufacturing. Visualization, 3-D wireframes, curves and surfaces, solid modeling. Numerical control machining, robotics, and assembly. Prerequisite: IND E 237; IND E 324. Offered: W.

IND E 439 Plant Layout and Material Handling (4) *Beamon, Storch* Design of new or expanding industrial facilities. Consideration of work organization and layout. Study of basic design of plant systems, including plumbing, electrical, HVAC, illumination, acoustics, and waste handling. In depth coverage of material handling system design and equipment choices.

IND E 455 User Interface Design (3) *Furness* Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Prerequisite: IND E 316. Offered: jointly with T C 455; A.

IND E 494 Design in the Manufacturing Firm (4) Engineering design in manufacturing firms is presented. Topics include design methodology, concurrent engineering, and project management. Focus on the relationship between product design and manufacturing (design for production and assembly). Prerequisite: IND E 237; T C 333. Offered: W.

IND E 495 Industrial Engineering Design (3) Capstone senior design project involving identification and synthesis of industrial engineering skills. Students apply their knowledge of industrial engineering to actual industrial problems. Prerequisite: IND E 494. Offered: Sp.

IND E 496 Technology-Based Entrepreneurship (3) Concentrates on hands-on aspects of innovation and entrepreneurial enterprise development. Examines relationships between innovation, iterative prototyping, and marketing testing. Students identify market opportunities, create new technology-based products and services to satisfy customer needs, and construct and test prototypes. Prerequisite: IND E 250. Offered: jointly with M E 496.

IND E 498 Special Topics in Industrial Engineering (1-5, max. 9) Lecture and/or laboratory.

IND E 499 Special Projects (2-5, max. 9)

Courses for Graduates Only

IND E 510 Applications of Optimization in Engineering Design (3) *Zabinsky* Discussion of issues arising in applications of optimization to engineering design. Emphasis on formulating problems and selecting appropriate solution techniques. Random search methods for problems otherwise computationally intractable. Individual projects in engineering optimal design. Prerequisite:

AMATH/MATH/IND E 515 and MATH 328 or permission of instructor. Offered: jointly with AMATH 510.

IND E 511 Management Decision Models (3) Quantitative approaches, using decision models. Topics include elements of a decision, theory of optimal decisions, resource allocation, simulated decision making, decisions under uncertainty, risk and pressure, utility theory, and game theory. Projects in manufacturing, community health, construction, and urban development. Prerequisite: IND E 324, IND E 250, and IND E 315, or permission of instructor.

IND E 513 Linear Optimization Models in Engineering (3) *Zabinsky* Advanced formulation techniques to expand applications of linear programming to large-scale models. Appreciation of role of optimization models in engineering applications through introduction of techniques such as decomposition. Individual engineering projects. Prerequisite: IND E 324 and MATH 308 or permission of instructor.

IND E 515 Fundamentals of Optimization (5) Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with AMATH 515/MATH 515.

IND E 518 Seminars on Advances in Manufacturing and Management (1) *Mescher, Ramulu, Woo* Current topics and advances made in manufacturing and management. Topics presented by invited speakers from academia and industry. Emphasis on the multidisciplinary nature of manufacturing and management. Offered: jointly with M E 518 AWSp.

IND E 521 Quality Control in Manufacturing (3) *Kapur, Storch* Design of quality control systems in manufacturing. Use of advanced statistical process controls, sampling inspection techniques, process capability, and other statistical tools. Also include vendor sourcing and control tools, methods for establishing specifications and tolerances, quality function deployment, and other quality control techniques. Prerequisite: graduate standing.

IND E 524 Robust Design and Quality Engineering (3) *Kapur* Introduction to robust design and quality engineering. Applications of design of experiments for product and process design optimization. Experimental design using orthogonal arrays and linear graphs. System models using Chebyshev's orthogonal polynomials. Robustness in design and quality improvement for complex systems including Taguchi methods for quality engineering. Prerequisite: IND E 316 or equivalent.

IND E 526 Reliability in Product Design and Testing (3) *Kapur* Product assurance including reliability and quality engineering. Reliability design, measurement, and optimization. Advanced topics in probabilistic design. Design of reliability test plans and analysis of test data. Design of reliability programs and their management. Prerequisite: graduate standing.

IND E 531 Computer Integrated Manufacturing (3) Design and analysis of advanced manufacturing systems from a strategic as well as technological perspective. Focus on information generation, management, and coordination aspects of complex manufacturing organizations. Examination of system integration alternatives and consequences for relationships with customers and suppliers. Prerequisite: IND E 431 or equivalent.

IND E 532 Geometric Modeling (3) *Woo* Mathematics and computations in geometric model-

ing of three-dimensional objects. Parametric representation of curves and surfaces. Topology for data structure design. Visibility for line-of-sight computations.

IND E 533 Computational Methods in Design and Manufacturing (3) *Woo* Sampling size and accuracy: uniform, random, and Hammersley. Approximation of curves and surfaces. Optimization: minima and maxima. Search and gradient techniques. Line integral for geodesic and optimal path.

IND E 535 Engineering Simulation (3) *Beamon* Advanced applications of discrete event, continuous, and combined discrete-continuous simulation modeling, detailed examination of fundamental computer programming concepts underlying the design and development of simulation languages, variance reduction techniques, and output analysis for various engineering, service systems, and manufacturing applications. Prerequisite: IND E 424 or equivalent.

IND E 538 Large Assembly Manufacturing Systems (3) *Storch* Presents principles of group technology, zone construction, product-oriented work breakdown structure. Application to shipbuilding, aircraft, rail-car, and truck manufacture. Techniques of production planning, scheduling and control, organization, and plant layout, as well as the role of the computer, are studied in detail. Prerequisite: graduate standing.

IND E 543 Virtual Interface Technology (1/3, max. 3) *Furness* Explores advanced concepts and technologies for interfacing humans to complex machines, with focus on virtual interfaces. Interface design principles reviewed from psychological and technological perspectives. Hardware, software, and mindware aspects of virtual interfaces investigated. Applications postulated and designed. Prerequisite: graduate standing in College of Engineering or permission of instructor.

IND E 544 Virtual World Development (3) *Furness* Software implementation, physiological and cognitive constraints, and the mathematics and philosophy of inclusion. Development of software tools, editing and interaction techniques, disposition of virtual world entities, nature of space, situated knowledge, divergent models for multiple participants, experiential mathematics, cyberspace. Cultural, legal, moral, ethical issues. Prerequisite: IND E 543 or permission of instructor.

IND E 570 Supply Chain Systems (3) *Beamon* Develops concepts related to the design, evaluation, and performance of supply chain systems through an exploration of contemporary practice and research, focusing on current issues, analytical frameworks, and case studies. Prerequisite: IND E 315 or equivalent.

IND E 591- Seminar (1) Credit/no credit only. Topics of current interest in industrial engineering. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

IND E -592- Seminar (1) Credit/no credit only. Topics of current interest in industrial engineering. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

IND E -593 Seminar (-1) Credit/no credit only. Topics of current interest in industrial engineering. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

IND E 599 Special Topics in Industrial Engineering (1-5, max. 9) Prerequisite: permission of supervisor.

IND E 600 Independent Study or Research (*)

IND E 700 Master's Thesis (*)

IND E 800 Doctoral Dissertation (*)

Materials Science and Engineering

302 Roberts



General Catalog Web page:
www.washington.edu/students/genocat/academic/Material_Sci.html



Department Web page:
depts.washington.edu/mse/

Materials science and engineering is an interdisciplinary field that addresses the structure, processing, and property relationships in materials for engineering applications. Basic principles of chemistry and physics are applied to provide an understanding of the structure of materials and the manner in which the structure determines the properties. Scientific processing methods are then applied to yield the necessary properties, which then can be integrated with, and designed to accommodate, the needs of modern technology.

The faculty of the Department of Materials Science and Engineering recognizes that a strong graduate program is an essential component of a balanced educational effort in materials. The department's graduate programs in materials science and engineering are designed to build on and enhance the educational experience imparted in its undergraduate programs. Therefore, a related department goal is to provide coordination and balance between the undergraduate and graduate degree programs, and to ensure that each program is allocated the resources necessary to meet its goals.

Within the overall field of materials science and engineering, students are offered both broad options and in-depth core. The program provides the needed background and understanding of all types of engineering materials, including metals, ceramics, polymers, biomaterials, composites and hybrids, electronic materials, nanomaterials, and photonic materials.

Ceramic materials are resistant to high temperatures, chemically durable, strong, rigid, and exhibit a broad range of functional and electronic properties. The ceramic engineering program provides students with an understanding of the chemical, electrical, optical, mechanical, and thermal properties of ceramics; of processing methods and their effects on the structure and properties; and of the feasibility and economics of manufacture of ceramic materials for engineering applications.

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.

Electronic and optical materials are utilized in a variety of modern technology, from fiber optic communications to computer technology. Semiconductor and insulating materials are utilized in many applications from computer chips to light emitting diodes; these materials have special properties provided by structural modification, impurity incorporation, and special processing techniques. Conducting materials of high purity are needed for many electronic applications. Fiber optics depend on glass fiber of special composition and are made using specific processes. Optical materials such as those used in lasers are specially modified using crystal growth and doping techniques. The University's materials engineering pro-

grams provide students with the background and experience needed for a career in this broad area.

The M.S.E. program has recently experienced rapid expansion into new research areas. These include polymers, hybrids, biomaterials, nanomaterials, and photonic materials. These research areas demand a broad spectrum of interdisciplinary knowledge from chemistry, physics, optics, device fabrication, and biology. Many new synthesis techniques are developed or applied in these materials processing. New physical properties are found in these atomically engineered materials with well-controlled microstructures. Potential applications of nanomaterials, biomaterials, and photonic materials exist in modern industry and cutting-edge technologies.

Graduate Program

Graduate Program Coordinator
302 Roberts, Box 352120
206-543-2600

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The Department of Materials Science and Engineering offers programs of study leading to the degree of Master of Science in Materials Science and Engineering with defined options in materials science, ceramic engineering, metallurgical engineering, and engineering materials. The Doctor of Philosophy program is offered with defined pathways in ceramic engineering, metallurgical engineering, and materials science.

The materials science option or pathway is a course of study that combines the basic elements of understanding ceramics, metals, polymers, composites, and electronic materials. Many specialized courses, including engineering fracture mechanics, semiconductor devices, and polymer chemistry, may be taken in other departments to provide a broad, yet basic, materials-study program.

Ceramic engineering graduate programs are designed to develop a fundamental understanding of the physical, chemical, and structural relationships that influence the properties and applications of ceramic materials. Processing, the development of microstructure, and the relationships of microstructure to properties are considered from a basic viewpoint that is applicable to a broad range of materials.

Graduate programs in metallurgical engineering encompass a variety of courses and research programs that are related to the physical and chemical aspects of metals, alloys, and related engineering materials. Programs in the physical-metallurgy and materials-science areas include the structure and properties of alloys, phase transformations, biomaterials, lattice defects, the optical properties of non-metallic solids, failure analysis, x-ray diffraction, and the mechanical behavior of materials. Programs include metallurgical thermodynamics, rate phenomena, and carbothermic reduction processes.

The engineering materials option is open to students with industrial experience. In this option, students take practice-oriented courses, complete an analysis, and develop a recommended solution to an engineering-materials problem in place of a research thesis. Programs of study generally are related to a specific field of materials-engineering practice.

Graduates in material science become professionals in multiple industries, including electronics, automotive, and aerospace. They work in material design and manufacturing, including electronic and optical material and devices, microelectromechanical systems (MEMS), system design, and materials selection as related to the structure, properties, processing, and applications of materials.

Master of Science in Materials Science and Engineering

All Master of Science degrees offered by the department require course work and the satisfactory completion of an M.S. thesis research problem, with the exception of the engineering-materials option, which requires 32 credits plus 4 credits for the problem-solution project. Of the course credits, 12 are specified to include courses on thermodynamics, crystal structure, imperfections, microstructure and phase transformations, and a graduate seminar. Other courses may be required for specific program options. The residence and grading requirements follow those of the Graduate School.

The department is authorized to supervise an option in materials science and engineering that leads to the College of Engineering Master of Science degree. This degree program is intended to accommodate students who have a strong science background but lack an undergraduate engineering degree. The required courses are the same for all of the above degrees. Students with deficiencies in their intended area of engineering specialization may be required to take undergraduate courses in addition to the normal graduate course requirements.

Doctor of Philosophy

Students who have completed one year of graduate work must take the Ph.D. qualifying evaluation to determine whether the faculty will advise continued study proceeding to the General Examination for the degree of Doctor of Philosophy. Students are required to pass the Ph.D. Qualifying Examination which includes an evaluation portfolio. This portfolio consists of both a written fundamental exam and a research report and presentation. A critical examination of the applicant's complete academic record, recommendations, and proposed course of study will be pertinent to this decision. In addition to course work, each student is required to pass the General Examination, which is sufficiently comprehensive to demonstrate the student's ability to deal with broad aspects of materials science, as well as with a specialized subject area. Proficiency in basic research is of paramount importance. Each prospective candidate is required to present a written dissertation that makes an original and independent contribution to knowledge in the student's field of specialization.

Research Facilities

The research laboratories in the Department of Materials Science and Engineering are well equipped for a variety of research endeavors. Facilities include equipment for electron and optical microscopy, x-ray diffraction, a variety of spectroscopies, high-temperature heat treatment, electrical, optical and mechanical property testing, specialized processing equipment, including hot and cold isostatic presses, nitrogen reaction furnaces, and automated TGA, DTA analysis systems. Equipment for analyses of particle size, surface area, and pore size is also available. Students have liberal access to the University computing facilities.

Financial Aid

A number of teaching-assistant and research-assistant appointments are available. Early application and direct correspondence or interviews with faculty members who may have open positions on research projects are encouraged. Requests for application forms and financial aid should be directed to the academic counselor. Further information about financial aid and the graduate application process is available from the department's Web site at depts.washington.edu/mse/.

Faculty

Chair

Rajendra Kumar Bordia

Professors

Allan, G. Graham * 1966, (Adjunct); PhD, 1956, University of Glasgow (UK), DSc, 1971, University of Strathclyde (UK); creativity and innovation.

Anderson, Donald 1947, (Emeritus); BS, 1941, University of Illinois; mining and exploration.

Archbold, Thomas F. * 1961, (Emeritus); PhD, 1961, Purdue University; corrosion, thermal diffusion, substructure characterization, fatigue.

Dunham, Scott T. * 1999, (Adjunct); MS, 1980, PhD, 1985, Stanford University; modeling and simulation of microfabrication processes and device behavior.

Fischbach, David B. * 1969, (Emeritus); PhD, 1955, Yale University; structure and properties of carbons graphite, other non-oxide ceramics, and composite materials.

Ghose, Subrata * 1972, (Adjunct); MS, 1955, Calcutta University (India), PhD, 1959, University of Chicago; mineral physics, crystallography, mineralogy.

Inoue, Kanryu * 1993, (Research); PhD, 1977, Osaka City University (Japan); mechanical, physical, and magnetic properties, phase transformations of intermetallic alloys.

Jen, Alex K.Y. * 1999; PhD, 1984, University of Pennsylvania; organic and polymer chemistry, interdisciplinary materials science.

Jonsson, Hannes * 1988, (Adjunct); PhD, 1985, University of California (San Diego); computer simulations and scattering calculation in materials and surface science.

Kalonji, Gretchen * 1990; PhD, 1982, Massachusetts Institute of Technology; defects in crystalline solids, atomistic computer simulation techniques, rapid solidification of ceramics.

Krishnan, Kannan M. 2001; PHD, 1984, University of California (Berkeley); thin films/nanostructures, magnetism/transport, metals/alloys, complex oxides, functional ceramics.

Kumar, Vipin * 1988, (Adjunct); PhD, 1988, Massachusetts Institute of Technology; manufacturing, polymer processing, microcellular plastics, design theory and methodology.

Mayer, George 2000, (Research); PhD, 1967, Massachusetts Institute of Technology; durability of materials, micro-mechanical behavior and failure of materials, biomimetics.

Ohuchi, Fumio * 1992; PhD, 1981, University of Florida; thin films, electronic materials, physics and chemistry of layered materials, nanostructures.

Rao, Y. Krishna * 1976; PhD, 1965, University of Pennsylvania; kinetics and thermodynamics in materials systems, materials processing, mineral engineering.

Stoebe, Thomas Gaines * 1966, (Emeritus); PhD, 1965, Stanford University; physics of solids, compound semiconductors, thermoluminescence, materials education.

Taya, Minoru * 1986, (Adjunct); PhD, 1977, Northwestern University; composite materials, elasticity and plasticity, impact physics, fracture theory.

Whittemore, Osgood J. * 1964, (Emeritus); MS, 1941, University of Washington, PhD, 1950, Iowa State University; ceramic processing, refractories, industrial minerals.

Associate Professors

Bordia, Rajendra Kumar * 1991; PhD, 1986, Cornell University; processing and mechanical properties of ceramics, polymer and ceramic composites.

Brush, Lucien N. * 1990; PhD, 1988, Carnegie Mellon University; computational modeling of solidification, modeling studies of materials processing.

Dogan, Fatih * 1990; PhD, 1989, Technische Universitat (Germany); ceramic processing; electronic and magnetic materials, crystal growth of high Tc superconductors.

Kumar, Vipin * 1988, (Adjunct); PhD, 1988, Massachusetts Institute of Technology; manufacturing, polymer processing, microcellular plastics, design theory and methodology.

Sarikaya, Mehmet * 1984; PhD, 1982, University of California (Berkeley); biomimetics, nanocomposites, dielectrics, high-temperature semi/superconductors, electron microscopy.

Stang, Robert George * 1973, (Emeritus); PhD, 1972, Stanford University; mechanical behavior of materials, elastic/plastic materials deformation.

Assistant Professors

Cao, Guozhong * 1996; PhD, 1991, Eindhoven University (Netherlands); inorganic materials (films) by sol-gel processing and chemical vapor deposition (CVD).

Flinn, Brian D. * 1991, (Research); PhD, 1991, University of California (Santa Barbara); processing-structure-property relationships of advanced structural materials.

Xia, Younan * 1997, (Adjunct); PhD, 1996, Harvard University; materials chemistry and nanotechnology.

Zhang, Miqin 1999; PhD, 1998, University of California (Berkeley); biomaterials, BioMEMS, surface/protein/cell interactions, cell micropatterning for tissue engineering.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Materials Science and Engineering

MSE 421 Thermodynamics of Solids (3)
Applications of thermodynamics to the solid state. Statistical interpretation of entropy. Heterogeneous equilibria. Theories of solutions. Thermodynamics of surfaces and of defects in solids. Offered: W.

MSE 423 Fiber-Reinforced Composite Materials (4)
Introduction to composites in polymer, metal, or ceramic matrices. Properties of individual phases and of fiber/matrix interface; micromechanisms of load transfer from matrix to fiber; fabrication and elastic and failure properties. Laboratory studies of processing and properties of composites. Offered: A.

MSE 433 Polymeric Materials (3) Relationship between configuration, conformation, molecular ordering, microstructure and properties of polymeric

materials. Application of materials characterization and processing techniques to polymers. Tailoring polymer molecules and microstructures for high-technology applications. Liquid crystalline polymers. Interaction between polymers and their in-service environment. Offered: A.

MSE 442 Seminar in Ethics and Safety (1) Deals with issues of engineering ethics and industrial safety within the context of materials science and engineering. Requires short updates on the senior project progress (MSE 499). Credit/no credit only. Offered: W.

MSE 466 Physical Properties of Materials (4) Introduction to elementary solid-state concepts in materials. Atom bonding, statistical mechanics, free electron and band theories, thermal properties. Application of principles to conduction in metals, insulators, semiconductors, and to magnetic and optical processes in solids. Offered: W.

MSE 485 Introduction to Electronic Packaging and Materials (3) The governing equations of transport phenomena: mechanical, thermal, and electromagnetic behavior, thermomechanical and electromagnetic properties of packaging materials, electromagnetic characteristics of circuit and transmission lines, thermal management and reliability analysis of packaging, interconnect and material processing technology. Prerequisite: MSE 170. Offered: jointly with M E 485; A.

MSE 486 Fundamentals of Integrated Circuit Technology (3) Processing physics, chemistry and technology, including evaporation, sputtering, epitaxial growth, diffusion, ion implantation, laser annealing, oxidation, chemical vapor deposition, photoresists. Design considerations for bipolar and MOS devices, materials and process characterization. Future trends. Prerequisite: either E E 482 or MSE 466. Offered: jointly with E E 486; W.

MSE 487 Laboratory in Electronic Packaging and Materials (1) Laboratory course to accompany ME 485 Experiments related to design, processing and reliability of electronic packaging used in consumer electronics. Corequisite: MSE 485. Offered: jointly with M E 487; A.

MSE 489 Integrated Circuit Laboratory (1) Hands-on experience in the building of a PMOS device, complete with oxidation, diffusion, photolithography, etching, metallization, and testing. Prerequisite: E E 486/MSE 486, which may be taken concurrently. Offered: jointly with E E 489; W.

MSE 498 Special Topics (1-5, max. 8) Special topics in materials science and engineering offered as a course with lectures, conferences, or laboratory. Offered: AWSpS.

MSE 499- Special Project (*-, max. 5) Materials science and engineering field or laboratory investigations in group or individual setting. Written report required. Offered: AWSpS.

Courses for Graduates Only

MSE 501 Advanced Processing of Inorganic Materials (3) Discusses advanced processes of inorganic materials including metals, ceramics and electronic materials, such as high temperature processing, sintering, solidification, single crystal growth from liquid, and vapor phase deposition. Emphasizes both the fundamentals and practical approaches of these processing techniques. Offered: even years; A.

MSE 502 Sol-Gel Processing (3) Fundamentals of colloid science and the physics and chemistry of the sol-gel process. Emphasizes the synthesis and applications of various materials, such as multi-component oxides, nano-composites, meso- and microporous materials, organic/inorganic hybrids, and bio-

materials that have important applications in both leading technologies and modern industries. Offered: odd years; A.

MSE 504 Introduction to Microelectro Mechanical Systems (4) Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered: jointly with E E 502/M E 504; A.

MSE 510 Crystallography and Symmetry-Related Properties of Materials (3) Detailed analysis of crystallographic structures, lattice transformations, reciprocal lattice, diffraction from crystals. Elements of symmetry operations, point groups, space groups, transformations. Tensor properties of crystal related to crystallography and symmetry. Offered: A.

MSE 512 Experimental Transmission Electron Microscopy (3) Fundamentals of electron optics as applied to microscopy; applications of contrast theories and electron diffraction with emphasis on defects and multiphase structures in crystalline solids. Prerequisite: MSE 510. Offered: W.

MSE 513 Transmission Electron Microscopy Laboratory (2) One four-hour laboratory and one two-hour discussion/demonstration per week; metallic, ceramic, electronic biological sample preparation techniques; diffraction, imaging, and spectroscopy techniques in electron microscopy. Prerequisite: MSE 512 which may be taken concurrently. Offered: W.

MSE 515 Advanced Transmission Electron Microscopy (3) Principles of image formation in crystalline and amorphous materials at the atomic resolution level; high spatial resolution electron diffraction with emphasis on convergent beam electron diffraction; quantitative elemental compositional and chemical analysis with energy dispersive x-ray spectroscopy and electron energy loss spectroscopy; high voltage electron microscopy. Prerequisite: MSE 512 and MSE 513. Offered: odd years; Sp.

MSE 518 Advanced Mineralogy (3) Crystal symmetry: point groups, space groups. Mathematical description of crystal structures; group theory and irreducible representations; tensor description of physical properties; stress, strain, piezoelectricity, elasticity; structural and magnetic phase transition, Landau theory, deformation and creep in crystals; elasto-viscous properties of Earth's mantle, crystal chemistry and solid state reactions. Offered: jointly with ESS 537; Sp.

MSE 520 Seminar (1, max. 6) Review of research problems in recent literature. Registration required for all graduate students. Credit/no credit only. Offered: AWSpS.

MSE 524 Applied Rate Phenomena (3) Introduction to rate theory and transport processes. The principal thrust is on applications in ceramics and metallurgy. Prerequisite: basic course in transport phenomena or permission of instructor. Offered: W.

MSE 525 Kinetics and Phase Transformations (3) Thermodynamic basis for kinetic processes, including diffusion and phase transformation kinetics. Diffusion problems and solution methodologies, statistical treatment of diffusion, solid-liquid and solid-solid transformations, ordering transitions. Special topics related to grain growth, sintering, martensitic transformations. Prerequisite: MSE 315 and MSE 421 or equivalent. Offered: Sp.

MSE 530 Fundamentals and Applications of Metal Finishing (3) Fundamentals and applications of corrosion to the finishing and processing of metals. Corrosion, electrochemical fundamentals, materials

cleaning processes, electrodeposition, surface treatments, finishing processes. Offered: odd years; A.

MSE 541 Defects in Materials (3) Detailed study of the general properties and effects of point, line, and planar defects in crystalline solids. Prerequisite: MSE 314, MSE 316, or equivalent. Offered: W.

MSE 544 Mechanical Behavior of Materials (3) Mechanical properties of metals, ceramics, and polymers. Elasticity and viscoelasticity. Macroscopic and microscopic aspects of deformation and fracture. Continuum plasticity and microscopic hardening mechanisms. High temperature deformation. Fracture mechanics, brittle and ductile fracture. Deformation and fracture mechanisms maps. Prerequisite: MSE 510 and MSE 541 or permission of instructor.

MSE 553 Vacuum Science and Technology (3) Fundamental theory and gas kinetics and treatment of gas flow, working principles of vacuum pumps and gauges, characteristics required of the vacuum components, material selection, fundamentals essential to vacuum system design. Covers both fundamental and practical aspects of modern vacuum science and technology.

MSE 555 Biomimetics: Bioinspired Design and Processing of Materials (4) How biological organisms produce materials with controlled structure, chemistry and hierarchy to attain physical properties far superior to traditional engineering materials. Fundamental biological building materials, their synthesis, and their self-assembly with emphasis on examples of soft and hard tissues.

MSE 559 Thin Film Science, Engineering, and Technology (3) The physics, chemistry, and engineering aspects of thin film deposition and technology. Vapor phase deposition emphasized. Topics include reactor types, vapor phase transport and hydrodynamics, surface and mass transport limited kinetics, nucleation and growth, homoepitaxy, heteroepitaxy, and thin film characterization. Prerequisite: permission of instructor. Offered: jointly with CHEM E 559.

MSE 562 Introduction to Electronic Composites (3) Fundamentals of microstructure-macro-property relation of electronic composites. This course covers applications (computers, laser packages, medical devices, MEMS, avionics), functions (mechanical, thermal, electromagnetic and optical), microstructure-macro-property relations, processing issues, and modeling of electronic composites. Recommended: 423 or M E 450. Offered: jointly with M E 562; odd years; Sp.

MSE 563 Advanced Composites: Design and Manufacturing (3) Manufacturing and processing techniques of metal-, polymer-, and ceramic-matrix composites; design considerations related to manufacturing techniques; non-destructive testing of composite structures. Fiber-matrix interfacial features and interactions. Interfacial thermodynamics applied to selection of fiber-matrix combinations. Prerequisite: MSE 423 or M E 450 or equivalent by permission of instructor. Offered: jointly with ME 563; Sp.

MSE 565 Electron Theory of Materials (3) Solid-state concepts of materials. Atomic bonding, statistical mechanics, Brillouin zone theory. Applications to conduction, optical, and magnetic properties of metals, semiconductors, and insulators. Prerequisite: MSE 466 or equivalent. Offered: W.

MSE 590 Advanced Seminar in Materials Science and Engineering (2) Advanced topics in material science, led by faculty with specific expertise in the area of interest. Topics to be chosen and announced quarterly.

MSE 598 Engineering Materials Problems (4)

Involves a concentrated project which may include the design of a system or process, or analysis of a set of data related to the materials engineering area. Requires a professional quality report and an oral presentation of the results.

MSE 599 Special Topics in Materials Science (1-5, max. 5)

Studies of special advanced topics in materials science. Prerequisite: permission of instructor. Offered: AWSpS.

MSE 600 Independent Study or Research (*)

Offered: AWSpS.

MSE 700 Master's Thesis (*)

Offered: AWSpS.

MSE 800 Doctoral Dissertation (*)

Offered: AWSpS.

Ceramic Engineering

CER E 401 Equipment and Plant Design (3) The design process and its application in ceramic engineering. Design projects. Offered: Sp.

CER E 411 Vitreous State (4) Chemistry and physics of glass, glazes, and porcelain enamels; structure, properties and processing of vitreous materials. Offered: Sp.

CER E 413 Physical Ceramics: Mechanical Properties (3)

Mechanical properties, elasticity, strength, thermal shock, and high temperature effects relative to structural design. Fracture mechanics and notch sensitivity of brittle materials. Environmental effects, plastic flow, and high temperature deformation. Offered: W.

CER E 414 Electrical Properties of Ceramics (3)

Ionic and electronic conduction in crystalline and noncrystalline inorganic solids. Dielectric and ferroelectric behavior, magnetic properties of ferrimagnetic materials, optical properties of dielectrics. Undergraduate ceramic engineering majors must take 415 concurrently. Offered: W.

CER E 415 Electrical Properties of Ceramics/Laboratory (1)

Ionic and electronic conduction in crystalline and noncrystalline inorganic solids. Dielectric and ferroelectric behavior, magnetic properties of ferrimagnetic materials, optical properties of dielectrics. Offered: W.

CER E 416 Mechanical Properties Laboratory (1)

Measurements of the mechanical properties of ceramics: strength, fracture, toughness, thermal shock damage. Use of Weibull statistics to characterize strength and failure. Offered: W.

CER E 421 Ceramic Processing (4)

Technology of ceramic fabrication processes. Material characterization at processing stages for control. Laboratory study of all operations in the manufacture of selected ceramic products. Offered: A.

CER E 470 Refractories (4)

Chemical and mineralogical composition; processing methods; thermal, physical, and chemical properties and tests; application in high-temperature processes.

Metallurgical Engineering**MET E 421 Metallurgical Processing (4)**

Principles and applications of techniques used to process metals and alloys including solidification and casting, heat treating, forming, joining and machining and their effects on microstructure and properties. Offered: A.

MET E 432 Corrosion of Engineering Materials (3)

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. Offered: W.

MET E 435 Corrosion (1)

Laboratory experiences in application of physical chemical principles to reaction of materials with their environments. To accompany 432. Offered: W.

MET E 461 Engineering Physical Metallurgy (4)

Phase transformations and strengthening mechanisms in ferrous and nonferrous alloys; heat treatment and microstructure control; physical metallurgy of carbon and alloy steels, aluminum and titanium alloys; microstructure-property relationships and alloy design. Offered: A.

MET E 462 Mechanical Behavior of Metals (3)

Theories of elastic and plastic deformation in materials. Application of these theories in design, stress and strain, tensile and compression loading, yielding and plastic deformation, fracture, introduction to fracture mechanics, creep and fatigue. Offered: W.

MET E 463 Reliability and Design in Metallurgical Systems (4)

Metallurgical design problems and failure analysis. Properties of commercially important engineering alloys. Offered: Sp.

MET E 464 Extractive Process Analysis (3)

Extractive processes analyzed by the methods of material and energy balances, computational thermodynamics, process kinetics and reactor theory. Introduction to process optimization. Offered: Sp.

MET E 465 Mechanical Behavior Laboratory (1)

Laboratory experience in mechanical behavior of metals. To accompany 462. Offered: W.

Mechanical Engineering

143 Mechanical Engineering Building



General Catalog Web page:

www.washington.edu/students/gencat/academic/Mechanical_Eng.html



Department Web page:

www.me.washington.edu

Mechanical engineering is one of the broadest and oldest of the engineering disciplines and therefore provides some of the strongest interdisciplinary opportunities in the engineering profession. Power utilization (and power generation) is often used to describe the focus of Mechanical engineering. Within this focus are such diverse topics as thermodynamics, heat transfer, fluid mechanics, machine design, mechanics of materials, manufacturing, stress analysis, system dynamics, numerical modeling, vibrations, turbomachinery, combustion, heating, ventilating, and air conditioning. Degrees in mechanical engineering open doors to careers not only in the engineering profession but also in business, law, medicine, finance, and other non-technical professions.

Undergraduate (B.S.M.E.) and graduate (M.S.M.E. and Ph.D.) degree programs are offered by the department. Courses are presented in both traditional class room lecture and laboratory settings as well as via distance learning through either televised instruction or Webcast methods. Interest groups within the faculty provide instruction in four areas: Design; Energy and Fluids; Mechanics, Materials and Manufacturing; and Systems and Dynamics. Departmental thrust areas for graduate and undergraduate research include: environment; health care; information technology; and manufacturing. Several on-going senior capstone design projects provide both undergraduate and graduate students with hands-on, interdisciplinary, team-driven opportunities that encompass such diverse topics as Formula

SAE car; human-powered submarine, mechatronics, and fuel cell technology.

Graduate Program

Graduate Program Coordinator

143 Mechanical Engineering Bldg, Box 352600

206-543-5090

megrad@u.washington.edu

The Department of Mechanical Engineering offers graduate programs leading to the degrees of Master of Science in Mechanical Engineering (M.S.M.E.) and Doctor of Philosophy (Ph.D.). The department also provides authorized options leading to the College-wide Master of Science in Engineering (M.S.E.) degree (e.g., Masters in Manufacturing Engineering, and Program in Engineering and Manufacturing Management). These degrees provide balanced combinations of formal instruction and independent research or design experience. Although there are thesis and non-thesis options for the M.S.M.E., completion of a thesis is highly recommended. Individual projects may be drawn from a wide spectrum of topics, which include mechanical and energy conservation systems, heat transfer, combustion, fluid mechanics, applied mechanics, computational mechanics, computer-aided design and manufacturing, production systems, materials behavior, robotics, controls, vibrations, and applications of mechanical engineering science to a variety of such interdisciplinary fields as bioengineering, ocean engineering, environmental engineering, nanotechnology, micro electro-mechanical systems, and acoustics. Flexible requirements for course work provide opportunities both for a broad scientific and professional background and for specialty training.

Research Facilities

The department has well-equipped laboratories for pursuing research in various disciplinary fields in mechanical engineering and for fabricating specialized research equipment. These include experimental stress analysis; materials testing/characterization; synthesis and simulation of electromechanical control systems; foundry, welding, and other metal fabrication operations; computer facilities for CAD/CAM/CIM and CFD research; wind tunnels for boundary-layer and high-speed flow analysis; combustion systems performance, exhaust emissions control, and combustion engines; acoustics, vibration, and dynamic testing and measurements and modal analysis; radiation, conduction, and convection (including multiphase) heat-transfer analysis, and a bioengineering flow facility.

Financial Aid

Financial aid is offered to full-time graduate students as funds permit. Funds, however, are limited and the assignment of assistantships and fellowships is highly competitive. This aid may be in the form of a research assistantship for sponsored programs, a fellowship provided by the University or industry, or a teaching assistantship.

Faculty

Chair

William R. D. Wilson

Professors

Alexander, Daniel 1960, (Emeritus); MS, 1954, University of Washington, Ph.D., 1977, Washington State University; engineering design.

- Balise, Peter * 1950, (Emeritus); MS, 1950, Massachusetts Institute of Technology; systems analysis and control.
- Böhringer, Karl F. * 1998, (Adjunct); MS, 1993, PhD, 1997, Cornell University.
- Chalupnik, James * 1964, (Emeritus); PhD, 1964, University of Texas (Austin); sound and vibration, wave propagation.
- Corlett, Richard * 1964, (Emeritus); PhD, 1963, Harvard University; energy systems and combustion.
- Daly, Colin H. * 1967; PhD, 1966, University of Strathclyde (UK); bioengineering, materials.
- Day, Emmett E. * 1947, (Emeritus); PhD, 1962, University of California (Berkeley); materials, experimental stress analysis.
- Depew, Creighton A. * 1960, (Emeritus); PhD, 1960, University of California (Berkeley); heat transfer, fluid mechanics.
- Emery, Ashley F. * 1961; MS, 1958, PhD, 1961, University of California (Berkeley); experimental design, heat transfer, HVAC, thermal stress/fracture, bioengineering.
- Firey, Joseph C. 1983, (Emeritus); MSME, 1941, University of Wisconsin; combustion, lubrication.
- Fridley, James * 1988; MS, 1981, University of Michigan, PhD, 1984, University of Washington; forest engineering systems design, interactive computer simulation.
- Galle, Kurt R. * 1960, (Emeritus); PhD, 1951, Purdue University; instrumentation, controls, bioengineering.
- Ganter, Mark * 1986; PhD, 1985, University of Wisconsin; solid modeling, computer graphics and geometry, kinematics, rapid prototyping, manufacturing design.
- Garbini, Joseph * 1979; PhD, 1977, University of Washington; systems and controls analysis, instrumentation, manufacturing automation.
- Gessner, Frederick B. * 1967; PhD, 1964, Purdue University; fluid mechanics, turbulence.
- Hyman, Barry * 1975; PhD, 1965, Virginia Polytechnic Institute and State University; engineering design, energy systems and policy, technology and public policy.
- Jenkins, Michael G. * 1992; PhD, 1987, University of Washington; mechanical properties, characterization, thermomechanical testing, design analysis of brittle materials.
- Jorgensen, Jens E. * 1968, (Emeritus); DSc, 1969, Massachusetts Institute of Technology; systems analysis, manufacturing, automation and controls, forest engineering.
- Kippenhan, Charles J. * 1963, (Emeritus); PhD, 1948, University of Iowa; energy conservation in buildings, heating ventilating and air conditioning, heat transfer.
- Kobayashi, Albert S. * 1958, (Emeritus); PhD, 1958, Illinois Institute of Technology; fracture mechanics.
- Kosalay, George * 1980; PhD, 1974, Eotvos Lorand University (Hungary), DSc, 1979, Hungarian Academy of Sciences; turbulent combustion, nuclear reactor dynamics.
- Kramlich, John C. * 1991; PhD, 1980, Washington State University; heterogeneous combustion, pollutant formation and control from thermal systems, waste remediation.
- Love, William J. * 1970, (Emeritus); PhD, 1952, University of Illinois; design, mechanics, power systems.
- Malte, Philip C. * 1979; PhD, 1971, University of Michigan; energy, combustion, thermodynamics.
- McCormick, Norman J. * 1966; PhD, 1965, University of Michigan; radiative transfer, optical oceanography, reliability/risk analysis, mechanical engineering design.
- McFeron, Dean E. * 1958, (Emeritus); PhD, 1956, University of Illinois; heat transfer and thermal power processes.
- Meldrum, Deirdre R. * 1992, (Adjunct); MS, 1985, Rensselaer Polytechnic Institute, PhD, 1993, Stanford University; laboratory automation systems, genome analysis, modeling and control of dynamic systems, robots.
- Morrison, James B. * 1946, (Emeritus); MS, 1954, University of Washington; design, dynamics.
- Pratt, David T. * 1981, (Emeritus); PhD, 1968, University of California (Berkeley); turbulent combustion, computer simulation.
- Ramulu, M. * 1978; PhD, 1982, University of Washington; manufacturing processes, production engineering, applied mechanics, fatigue and fracture mechanics.
- Reinhal, Per G. * 1982; PhD, 1982, California Institute of Technology; nonlinear dynamics, vibrations, vibration control, acoustics, biomedical engineering.
- Riley, James J. * 1983; PhD, 1971, Johns Hopkins University; fluid mechanics, especially turbulent flows.
- Sidles, John Arthur 1984, (Adjunct); PhD, 1983, University of Washington; seeing molecules (i.e., quantum-coherent instrumentation); regenerating cartilage.
- Taggart, Raymond * 1959, (Emeritus); PhD, 1956, Queen's University (UK); mechanical metallurgy.
- Taya, Minoru * 1986; PhD, 1977, Northwestern University; composite materials, elasticity and plasticity, impact physics, fracture theory.
- Tuttle, Mark E. * 1985; PhD, 1984, Virginia Polytechnic Institute and State University; applied solid mechanics, composite materials and structures, adhesion mechanics.
- Vesper, Karl H. * 1969; PhD, 1969, Stanford University; business policy, mechanical engineering, marine studies.
- Wilson, William R. D. * 1999; PhD, 1967, Queen's University of Belfast (Ireland); manufacturing and tribology, particularly metal forming.
- Wolak, Jan * 1965, (Emeritus); PhD, 1965, University of California (Berkeley); mechanics of materials, manufacturing processes.
- Woo, Tony C. * 1995, (Adjunct); MSEE, 1974, PhD, 1975, University of Illinois; graphics, imaging, robotics, design, manufacturing, differential geometry, optimization.
- Zabinsky, Zeldá * 1985, (Adjunct); PhD, 1985, University of Michigan; operations research, applications in industrial engineering, optimization with stochastic elements.
- stability, floating structures, waves, ship resistance, model testing.
- Atman, Cynthia J. * 1998, (Adjunct); PhD, 1990, Carnegie Mellon University; engineering education issues and developing cognitive models of engineering design.
- Berg, Martin C. * 1986; PhD, 1986, Stanford University; digital control system design, control of structurally flexible electromechanical systems.
- Bodoia, John R. * 1964, (Emeritus); PhD, 1959, Carnegie Mellon University; fluid mechanics, heat transfer, solar energy.
- Chalk, William 1957, (Emeritus); MSME, 1961, University of Washington; design graphics.
- Ching, Randal Preston * 1992, (Adjunct); PhD, 1992, University of Washington; orthopaedic biomechanisms related to injury prevention, injury mechanisms and injury repair.
- Dahl, Peter H. * 1989; PhD, 1989, Massachusetts Institute of Technology; underwater acoustics; sound scattering from the sea surface, bubbles, marine life.
- Devasia, Santosh 2000; PhD, 1993, University of California (Santa Barbara); control theory and applications: nanotechnology, distributed systems, and biomedical systems.
- Fabien, Brian C. * 1993; PhD, 1990, Columbia University; kinematics, modeling and simulation of physical systems, optimal control.
- Ford, Paul W. * 1957, (Emeritus); MSEng, 1959, University of Washington; manufacturing processes, metal casting.
- Forster, Fred * 1977; PhD, 1972, Stanford University; fluid mechanics, acoustics, micro-fluidics, biomedical applications.
- Holt, Richard * 1947, (Emeritus); MSME, 1957, University of Washington; manufacturing processes, welding.
- Jenkins, Michael G. * 1992; PhD, 1987, University of Washington; mechanical properties, characterization, and thermomechanical testing of brittle materials.
- Kieling, William C. * 1956, (Emeritus); MSME, 1959, University of Washington; design, dynamics, and kinematics.
- Kumar, Vipin * 1988; PhD, 1988, Massachusetts Institute of Technology; manufacturing, polymer processing, microcellular plastics, design theory and methodology.
- Kunzelman, Karyn S. * 1991, (Affiliate); PhD, 1991, University of Texas (Dallas); biomedical engineering, cardiac; anatomy and physiology.
- Reinhal, Per G. * 1982; PhD, 1982, California Institute of Technology; nonlinear dynamics, vibrations.
- Sanders, Joan Elizabeth * 1985, (Adjunct); PhD, 1991, University of Washington; soft tissue biomechanics and tissue adaptation to mechanical stress.
- Sandwith, Colin J. * 1966; PhD, 1966, Oregon State University; corrosion, material science, design, manufacturing.
- Shen, I-yeu (Steve) * 1993; PhD, 1991, University of California (Berkeley); linear and nonlinear vibrations, disk and machine dynamics, damping and vibration control.
- Sherrer, Robert E. * 1960, (Emeritus); PhD, 1958, University of Wisconsin; solid mechanics.

Associate Professors

Adee, Bruce H. * 1970; MS, 1968, PhD, 1972, University of California (Berkeley); vessel safety and

Storti, Duane W. * 1983; PhD, 1983, Cornell University; nonlinear dynamics and vibrations, dynamical systems, perturbations and bifurcations.

Assistant Professors

Cooper, Joyce S. * 1998; PhD, 1996, Duke University; design for environment and industrial ecology methodologies and models.

Labossiere, Paul E. 2000; PhD, 2000, University of Colorado (Boulder); the study of deformation and failure of solids and structures.

Li, Wei 2000; PhD, 1999, University of Michigan; monitoring and control of manufacturing processes, material processing in micro- and nano-scales.

Mescher, Ann M. * 1996; PhD, 1995, Ohio State University; polymer composites and manufacturing, polymer optics, heat transfer, design.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Mechanical Engineering

M E 403 Material-Removal Processes (3) *Ramulu* Cutting and noncutting processes for material removal in the shaping of manufactured products. Study of forces and of power consumption and relative costs in the various processes. Prerequisite: M E 355 which may be taken concurrently. Offered: A.

M E 406 Corrosion and Surface Treatment of Materials (3) *Sandwith* Corrosion fundamentals and forms (galvanic, crevice, pitting, stress corrosion, erosion, hydrogen and leaching). Principles of design, materials selection, cathodic protection and surface treatments (coatings, carburizing, nitriding and plating) applied to reduce corrosion. Failure analysis applied to case studies. Offered: Sp.

M E 409 Introduction to Numerical Control and Computer-Aided Manufacturing (3) *Li* Control system fundamentals, numerical control (NC) machine control systems, and the design aspect of NC machine tools, programming methods of NC machines, computer-aided manufacturing, CNC, DNC, and process optimization. Prerequisite: M E 355 which may be taken concurrently. Offered: ASp.

M E 415 Sustainability and Design for Environment (3) *Cooper* Analysis and design of technology systems within the context of the environment, economy, and society. Applies the concepts of resource conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with ENVIR 415/CEE 495; W.

M E 424 Combustion Systems and Pollutant Formation (4) *Malte* Combustion theory, including chemical thermodynamics, chemical kinetics, mixing and diffusion, and flame structure. Combustion chamber design concepts and performance. Pollutant formation and combustion methods for minimizing pollutant formation. Prerequisite: M E 323; recommended: M E 331; M E 333. Offered: even years; Sp.

M E 425 HVAC Engineering (4) *Emery* Heating, ventilating, and air conditioning of built environment. Human comfort, psychometric processes, load computations, fluid distribution, and controls. Design analysis of HVAC system is taught in the lectures and

applied in the class project. Prerequisite: M E 323; M E 331. Offered: Sp.

M E 426 Sustainable Energy Design (4) *Malte* Energy systems with renewable (solar) energy and efficient use of energy. Project-based learning: analysis, systems engineering, design, component characteristics, and environmental impacts. Prerequisite: CHEM E/ENVIR/M E/PHYS 342 or M E 430; recommended: M E 331. Offered: Sp.

M E 430 Advanced Energy Conversion Systems (4) *Kramlich* Advanced and renewable energy conversion systems and technologies are treated. Included are high efficiency combined cycles; renewable energy conversion involving solar, wind, and biomass; direct energy conversion and fuel cells; and nuclear energy. Environmental consequences of energy conversion and environmental control are discussed. Prerequisite: M E 323. Offered: W.

M E 431 Advanced Fluid Mechanics (4) *Forster* Advanced topics in fluid mechanics, including kinematics, potential theory and vortex dynamics, viscous flow, turbulence, experimental and numerical methods, and design. Prerequisite: M E 333. Offered: A.

M E 432 Gas Dynamics (3) *Gessner* Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes involving nozzles, diffusers, compressors, and turbines. Prerequisite: either M E 333 or CEE 342. Offered: by request only.

M E 433 Turbomachinery (4) *Gessner* Thermodynamics, gas dynamics, and fluid mechanics of axial and centrifugal compressors, pumps, and turbines. Selection of components for engineering applications. Design problems and/or laboratory experiments to illustrate operating characteristics of turbomachines. Offered: Sp.

M E 436 Friction and Wear of Materials (3) *Wilson* Study of principles of friction and wear behavior of materials and of those material properties that affect such behavior. Principles of lubrication. Applications to design of surfaces for wear resistance. Prerequisite: M E 333; M E 356. Offered: Sp.

M E 440 Advanced Mechanics of Materials and Solids (3) *Jenkins* Study of mechanics of deformable bodies, including three-dimensional stress and strain tensors and their transformations. Equations of compatibility, continuity and equilibrium. Elastic constants. Failure criteria including fracture, yield and instability. Deflection relations for complex loading and shapes. Indeterminate problems. Design applications and numerical methods. Prerequisite: M E 354. Offered: Sp.

M E 445 Introduction to Biomechanics (4) *Sanders* Presents the mechanical behavior of tissues in the body and the application to design of prostheses. Tissues studies include bone, skin, fascia, ligaments, tendons, heart valves, and blood vessels. Discussion of the structure of these tissues and their mechanical response to different loading configurations. An important part of the class is a final project. Offered: jointly with BIOEN 440; Sp.

M E 450 Introduction to Composite Materials and Design (3) *Tuttle* Stress and strain analysis of continuous fiber composite materials. Orthotropic elasticity, lamination theory, failure criterion, and design philosophies, as applied to structural polymeric composites. recommended: MSE 423. Offered: W.

M E 459 Introduction to Fracture Mechanics (3) *Ramulu* Deformation processes leading to fracture, and linear elastic fracture mechanics. Fatigue crack propagation. Fracture control and failure analysis. Prerequisite: M E 354; M E 356. Offered: W.

M E 460 Kinematics and Linkage Design (3) *Ganter* Synthesis of linkage-type mechanisms using graphical and computer methods. Offered: W.

M E 468 Air-Pollution Control Equipment Design (3) *Pilat* Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particular pollutants. Actual case studies. Offered: jointly with CHEM E 468/CEE 494; W.

M E 469 Applications of Dynamics in Engineering (4) *Storti* Application of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods, Hamilton's principle and Lagrange equations and the design of dynamic system. Prerequisite: M E 374. Offered: A.

M E 470 Mechanical Vibrations (3) *Reinhal* Single-degree-of-freedom linear systems techniques. Matrix techniques for multi-degree-of-freedom linear systems. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequisite: M E 373. Offered: A.

M E 471 Automatic Control (4) *Berg* Dynamic system modeling; control system stability and performance analysis; compensator design by Bode and root-locus methods. Prerequisite: M E 374. Offered: A.

M E 473 Instrumentation (4) *Garbini* Principles and practice of industrial and laboratory measurement. Dynamics of instrument response; generalized performance analysis of sensor systems; theory of transducers for motion, force, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite: M E 374. Offered: A.

M E 474 Systems Modeling and Simulation (3) *Fabien* Unified approach to modeling of systems, and computer simulation of systems behavior. Selecting system variables; writing state, loop, and node equations; modal response and state transition response; system functions and convolution; analogs. Applications to control, vibrations, and other problems. Prerequisite: M E 374. Offered: W.

M E 477 Embedded Computing in Mechanical Systems (4) *Garbini* Analysis of electromechanical systems employing microcomputers for control or data acquisition. Microcomputer architecture, memory organization, assembly language programming, interfaces, and communications. Particular emphasis on design of hardware and software interfaces for real-time interaction with mechanical systems. Weekly laboratory. Prerequisite: M E 374; M E 470; M E 473. Offered: W.

M E 478 Finite Element Analysis (4) *Labossiere, Reinhal* Development of theory and concepts of finite element analysis. Applications in all areas of mechanical engineering, including mechanics of solids, heat transfer, and design of dynamical systems. Weekly computer exercises. Prerequisite: M E 123; M E 374; either MATH 308 or AMATH 352. Offered: ASpS.

M E 480 Introduction to Computer-Aided Technology (4) Principles of computer-aided technology. Computer-aided design, engineering, drafting, and manufacturing; computer-aided design systems, geometry, computer graphics, hardware, computer-aided vehicle/system design synthesis. System demonstrations, laboratories, and site visits. Prerequisite: M E 123; CSE 142. Offered: ASp.

M E 481 Combustion Engines and Alternatives (4) *Kramlich, Malte* Thermodynamics, fuels, performance, combustion, and exhaust emissions control for spark ignition and compression ignition piston

engines. New technologies, including hybrid combustion-electric fuel cell engines. Principles and practice. Prerequisite: M E 323. Recommended: M E 333.

M E 485 Introduction to Electronic Packaging and Materials (3) *Taya* The governing equations of transport phenomena: mechanical, thermal, and electromagnetic behavior, thermomechanical and electromagnetic properties of packaging materials, electromagnetic characteristics of circuit and transmission lines, thermal management and reliability analysis of packaging, interconnect and material processing technology. Prerequisite: MSE 170. Offered: jointly with MSE 485; A.

M E 487 Laboratory in Electronic Packaging and Materials (1) *Taya, Stoebe* Laboratory course to accompany ME 485 Experiments related to design, processing and reliability of electronic packaging used in consumer electronics. Corequisite: M E 485. Offered: jointly with MSE 487 A.

M E 490 Naval Architecture (3) *Adee* Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching. Offered: A.

M E 491 Naval Architecture (3) *Adee* Theory of naval architecture; strength, ABS rules, water waves, ship and platform motions. Offered: W.

M E 492 Naval Architecture (3) *Adee* Theory of naval architecture; dimensional analysis, resistance, model testing, propellers, steering. Offered: Sp.

M E 495 Mechanical Engineering Design (4) *Hyman* 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. Prerequisite: M E 395. Offered: WSp.

M E 496 Technology-Based Entrepreneurship (3) Concentrates on hands-on aspects of innovation and entrepreneurial enterprise development. Examines relationships between innovation, iterative prototyping, and marketing testing. Students identify market opportunities, create new technology-based products and services to satisfy customer needs, and construct and test prototypes. Prerequisite: IND E 250. Offered: jointly with IND E 496.

M E 498 Special Topics in Mechanical Engineering (1-5, max. 6) Lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree.

M E 499 Special Projects (2-5, max. 9) Written report required. Offered: AWSpS.

Courses for Graduates Only

M E 501 Modern Manufacturing Processes (3) *Ramulu* General survey and introduction to modern manufacturing engineering processes. Fundamental principles and practices of modern manufacturing processes. Case studies and exercises relating the course material directly to modern industrial practice. Offered: A.

M E 502 Plasticity and Metal Forming (3) *Wilson* Stress-strain and stress-strain-rate relations in metal forming; plastic instability. Work of deformation. The slip-line field, load bounding, applications to frames, drawing, forging, and extrusion. Offered: odd years; Sp.

M E 504 Introduction to Microelectro Mechanical Systems (4) Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or

chemical and thermal transducers, recent advances. Offered: jointly with E E 502/MSE 504.

M E 510 Mathematical Foundations of Systems Theory (4) *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/CHEM E 510/E E 510; A.

M E 518 Seminars on Advances in Manufacturing and Management (1) *Ramulu* Current topics and advances made in manufacturing and management. Topics presented by invited speakers from academia and industry. Emphasis on the multidisciplinary nature of manufacturing and management Offered: jointly with IND E 518; AWSp.

M E 519- Seminar (0-) Credit/no credit only. Offered: AWSp.

M E -520 Seminar (-1, max. 6) Credit/no credit only. Offered: AWSp.

M E 521 Thermodynamics (3) *Kramlich* Fundamental concepts of temperature, thermodynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Introduction to statistical thermodynamics. Prerequisite: M E 323 and graduate standing in mechanical engineering or permission of instructor. Offered: A.

M E 523 Energy and Environment Seminar (1) *Malte* Student discussions of topics in combustion science and technology, alternative fuels, renewable energy, environmental consequences of energy conversion, and design for environment. Also, presentations by outside experts. May be repeated for credit. Credit/no credit only. Offered: AWSp.

M E 524 Combustion (3) *Kramlich* 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 of instructor. Offered: odd years; Sp.

M E 525 Acoustics in Engineering I (3) *Forster* Acoustic wave transmission, reflection, refraction, and diffraction. Review of continuum mechanics and examples from electromechanical systems. Prerequisite: graduate standing in mechanical or electrical engineering, or permission of instructor. Offered: W.

M E 526 Acoustics in Engineering II (3) *Forster* Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer design, propagation in an isotropic medium. Prerequisite: M E 525 or permission of instructor. Offered: Sp.

M E 528 Acoustics of Environmental Noise (4) Offered: jointly with CEE 554.

M E 530 Heat Conduction and Radiation (3) *McCormick* Heat conduction advanced fundamentals, emphasizing microscale applications. Radiative transfer for transparent and for absorbing and scattering media, emphasizing combustion, biomedical, and atmospheric/oceanic environmental applications. Forward and inverse problems for both conduction and radiation. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: W.

M E 531 Conductive Heat Transfer (3) *McCormick* Analysis of steady-state and transient heat conduction in single- and multidimensional systems by math-

ematical, graphical, numerical, and analogical methods. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: by request only.

M E 532 Convective Heat Transfer (3) *Kramlich* Introduction to fluid flow and boundary-layer theory as applicable to forced- and natural-convection heat transfer. Condensation and boiling heat transfer. Prerequisite: graduate standing or permission of instructor. Offered: Sp.

M E 533 Fluid Mechanics I (3) *Riley* Basic conservation laws and kinematics of fluid flow constitutive relationships, Newtonian fluids, dimensional analysis, vorticity dynamics, inviscid flows, applications. Offered: A.

M E 534 Fluid Mechanics II (3) *Riley* Review of basic principles, some exact solutions and their interpretation, waves (water waves, sound waves, shock waves), boundary layers, jets and wakes, flow stability, turbulence, applications. Prerequisite: M E 533 or permission of instructor. Offered: W.

M E 535 Computational Techniques in Mechanical Engineering (3) *Emery* Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite: permission of instructor. Offered: Sp.

M E 537 Topics in Fluid Mechanics (3) *Gessner* Selected fluid mechanics relevant to current advances in research and application. Topics selected vary with faculty and student interest, but have included flow stability, special topics in turbulence, and turbulent reacting flows. Offered: by request only.

M E 538 Turbulent Boundary Layer Theory (3) *Gessner* Characteristic features of turbulent boundary layers; development of the turbulent boundary layer equations; equilibrium boundary layers; integral methods of solution based on power law and wall-wake velocity profiles; methods of solution based on higher order constitutive equations; application to diffuser flows and free shear flows; new developments and physical models. Offered: odd years; A.

M E 541 Fatigue of Materials (3) *Ramulu* Macro and micro aspects of fatigue of metals and fatigue mechanisms. Analytical methods for fatigue and life assessment in advanced materials. Offered: W.

M E 543 Fluid Turbulence (3) *Gessner* Methods of characterizing fluid turbulence; probability concepts; spatial and temporal velocity correlations; spectral energy transfer; turbulent diffusion; isotropic turbulence and Kolmogoroff's hypothesis; Taylor's hypothesis; hot-wire measurement techniques. Prerequisite: 3 credits of graduate level fluid mechanics or permission of instructor. Offered: even years; W.

M E 544 Advanced Turbulence Modeling Techniques (3) *Riley* The Reynolds stress transport equations; plane homogeneous shear flow; modeling the pressure-strain, diffusion, and dissipation rate correlation tensors; one and two-equation turbulence models; near-wall turbulence and wall functions; limitations of length scale and eddy viscosity modeling. Prerequisite: 3 credits of turbulence related course work. Offered: even years by request only; Sp.

M E 548 Linear Multivariable Control (3) Single loop feedback control theory; poles, zeros, Nyquist stability, performance, robustness of multivariable systems; multivariable control synthesis: Linear-Quadratic-Gaussian methods, loop transfer recovery, Youla parametrization, H-infinity techniques, parameter optimization design. Prerequisite: E E 584 or M E 575; E E 446 or A A 448 or M E 471 or equivalent. Offered: jointly with A A 548/E E 548; W.

M E 549 Estimation and System Identification (3) Review of system models, model structure, model

parametrization; review of stochastic processes; state estimation: observers, the Kalman-Bucy filter, numerical issues in filter design and implementation; system identification: linear regression, least squares, maximum likelihood, instrumental variable techniques. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or E E 548. Offered: jointly with A A 549/E E 549; Sp.

M E 550 Nonlinear Optimal Control (3) Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with A A 550/E E 550; odd years.

M E 551 Elasticity I: Elastostatics (3) *Taya* Elastostatics, including general formulations of 2D and 3D elastostatic problems (stress function method, complex variable method, displacement potential method). Eshelby's method is emphasized and used to solve 2D and 3D problems with special application to composite materials. Offered: W.

M E 552 Elasticity II: Viscoelasticity and Elastodynamics (3) *Taya* Elastodynamics includes wave propagation in linear elastic and linear viscoelastic solids where solids are monolithic materials, composite materials. Viscoelasticity part includes the stress-strain equations in terms of convolution integral, Fourier transform and Laplace transform modes. Simple and fundamental problems are solved by several techniques as demonstration. Offered: even years; Sp.

M E 553 Adhesion Mechanics (3) *Tuttle* Introduction to adhesive systems and test/evaluation techniques. Stress/strain analysis methods used with adhesive joints. Examples of practical applications. Prerequisite: graduate student status or permission of instructor. Offered: even years; Sp.

M E 555 Thermoelasticity (3) *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: M E 551 or permission of instructor. Offered: by request only.

M E 556 Experimental Stress Analysis I (3) *Tuttle* Theory and practice of experimental techniques including strain gages and strain gage-based devices, thermocouples, LVDTs, and transducer design. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor. Offered: A.

M E 557 Experimental Stress Analysis II (3) *Tuttle* Theory and practice of optical mechanics, including interferometric techniques (moiré and holographic), geometric moiré methods, and photoelasticity. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor. Offered: even years; W.

M E 559 Introduction to Fracture Mechanics (3) *Ramulu* Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. Fracture toughness and fatigue testing techniques, crack initiation and propagation fatigue life prediction of mechanical components subjected to environmental effects. Offered: W.

M E 560 Advanced Theory of Fracture (3) *Ramulu* Theories of linear fracture mechanics, fracture dynamics, ductile fracture, stable crack growth and mixed mode fracture. Discussion of advanced topics from recent literature. Prerequisite: M E 559 or permission of instructor. Offered: even years; Sp.

M E 562 Introduction to Electronic Composites (3) *Taya* Fundamentals of microstructure-macro-property relation of electronic composites. This course covers applications (computers, laser packages, medical devices, MEMS, avionics), functions (mechanical, thermal, electromagnetic and optical), microstructure-macro-property relations, processing issues, and modeling of electronic composites. Recommended: 450 or MSE 423. Offered: jointly with MSE 562; Sp.

M E 563 Advanced Composites: Design and Manufacturing (3) Manufacturing and processing techniques of metal-, polymer-, and ceramic-matrix composites; design considerations related to manufacturing techniques; non-destructive testing of composite structures. Fiber-matrix interfacial features and interactions. Interfacial thermodynamics applied to selection of fiber-matrix combinations. Prerequisite: M E 450 or MSE 423 or equivalent by permission of instructor. Offered: jointly with MSE 563; Sp.

M E 564 Mechanical Engineering Analysis (3) *Storti* 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 of instructor. Offered: A.

M E 565 Mechanical Engineering Analysis (3) *Storti* Applications of vectors, matrices, and partial differential equations to mechanical engineering systems, including computational techniques and analogies. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: W.

M E 566 Introduction to Random Processes (3) *Kosály* Probability and random variables. Ensemble averaging, probability density function, auto- and cross-correlation functions. Brownian motion, Poisson process. Ergodicity. Frequency domain analysis, auto- and cross-spectrum, transfer function. Fundamentals of digital spectral analysis. Applications in fluid mechanics, acoustics and vibrations. Offered: by request only; even years; A.

M E 572 Methodologies for Engineering Design: Conceptual Design (3) *Kumar* Methodologies particularly useful in the conceptual or preliminary phase of a design. The design process. Impact of formulating independent functional requirements. Physical and functional coupling in design. Case studies in conceptual design of products and processes. Prerequisite: graduate standing or permission of instructor. Offered: even years; W.

M E 573 Methodologies for Engineering Design: Probabilistic Mechanical Design (3) *Jenkins* Study, implementation of probabilistic methods to design. Loading, geometry, stress, strain/deflection described as random variables, compared to material properties/behavior in terms of random variables. Design, analysis, reliability, risk analyses conducted on common structures with results compared to conventional deterministic approaches. Projects using probabilistic methods to optimize selected component designs. Offered: even years; Sp.

M E 575 Linear Systems Theory (3) Transfer-function and state-space descriptions. Solution of the state equation; state transition matrix. Controllability and observability. Zeros and poles of multivariable systems; the Smith McMillan form. Systems invertibility. Prerequisite: graduate standing or permission of instructor. Offered: A.

M E 579 Fluid Power Systems (3) Design, analysis, and control of fluid power systems. Steady-state analysis of valves, actuators, and transmissions. Dynamic modeling, response, stability, and control analysis via linear element representation and computer simulation. Prerequisite: graduate standing in

mechanical engineering or permission of instructor. Offered: Sp.

M E 581 Digital Control I (3) *Berg* Discrete-time and sampled-data systems, difference equations, and z-transform. Frequency response. Nyquist stability criterion. Gain and phase margins. Limitations of sampling. Sample rate selection. Controller design via discrete-time equivalents to continuous-time controllers, by direct-digital root locus and by loop shaping. Prerequisite: M E 471 or equivalent; recommended: M E 575 or equivalent. A A/E E 581; W.

M E 582 Digital Control II (3) *Berg* Controller design via state feedback and observers. Introduction to discrete-time stochastic processes. Quantization effects. Introduction to parameter identification using noisy measurements. LQR optimal control. Kalman filter design. LQG optimal control. Prerequisite: M E 581 or permission of instructor. Offered: jointly with A A 582/E E 582; Sp.

M E 583 Nonlinear Control Systems (3) *Hannaford* Analysis and synthesis of nonlinear controls systems. Assessment of stability by phase plane and describing function methods, circle and Popov criteria, Lyapunov criteria. construction of Lyapunov functions by method of Kraasovskii and Lu're. Introduction to nonlinear control system design. Prerequisite: M E 446, M E 584, or permission of instructor. Offered: jointly with E E 583; odd years; Sp.

M E 584 Combustion in Airbreathing Propulsion (3) *Gessner* Fundamentals of gasdynamics, mixing, and thermodynamics applies to the analysis and design of gas turbine, ramjet and scramjet engine combustors, with treatment of computer simulation. Offered: by request only.

M E 588 Dynamics and Vibrations (3) *Shen* Variational techniques, Hamilton's principle, Lagrange's equations applied to dynamics of particles and rigid bodies. Vibration analysis of multi-degree-of-freedom and continuous systems. Prerequisite: graduate standing in engineering or permission of instructor. Offered: A.

M E 589 Vibrations (3) *Storti* Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Nonlinear systems are emphasized. Prerequisite: M E 588 or permission of instructor. Offered: even years; W.

M E 590 Vibrations (3) *Reinhal* Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Random inputs are emphasized. Prerequisite: M E 588 or permission of instructor. Offered: even years; Sp.

M E 591 Robotics and Control Systems Colloquium (1, max. 3) *Berg* Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with A A/CHEM E/E E 591; AWSp.

M E 598 Topics in Research (1) Doctoral seminar. Credit/no credit only. Offered: AWSp.

M E 599 Special Projects (1-5, max. 9) Written report required. Prerequisite: permission of department Chairperson. Offered: AWSpS.

M E 600 Independent Study or Research (*) Written report required. Offered: AWSpS.

M E 700 Master's Thesis (*) Offered: AWSpS.

M E 800 Doctoral Dissertation (*) Offered: AWSpS.

Mechanical Engineering Industrial Engineering

Courses for Graduates Only

MEIE 516 Advanced Topics in Engineering Statistics (3) *Roberts, Zabinsky* Topics are flexible and tailored to the needs of the particular student group involved. Topics usually considered: regression, correlation, experimental design, Monte Carlo techniques, Markov processes, extreme value theory, time-series analysis. Prerequisite: graduate standing or permission of instructor.

MEIE 599 Special Projects in Industrial Engineering (1-5, max. 9) Prerequisite: permission of industrial engineering program director. Offered: AWSp.

Technical Communication

14 Loew



General Catalog Web page:

www.washington.edu/students/gencat/academic/Tech_Communication.html



Department Web page:

www.uwtc.washington.edu

Technical communicators use their language, visual, and analytical skills, as well as training and research in electronic and other media, to create and enhance communication in scientific and technical environments. The Department of Technical Communication prepares students to design, create, edit, and evaluate technical and scientific discourse. The department also provides course work in the development of online help systems and in the design of general-audience content for delivery by means of advanced communication technologies such as the Web.

The complexities of modern life have greatly increased the number of people who need to communicate about technical and other specialized topics. Scientific journal articles, manuals, proposals, and other genres have become important for a vast array of readers. With the Information Age, gaining and sharing technological understanding and capability has become a constant and crucial human activity. We communicate in more genres, address broader (often global) audiences, and face more complex rhetorical problems than ever before.

To achieve success in their communication activities, progressive organizations are employing sophisticated planning and development methods, including user-centered design and evaluation, content management, and systems-based analyses. In addition, they undertake research projects and apply existing research to their own needs. Contemporary research in technical communication ranges from controlled empirical research on the processing of text, graphics, and multimedia content to observational research on how meaning is created and negotiated in business environments and virtual communities.

The Department of Technical Communication prepares students to assume positions of intellectual leadership in industry, government, and non-profit organizations. Students also specialize in science writing or Web site design. The Technical Japanese program provides a unique opportunity to develop cross-cultural experience and expertise.

Whatever their professional direction, technical communication students learn the newest communication technologies and practices, the most effective information-design strategies, and the research skills appropriate to their interests. They also learn the

enduring theory and principles that enable them to understand the constant changes they will encounter throughout their careers. Finally, their coursework takes place in the context of social and political issues and human needs.

Other major interests of the department are the human-computer interface, hypermedia, communications technology, the rhetoric of technical discourse, international communication, visual communication, international technical communication, publications and communications management, policy analysis of technological systems, and research and testing.

Graduate Programs

Graduate Program Coordinator
14 Loew, Box 352195
206-543-2567
tc@uwtc.washington.edu

Master of Science, Day Program

Technical Communication offers a Master of Science (M.S.) in technical communication. (An evening program is offered through UW Educational Outreach.) A total of 45-48 credits is required for the M.S. degree, which includes 25 credits of required T C graduate courses; 11 credits of approved electives; and 9 to 12 credits of degree-completion credits. To complete their degrees, students choose from one of three options: 9 credits of thesis; 5 credits of internship and 4 credits of a project report related to the internship; or 12 credits of a linked set of courses.

In making recommendations for admission, the faculty consider the following from an applicant's record: (1) undergraduate GPA; (2) undergraduate degree program and work experience; (3) the Graduate Record Examination (GRE) Verbal score; (4) the Test of English as a Foreign Language (TOEFL) score (if applicable); (5) letters of recommendation; and (6) Statement of Goals and Career Objectives. A limited number of prerequisite undergraduate courses may be required.

Research Facilities

The Department of Technical Communication has a well-equipped computer laboratory that effectively supports its courses and research projects. In addition, there are two specialized departmental research laboratories: the Technical Japanese Lab and the Laboratory for Usability Testing and Evaluation (LUTE). An award-winning magazine, *Northwest Science and Technology*, is produced in the department and serves as a kind of laboratory for science-writing students. Finally, technical communication graduate students can utilize significant College of Engineering and University-level research facilities.

Financial Aid

A limited number of teaching and research assistantships and scholarships are available for the financial support of graduate students in technical communication. More information and application forms can be obtained by contacting the department.

Master of Science in Engineering—Technical Japanese Program

The Technical Japanese Master's Program, within the College of Engineering Interengineering Program, offers a range of classes in advanced, practical Japanese for both master's and non-master's track students. Master's track students follow a two-year, 54-credit program which combines graduate work in an engineering or science field with advanced instruction in technical Japanese language. Non-

master's track students may take any combination of technical Japanese oral communication or reading classes. These courses equip students with the skills necessary to read business/technical literature in Japanese and to work effectively with Japanese engineers, scientists, and business people in research and business environments. The complete program includes an internship in Japan in an industrial or research setting.

Master's track students are admitted to the program autumn quarter only, and the application deadline is February 28. Other students may begin any quarter.

To be admitted, master's track applicants must have a bachelor's degree in engineering or science, a minimum undergraduate GPA of 3.00, three years of college-level Japanese or equivalent training, satisfactory scores on the GRE, and satisfactory scores on the Japanese Proficiency Test (administered by the Technical Japanese Program).

Applicants with a bachelor's degree in areas other than engineering or science can also earn a master's degree through the Technical Japanese Master's Program by specializing in technical communication as their inter-engineering track.

Faculty

Chair

Judith A. Ramey

Professors

Bereano, Philip L. * 1975; JD, 1965, Columbia University, MRP, 1971, Cornell University; technology assessment, biotech policies, policy and technology, social values, citizen participation.

Coney, Mary B. * 1976; PhD, 1973, University of Washington; writing style and theories of technical communication, rhetoric, reader response theory.

Farkas, David K. * 1983; PhD, 1976, University of Minnesota; information design, Web design, computer documentation.

Furness, Thomas A. * 1989, (Adjunct); PhD, 1981, University of Southampton (UK); display systems engineering, human factors, computer graphics, virtual reality.

Haselkorn, Mark P. * 1985; PhD, 1977, University of Michigan; strategic management of information and communication systems, human/machine interaction.

Ramey, Judith A. * 1983; PhD, 1983, University of Texas (Austin); computer-assisted communication user-centered design, usability testing.

Spyridakis, Jan * 1982; PhD, 1986, University of Washington; comprehension and usability, document design, Web design, research methods.

Warnick, Barbara P. * 1980, (Adjunct); PhD, 1977, University of Michigan; rhetorical theory and criticism.

White, Myron 1947, (Emeritus); PhD, 1958, University of Washington; technical editing, publications management, bibliography for document design.

Winn, William David * 1985, (Adjunct); PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

Associate Professors

Brainard, Suzanne Gage 1987, (Affiliate); PhD, 1989, Ohio State University; educational evaluation,

methodology and gender and ethnic issues in science and engineering.

Ceccarelli, Leah M. * 1996, (Adjunct); MA, 1992, PhD, 1995, Northwestern University; rhetoric of science, rhetorical criticism.

Kolko, Beth E. * 2000; MA, 1991, PhD, 1994, University of Texas (Austin); computer-mediated communication; virtual environments.

McClintock, Marshall 1997, (Affiliate); MA, 1977, PhD, 1980, State University of New York (Binghamton), MA, 1990, George Mason University; philosophy of science, human factors.

Tsutsui, Michio * 1990; PhD, 1984, University of Illinois; computer-aided instruction, international communication, Japanese linguistics, technical Japanese.

Williams, Thomas R. * 1976; MCP, 1981, PhD, 1988, University of Washington; text and visual information processing, document design, interactive multimedia.

Assistant Professors

Illman, Deborah L. 1982; PhD, 1981, Universidad Estadual de Campinas (Brazil); science/engineering news reporting, public understanding of science and technology.

Sauer, Geoffrey F. * 2000; MA, 1992, PhD, 1998, Carnegie Mellon University; new media within the context of the history of publishing.

Senior Lecturer

Plumb, Carolyn Sue * 1986; PhD, 1991, University of Washington; cognitive dimensions of reading, writing, and the human/computer interface.

Lecturer

Kato, Masashi 1988; MA, 1980, University of Washington; technology-enhanced instruction, distance learning, research methods, international communication.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

T C 400 Scientific and Technical Communication (3) *Haselkorn, Kolko* Principles and practices of writing to communicate scientific and technical information to a variety of readers, including the expert, general scientific and technical reader, manager, and general public. Required of technical communication majors. Prerequisite: T C 231. Offered: ASp.

T C 401 Style in Scientific and Technical Writing (3) *Coney, Spyridakis* Grammatical structures and stylistic strategies within specific professional contexts. Achieving clarity and conciseness through word choice and placement, using a variety of sentence structures for appropriate emphasis, handling details, establishing effective tone. Required of technical communication majors. Offered: ASp.

T C 402 Scientific and Technical Editing (3) *Farkas, Kolko* Editorial responsibilities and practice in the communication of scientific and technical information; the editor's role both as editor and as supervisor of publication groups. Required of technical communication majors. Prerequisite: T C 401. Offered: AW.

T C 403 Publication Project Management (3) *Plumb* Responsibilities and practice in managing publication projects in scientific and technical organizations. Project design, coordination, production, and evaluation, including planning, organizing, staffing, and directing. Required of technical communication majors. Prerequisite: T C 402. Offered: WSp.

T C 406 Understanding Research in Technical Communication (3) *Spyridakis* Provides a basis for integrating knowledge acquired in other technical communication courses. Students examine the research literature of various disciplines that impact technical writing. Structured around theoretical and empirical literature as it relates to different textual issues in technical writing. Offered: W.

T C 407 Computer Documentation (3) *Farkas, Ramey* Concepts and skills for preparing online help systems, performance-support systems, print manuals, and other forms of computer documentation. Analysis of users, their tasks, and the product's interface. Usability testing of documentation. Relationship between documentation process and product development cycles. Recommended: T C 310. Offered: ASp.

T C 411 Visual Media in Technical Communication (5) I&S/VLPA *Williams* Use of visuals in print and electronic communication. Topics include vision, perception, comparison of text and visual media principles for the selection and use of visual media, information graphics icons, page and screen design typography, and color. Offered: ASp.

T C 412 Print Production (3) *Sauer, Williams* Introduction to print production for technical communicators. Topics include digital pre-press, printing, binding, and finishing. Prerequisite: T C 411. Offered: W.

T C 415 Production Editing (4) *Williams* The editorial role in the preparation of text and visual materials for production. The editor's responsibilities and prerogatives as they relate to those of other professionals in the production phase of the publications field.

T C 420 Introduction to Technology as a Social and Political Phenomenon (5) I&S *Bereano* Introductory survey presenting some of the issues pertaining to technology and social change, technology and values. Emphasis on the social, political, and economic aspects of current problems that have important technological components. Prior technical background not required; readings from diverse sources. Offered: A.

T C 425 Technology Assessment (5) I&S *Bereano* In-depth analysis of the concept, practice, and methods of technology assessment (policy analysis that concentrates on social consequences of technological development): social, political, economic, and environmental impacts of new technologies; options for channeling these developments; and relevant decision-making institutions and processes. Offered: W.

T C 428 Policy Dimensions of Genetic Engineering (3) I&S *Bereano* Explores technological discourse in public policy formation and decision-making regarding genetic engineering, analyzing a variety of media and formats to explore the contending ideological paradigms, imagery, and argumentation used by the major policy actors. No prerequisite, although prior work in biology, communication, or policy sciences is useful. Offered: Sp.

T C 435 Content Management (3) Principles and practices of building, managing and using content management systems in the technical communication workplace. Examines both the intricacies of collaborative workflow technologies and the organizational contexts that surround them.

T C 436 Design and Authoring of CAI (3) *Winn* Introduction to the design of computer-assisted-instructional programs. Types of learning, characteristics of effective instruction. Students design and produce CAI programs using authoring systems for computers. Offered: jointly with EDC&I 436; A.

T C 437 Interactive Multimedia (3) I&S/VLPA *Farkas* Study of concepts and design principles with an emphasis on communicating technical and workplace information. Includes hypertext theory, interface design principles for content computing, and societal issues. Implementation of designs is encouraged but not required. Prerequisite: T C 411. Offered: W.

T C 438 Advanced Interactive Multimedia (3) The building of advanced multimedia systems to communicate technical and workplace information. Topics include effective information hierarchies, user interface elements for complex navigation, the special challenges of redesigning existing multimedia, and techniques for collaborative multimedia development. Implementation of designs suitable for a portfolio is required. Prerequisite: T C 437.

T C 440 Science and Engineering News Writing (3) *Illman* Explores the science news publishing process, from researching topics and interviewing sources to the structure of news articles and production. Writing assignments address the press release, news brief, and news articles. Offered: A.

T C 455 User Interface Design (3) *Furness* Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interfaces, and research methodologies are discussed. Offered: jointly with IND E 455; A.

T C 461 Reading in Technical Japanese I (3) VLPA *Kato* Students review and strengthen their basic knowledge of grammar, vocabulary, and kanji and apply this in reading authentic materials on technology related topics. Skills to analyze sentence structures for accurate interpretation are taught. Prerequisite: JAPAN 423. Offered: A.

T C 462 Reading in Technical Japanese II (3) VLPA *Kato* Students improve skills for analyzing complex sentence structures, and learn skills (such as predictions) for more effective reading. Additional grammar, vocabulary, and kanji necessary for reading technology-related materials are introduced. Prerequisite: T C 461. Offered: W.

T C 463 Reading in Technical Japanese III (3) VLPA *Kato* Students further improve skills introduced in previous courses. Covers the skills for understanding inter-sentential and paragraph structure. Additional grammar, vocabulary, and kanji necessary for reading technology-related materials are introduced. Prerequisite: T C 462. Offered: Sp.

T C 471 Oral Communication in Japanese in Technical and Business Settings I (3) VLPA *Kato* Students review and strengthen their knowledge of grammar, vocabulary and apply this to basic technical and business communication situations. Covers the cultural concepts underlying these situations. Lab work is required for conversation practice and listening comprehension. Prerequisite: JAPAN 423. Offered: A.

T C 472 Oral Communication in Japanese in Technical and Business Settings II (3) VLPA *Kato* Students learn the functional and situational skills necessary to communicate in technical and business settings. Covers the cultural concepts underlying these situations. Lab work is required for conversation practice and listening comprehension. Prerequisite: T C 471. Offered: W.

T C 473 Oral Communication in Japanese in Technical and Business Settings III (3) VLPA *Kato* Students learn the functional and situational skills necessary to communicate in more complex technical and business settings. Covers the cultural concepts underlying these situations. Lab work is required for conversation practice and listening comprehension. Prerequisite: T C 472. Offered: Sp.

T C 493 Senior Study (5) Integration of knowledge and skills acquired during major program into one paper or project. Offered: AWSpS.

T C 495 Professional Practice (3-10, max. 10) *Williams* Supervised internship in a publications organization approved by the faculty adviser. A minimum of one internship is required of students majoring in technical communication. Credit/no credit only. Offered: AWSpS.

T C 496 Directed Research in Technical Communication (1-3, max. 10) Students, working in teams under the supervision of individual faculty members, review relevant literature, pose research questions, design and conduct studies, and present the results in papers prepared either for submission to a professional journal or for presentation at a professional conference. Credit/no credit only. Offered: AWSpS.

T C 497 Study Abroad: Technical Communication (3-5, max. 15) Upper-division technical communication courses, for which there are no direct University of Washington equivalents, taken through the Department of Technical Communication's Study Abroad Program. Offered: S.

T C 498 Special Topics (1-5, max. 10) Special topics in technical communication to be offered occasionally by permanent or visiting faculty members.

T C 499 Special Projects (1-5, max. 10) Individual undergraduate projects in technical communication. Offered: AWSpS.

Courses for Graduates Only

T C 501 Theoretical Dimensions of Technical Communication (4) *Coney, Sauer* Theories and research drawn from a variety of fields that inform such topics as the historical and social context of technical communication, the aims of technical discourse, readability, invention and audience, audience analysis, technical style, and graphics. Prerequisite: admission to an engineering master's program or permission of instructor. Offered: A.

T C 502 Empirical Traditions in Technical Communication (4) *Williams* Introduction to empirical traditions that inform research and practice in field of technical communication. Topics include epistemological assumptions underlying empirical research, empirical methods, and survey of results of empirical research on effects of text and visual media on comprehension, recall, and performance. Prerequisite: graduate standing or permission of instructor. Offered: W.

T C 505 Computer-Assisted Communication (4) *Kolko* Explores computer-assisted communication from three perspectives: (1) cultural roles of communication technologies; (2) relationships between communication and information including information technologies in the workplace, academe, and other settings; and (3) application to design including models for audience analysis, task analysis, and cognitive systems engineering. Prerequisite: graduate standing or permission of instructor. Offered: A.

T C 509 Writing the Scientific Article (3) *Haselkorn, Illman* Examination of principles and practice of writing research manuscripts, articles, abstracts, and oral presentations. Detailed examination of scientific

publication process includes issues of style, organization, and ethics. Students draft, critique, and revise their own manuscripts and learn to review the manuscripts of others. Offered: Sp.

T C 510 Information Design (4) *Farkas* Examination of the design principles and procedures underlying the creation of both print and electronic information presentations. Topics include: print vs. electronic media, designing for the page and screen, information topologies, and hypermedia. Seminar includes a design project. Prerequisite: T C 501 or permission of instructor. Offered: Sp.

T C 511 Visual Media in Technical Communication (5) *Williams* Use of visuals in print and electronic media. Topics include vision, attention and perception, semiotics, depiction, information graphics, icons, typography, and principles of page and screen design.

T C 512 International Technical Communication (4) *Spyridakis* Examines theory, research, and practice in the internationalization and localization of paper and electronic documents. Topics include cultural models and schemata, contrastive rhetoric, controlled languages, translation, visuals, and usability testing. Prerequisite: graduate standing or permission of instructor. Offered: W.

T C 516 Research Theory and Application in Technical Communication (4) *Spyridakis* Introduction to research methods in technical communication. Students examine the relationship between theory and research, hypothesis testing, experimental designs, modes of observation, sampling, validity, and data analysis and interpretation. Prerequisite: introductory statistics course. Offered: Sp.

T C 517 Usability Testing (4) *Ramey* Discusses the human-computer interface (HCI) as the communicative aspect of a computer system. Analyzes usability issues in HCI design, explores design-phase methods of predictability, and introduces evaluative methods of usability testing. Prerequisite: substantial experience with computers and graduate standing, or permission of instructor. Offered: W.

T C 520 Technical Communication Systems (4) *Haselkorn* Emphasizes the role and function of communication as a key to understanding organizational frameworks and managerial practices. Traditional and innovative approaches to viewing and managing technical communication. Roles, responsibilities, impact of technology. Offered: Sp.

T C 521 Seminar: Current Issues in Technical Communication (1-2, max. 3) Presentations on current issues in technical communication. Credit/no credit only. Prerequisite: T C graduate student status or permission of instructor. Offered: AW.

T C 525 Assessing Communications Technologies (4) *Bereano* Analysis of development, deployment of new communication technologies; emphasis on public policy issues they present (e.g., videotelephone, mobile telephoning, hypermedia, electronic message transfer, virtual reality). Impacts explored include access, privacy, civil liberties; power of elites; changes in social organization. Prerequisite: T C 425 or other background in policy analysis, technology, and society. Offered: Sp.

T C 540 SciTech Writing Practicum I (4) *Illman* An advanced experience in science and engineering news writing for graduate students and upper division undergraduates. Participants serve as science writing interns on the staff of Northwest Science & Technology magazine and develop a portfolio of professional quality science/technology news articles which may be eligible for publication in the maga-

zine. Prerequisite: T C 498 or permission of instructor. Offered: W.

T C 541 SciTech Writing Practicum II (4) *Illman* Advanced science writing, focusing on the narrative feature and other forms of creative non-fiction used to present technical content to general audiences. Participants develop a portfolio of professional quality science/technology news articles which may be eligible for publication in Northwest Science and Technology magazine. Prerequisite: T C 540 or permission of instructor. Offered: Sp.

T C 561 Advanced Japanese for Technical and Business Professions 1 (3) *Tsutsui* Focuses on reading skills (e.g., sight reading, vocabulary, grasping main ideas) and familiarizes students with Japanese news media sites and Web reading tools. Students also develop the oral communication skills necessary for giving technical and business reports and the writing skills for business emails. Prerequisite: T C 463 and T C 473. Offered: A.

T C 562 Advanced Japanese for Technical and Business Professions 2 (3) *Tsutsui* Focuses on developing reading speed. Students read more extensively, expand their technical/business vocabulary, and further improve skills for grasping main ideas quickly. Students also improve oral skills for report-giving and discussion and writing skills for business emails and reports. Prerequisite: either T C 561 or T C 463; and T C 473 and TC 601. Offered: W.

T C 563 Advanced Japanese for Technical and Business Professions 3 (3) *Tsutsui* Integrates the reading, oral, and writing skills acquired through the first-year and second-year technical/business Japanese sequences. Students work on research projects, give formal presentations, and submit project reports. Substantial individual readings are involved as well as individual conferences with the instructor on readings and report drafts. Prerequisite: T C 562. Offered: Sp.

T C 596 Directed Research in Technical Communication (1-3, max. 10) Students, working in teams under the supervision of individual faculty members, review relevant literature, pose research questions, design and conduct studies, and present the results in papers prepared either for submission to a professional journal or for presentation at a professional conference. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

T C 597 Approaches to Teaching Technical Communication (1-2, max. 2) *Plumb* Readings in pedagogical theory of technical communication and discussion of practical applications. Credit/no credit only. Prerequisite: concurrent teaching appointment or permission of instructor. Offered: AWSpS.

T C 598 Special Topics (1-5, max. 6) Prerequisite: permission of instructor.

T C 599 Special Projects (1-5, max. 5) Written report required. Prerequisite: permission of graduate adviser or committee chair. Offered: AWSpS.

T C 600 Independent Study or Research (*) Written report required. Prerequisite: permission of committee chair. Offered: AWSpS.

T C 601 Internship (2-10, max. 10) Written report required. Prerequisite: permission of committee chair. Offered: AWSpS.

T C 700 Master's Thesis (*) Prerequisite: permission of thesis adviser. Offered: AWSpS.

College of Forest Resources

Dean

B. Bruce Bare
107 Anderson

Associate Dean for Infrastructure

Robert Edmonds
264 Bloedel



General Catalog Web page:

www.washington.edu/students/gencat/academic/College_Forest_Res.html



College Web page: www.cfr.washington.edu

Founded in 1907, when professional forestry education was in its infancy, the College holds a position of national and international leadership in both instruction and research. Its location in one of the world's largest forest regions provides unique opportunities for field classes and research, experience in the management of forested lands for multiple uses, exposure to wood-based industries, and awareness of resource-use issues. Enrolled in the College are approximately 300 undergraduate and 180 graduate students, taught by more than 50 faculty members. Thus, students enjoy small classes and close association with faculty, as well as the diversity and superior facilities of a large research university.

The College of Forest Resources is dedicated to generating and disseminating knowledge for the stewardship of natural and managed environments and the sustainable use of their products and services. Its vision is to be internationally recognized as the source for solutions to environmental and natural resource issues.

The College's goals are (1) to provide students with a premier educational and training experience in integrated natural resource management, utilization, environmental sciences, and stewardship; and (2) in a timely and efficient manner, to develop and deliver the following to the public and the professions throughout the state, region, and world:

- educational information related to the College's mission, and
- findings from the College's applied and basic research programs.

College Facilities

The College occupies three central campus buildings: Alfred H. Anderson Hall, the Hugo Winkenwerder Forest Sciences Laboratory, and Julius H. Bloedel Hall. In addition, the Center for Urban Horticulture is located in an east campus building complex. Overall, the College has excellent areas and equipment on the Seattle campus for scientific laboratories, classrooms, seminar rooms, special collections, and administrative offices.

The Forest Resources Library, a separate branch of the University of Washington Libraries, contains more than 50,000 books, reports, conference proceedings, and bound journal volumes, and subscribes to more than 1,100 active journals. Disciplines covered by the collection support the programs of the College, including forestry and silviculture, forest products,

forest engineering, soils, wildlife, wildland conservation, paper sciences, and urban forestry. The Forest Resources Library provides a gateway to the larger University Libraries collection of more than five-million volumes through the systemwide electronic catalog, and provides access to numerous electronic and print indices as well as Internet resources. The library is located in Bloedel Hall.

The Center for Urban Horticulture also maintains a library that serves students, faculty, landscape professionals, and the public. The Center's herbarium supports forest resources students' fieldwork in urban horticulture, restoration ecology, and dendrology. Containing representative plant material from all parts of the United States, the collection includes dried, mounted specimens of shrubs, hardwood trees, and conifers. Another herbarium, complete in plants native to the Pacific Northwest and maintained by the Department of Botany, is available for use by forest resources students.

The laboratory facilities of the College represent 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, and physical-test equipment. Specific laboratories are designed to study soil chemistry and soil physics, hydrology, polymer chemistry, tree physiology, genetics, wood and extractives chemistry, physics of fibrous composites, applied mechanics, wood process technology, silviculture, ecology, paleoecology, pathology, entomology, wildlife, horticultural physiology, and horticultural plant materials.

The College computing facilities include microcomputer systems dedicated to specific research areas, a microcomputer student laboratory, a geographical information systems (GIS) laboratory, and several servers offering access to the Internet and shared printers.

Office of Student Services

Director, Student Services
Michelle M. Trudeau
115 Anderson
cfradv@u.washington.edu

The Office of Student Services in the College of Forest Resources assists prospective undergraduate and graduate students with admission to the College and advises current students, including interpretation of College and University requirements and assistance in course registration to meet graduation requirements. Faculty advisers are available to assist students in choosing elective courses to help them build an appropriate academic background for their chosen professional specialty.

The Office of Student Services keeps job listings and employer resources to help students obtain summer employment and internships while in school, and permanent employment upon graduation. The office also sponsors a career fair every year. Summer work may be available through federal and state agencies and in the numerous private companies associated with the wood-using industry of the region. Although field experience is not required for graduation, students are strongly urged to seek summer employment or field experience relevant to their major and career goals.

The College has a strong scholarship and financial assistance program. Through the generous donations of alumni and friends, the College has established scholarships, fellowships, and loan programs to assist students in paying for their tuition. The Washington Pulp and Paper Foundation provides scholarships for students enrolled in the Paper Science and Engineering curriculum. The foundation is supported by companies of the pulp and paper industry and by supplier companies. Information

about paper science and engineering scholarships may be obtained from Professor William McKean, 318 Bloedel. Information on all College scholarships is available through the Office of Student Services, 115 Anderson.

Students seeking information about financial aid offered outside the College should contact the Office of Student Financial Aid, 105 Schmitz.

Institute of Forest Resources

The overall research program of the College is administered by the Institute of Forest Resources. Because of the size and complexity of this program, the institute assumes a broad scope of responsibility and provides vital support to the College administration, faculty, staff, and students. Major functions include administering all research projects funded by federal, state, and private agencies, monitoring the McIntire-Stennis research program, ensuring College compliance with federal reporting requirements, and producing College publications and special research reports.

Institute staff coordinate and facilitate the submission of research proposals for the faculty with the University administration and numerous funding agencies. Students earn research and thesis credit toward advanced degrees by working on major forest resources problems supported by grants or contracts.

Areas of current and future research cover a broad array of topics including forest policy analysis, stand management, streamside and riparian zone management, forest ecosystem analysis, international trade in forest products, forest-products marketing, forest biotechnology, wildlife science, forest soils, urban horticulture, forest engineering, hydrology, and paper science and engineering. Research projects include studies by individual faculty, as well as interdisciplinary programs, which combine the interests of College faculty with those from other academic units of the University and other institutions.

The College also collaborates with Cooperative Extension of Washington State University to undertake and promote continuing education for citizens of the state, particularly in the nonindustrial forestry area.

The Institute Publications Office provides a wide range of services in producing College research publications: technical editing, desktop-publishing systems, format and layout design, computer graphics, printing/publishing coordination, and distribution. College publications are distributed to national and international institutions and libraries, as well as to forestry professionals, to organizations in the private sector, and to the general public.

Field Research Areas and Facilities

The College field facilities include two major forested areas covering more than 4,000 acres, an arboretum, a reserve, and several cooperative research centers and stations. These lands offer a wide variety of terrestrial and aquatic characteristics favorable to a full range of scientific investigations. They also 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 Experimental Forest of approximately 4,200 acres is located 65 miles south of the University, near Eatonville. This forested property is the focal point for on-the-ground academic work in forest management, resource science, and forest engineering, both at the undergraduate and graduate levels. Broad forest and soil diversity has led to extensive biological, management, and engi-

neering research, much of which may be characterized as a pioneering effort. A full-time resident staff manages this facility, harmonizing its public-education objectives with academic and research objectives. Rustic but comfortable facilities which provide housing and support to academic and research programs are also used extensively for conferences both within and outside the University.

The Olympic Natural Resources Center (ONRC) is a 19,000-square-foot research and education facility located on the west side of the Olympic Peninsula. The mission of the Center is to conduct research and education on natural-resources management practices which integrate ecological and economic values. Innovative management methods that integrate environmental and economic interests into pragmatic management of forest and ocean resources are demonstrated. A forest management program as well as a marine program are in place to study the relationship between the terrestrial and marine environment.

The Lee Memorial Forest, approximately 160 acres, is located about 22 miles northeast of the University, near Malby. This forested property provides valuable academic and research opportunities near the campus. Characterized by forest types and soils common to western Washington lowlands, Lee Forest is used extensively for part-day trips and for long-term research and demonstration projects especially related to changing land uses.

The Allan H. Thompson Research Center and the Joe E. Monahan Findley Lake Reserve and Research Area in the Cedar River watershed are utilized by the College in cooperation with Seattle Public Utilities for studies in forest physiology and mineral cycling in the forest ecosystem.

The Center for Urban Horticulture has offices, laboratories, public-education resources, and field sites for teaching and experimentation along the shore of Union Bay. Its 10-acre Union Bay Gardens, for research, teaching, and display, currently emphasize unusual ornamental and native woody landscape plants. The 60-acre Union Bay Natural Area, a former dumpsite now a naturalized habitat, is used by classes in four different colleges and the public to study principles and practices of restoration ecology. The Douglas Research Conservatory is a modern plant-growing facility with greenhouses, growth chambers, nursery, and classrooms. The Otis Douglas Hyde Hortorium is an herbarium dedicated to plants of urban horticultural significance. The Elisabeth C. Miller Horticultural Library is the Northwest's foremost public horticultural library, with books, journals, and other materials available to the gardening public, students, and professional horticulturists. The Center also conducts courses, lectures, and special events for the public and professionals as part of the College's Continuing and Public Education program. Cooperative programs are in place with Washington State University/King County Cooperative Extension, whose horticulture program is housed at the Center.

The Center's largest facility is the Washington Park Arboretum, a 230-acre collection of trees and shrubs growing in a naturalistic setting on the south shore of Lake Washington. Managed in cooperation with the City of Seattle Department of Parks and Recreation and the Arboretum Foundation, the arboretum contains some 5,200 different kinds of woody plants that are available for research and academic study, making it the third most diverse arboretum in the United States. Displays and programs educate students and visitors about woody plants' diversity, natural ecology, and urban landscape use, as well as conserving endangered natural and cultivated plants. Classes in botany, dendrology, horticulture, wildlife, and landscape architecture make use of the collections, while the grounds are used for studies in soil science, ecology, and various research projects, including many

independent student projects. The arboretum, established in 1934, also serves as an important public-service area to the University, offering numerous formal and informal classes for the general public and, in addition, serving the community as a public park and open space.

Summer Opportunities

During summer quarter, there are many internships and independent study courses in which a student may get credit for summer work.

In late summer, there is a four-week intensive program that combines work and study in Pacific Northwest forests with the study of English as an international language for forestry. The College and the Department of English As A Second Language schedule the program.

For more information, contact Aaron Bidelsbach, UW Educational Outreach, 206-543-2300.

Ecosystem Sciences Division

Chair

David Manuwal
104 Winkenwerder

Courses included in the Ecosystem Sciences Division cover basic and applied subject matters in forest biology, wildlife science, and urban horticulture. Urban horticulture is concerned with the selection, management, and role of plants and ecosystems in urban environments. Subjects covered include plant and animal ecology, wildlife biology and conservation, dendrology and autecology, soils, ecosystem analysis, environmental horticulture, public horticulture, and urban forestry.

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees include ecosystem analysis (ecology, tree physiology and genetics, and soils and mineral cycling), wildlife science, and urban horticulture. A Master of Forest Resources degree in urban horticulture is also available.

Management and Engineering Division

Chair

Richard R. Gustafson
332 Bloedel

Courses for which the Management and Engineering Division is responsible deal with all the facets of the forest resources arena, from management of forests to the production and recycling of paper products. Multiple uses of forests including timber, water, wildlife habitat, and recreation are embraced in the forest management curriculum. Courses in the forest and ecological engineering curriculum emphasize the scientific and engineering design principles that enable graduates to find technical solutions to problems facing forest-related enterprises and rural communities. Paper science and engineering courses provide students with the skills to work as technical and management professionals in the paper and allied industries.

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees are offered by this division and include social sciences, forest economics, forest engineering/hydrology, forest products marketing, silviculture and forest protection, quantitative resources management, and paper sciences and engineering. A practice-oriented degree leading to

the Master of Forest Resources in the area of silviculture is also available.

Graduate Programs

Graduate Program Coordinator
115 Anderson, Box 352100
206-543-7081
cfradv@u.washington.edu

Graduate programs in forest resources are designed to accommodate a wide range of education and career objectives. A student may concentrate on development of advanced professional skills and knowledge or on exploration of sciences basic to forest resources.

Graduate programs offered in forest resources lead to the degrees of Master of Forest Resources, Master of Science, and Doctor of Philosophy. Graduate students may center their graduate study in one of the special fields of study within the College divisions.

Master of Forest Resources

The Master of Forest Resources degree is a professional degree offered for students who wish to acquire a greater competence in a specific subject area of forest resources. This is a non-thesis option open to professionals who are returning to study and to obtain expertise in areas such as silviculture and urban horticulture. Interested persons should contact the graduate program coordinator to determine eligibility for this degree program.

Master of Science

The Master of Science degree is a learned degree, often precursory to the Doctor of Philosophy degree. Some areas of study allow non-thesis work while most areas of study require the completion of a thesis. The non-thesis program requires at least 6 credits of research; the thesis program requires a minimum of 9 credits of research. A foreign language is not required. Students must complete a set of core courses prescribed for the major area of study.

Doctor of Philosophy

The Doctor of Philosophy degree may be preceded by education in either forest resources or another discipline. The program comprises an appropriate selection of core courses in forest resources and in the related natural and social sciences. The program requires passage of the General Examination in forest resources; research, analysis, and interpretation; and completion of a dissertation. A minimum of two years of residence at the UW also is required. The time necessary to complete the degree requirements depends upon the thoroughness and applicability of prior course work. Reading proficiency in one foreign language may be required by the supervisory committee when the language is essential to the student's program of study.

Mid-Career Education

The College has established the National Resources Institute, a certificate program in natural resources to provide mid-career education for professionals. Participants in the mid-career program take courses to prepare themselves for new or broader responsibilities in their current career. In this certificate program, courses can be taught in a more flexible time arrangement to meet the specific career and scheduling needs of participants. Additionally, a variety of programs are offered to enhance professional education in natural resources. Interested natural resources and forest products professionals should contact the College of Forest Resources Continuing Education Office, 206-543-0867, fax 206-685-6705.

Graduate Areas

Graduate education is offered through the Division of Management and Engineering and the Division of Ecosystem Science, Horticulture and Conservation. Major areas of study and emphasis include paper science and engineering (wood chemistry, polymer and fiber science); forest engineering/hydrology; forest products marketing; forest economics; forest ecosystem analysis (forest ecosystems, forest ecology, forest genetics, biotechnology, streamside/riparian management, tree physiology, and forest soils); quantitative resources management (biometry, quantitative management, aerial photogrammetry/remote sensing); silviculture and forest protection (silviculture, forest entomology, fire management, forest pathology); social sciences (forest land use planning, forest policy and law, forest sociology and leisure studies); wildlife science; and urban horticulture (environmental horticulture, horticultural taxonomy, horticultural physiology, wetlands management).

In all areas of study, the College maintains a close working relationship with faculties of other colleges and schools throughout the University, including service on graduate committees. Faculty advisers assist graduate students in determining those courses in other departments on campus which will lend to students' intended areas of expertise.

Admission Qualifications, Background

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 by the College of Forest Resources.

Basic requirements for admission to the Graduate School are a baccalaureate degree from an institution of recognized standing, a minimum GPA of 3.00 in the junior and senior years of college work, approval of the Dean of the Graduate School, and approval of the faculty of the College. An applicant may obtain a graduate admission form and supplemental admission and reference forms from the College of Forest Resources Office of Student Services, 115 Anderson, 206-543-7081, cfradv@u.washington.edu.

The Graduate Record Examination (GRE) general test is required by the College, and test scores must be submitted to the College by the applicant. Students interested in forest-products marketing may take the Graduate Management Admission Test (GMAT) or the GRE.

In addition, international students are required to take the Test of English as a Foreign Language (TOEFL). International students hoping to obtain teaching assistantships must also complete the Test of Spoken English (TSE). Please refer to the Graduate School section for minimum scores and exceptions.

Upon enrollment, the student is assigned a graduate program committee that is responsible for guidance in the early stages of the graduate program, to be followed by more formal committees as the student's program develops.

Applicants for the College are considered quarterly within the enrollment limitations for the College and the available faculty and workload limitations within the specific program area of study selected. Students with both undergraduate forestry degrees and other related fields are considered, although a prior forestry degree is normally expected of applicants for the professional Master of Forest Resources degree in silviculture.

Financial Aid

The College has available a limited number of appointments for teaching and research assistantships. Teaching and research responsibilities allow time to pursue a full academic load. Students may contact faculty about research assistantships or the Office of Student Services about teaching assistantships.

Fellowships and scholarships without teaching or research obligations are also available. Requests for financial aid must be submitted by February 1 for priority consideration for the following academic year. Applications are in the College's admissions packet which may be requested from the Office of Student Services.

Teaching and Research Centers

Center for International Trade in Forest Products

The Center for International Trade in Forest Products (CINTRAFOR) was established in 1984 to respond to opportunities and problems relating to the export and import of wood products. Through programs of research, education, and outreach, CINTRAFOR works to improve knowledge of export trade and to train professionals competent in the analysis and interpretation of trade problems, issues, and policies. The Center serves as a focal point for dissemination of information on world trade in forest products by means of seminars, conferences, workshops, and publications.

CINTRAFOR activities involve the cooperative effort of the forest-products industry, state and federal organizations, and other organizations at the University such as the School of Business Administration and the Northwest Policy Center. The research undertaken by CINTRAFOR includes country-market analyses; a global competitive-trade model; new product and market opportunities; and studies of the linkage between forest-products trade and environmental impacts, regional socioeconomic stability, and policy impact analyses.

Students interested in participating in specific research activities sponsored by CINTRAFOR may enroll for study in graduate programs in one of the College's two academic divisions or in programs offered by other academic divisions on campus.

Center for Streamside Studies

Director

Susan M. Bolton
244 Bloedel

The Center for Streamside Studies (CSS) was established in 1987 as a joint effort of the College of Forest Resources, the College of Ocean and Fishery Sciences, and the Center for Quantitative Science in Forestry, Fisheries, and Wildlife. CSS provides information for the resolution of management issues related to the production and protection of forest, fish, wildlife, and water resources associated with the streams and rivers in the Pacific Northwest.

The Center conducts research activities related to the understanding of ecological and physical processes and their relation to governmental regulations. Projects are solution-oriented, centering around biological, physical, and social aspects of management issues. Cooperative projects are undertaken with state and federal agencies, tribes, private industry, and national and international research institutions, and involve faculty and students of the College of

Forest Resources, the College of Ocean and Fishery Sciences, the College of Engineering, and the College of Arts and Sciences.

To provide interdisciplinary training necessary to deal with the management of interacting resources, CSS conducts symposia, workshops, conferences, and seminar series as forums for resource-conflict discussion and resolution. Students interested in participating in specific research activities sponsored by CSS may enroll for study in graduate programs in one of the College of Forest Resources' two academic divisions or in programs offered by other academic units on campus.

Olympic Natural Resources Center

Director

John M. Calhoun

The mission of the Olympic Natural Resources Center (ONRC) is to conduct research and education on natural-resource-management practices that integrate ecological and economic values. Created by the Washington State Legislature in 1989, the Center conducts biological, physical, economic, and social-science research in both terrestrial and coastal/marine systems, focusing on its strategic priorities. The Center's programs aimed at pragmatic management solutions span a spectrum from developing new knowledge through applied research to education and outreach.

Much of the Center's work is conducted cooperatively with other research institutions, state and federal agencies, resource owners, and interest groups. The Center is housed in facilities at Forks, Washington, on the Olympic Peninsula. It is well suited for education, research, and conference activities. The natural resources of the area are a major focus of the work of the Center. The Center is jointly administered by the College of Forest Resources and the College of Ocean and Fishery Sciences.

Center for Urban Horticulture

Director

Thomas Hinckley

The Center for Urban Horticulture is dedicated to research, teaching, and public service concerning the selection, management, and role of plants and of ecosystems in urban landscapes. Urban landscapes—landscapes that are subject to direct impacts of human activity—include city streets, urban parks, public gardens, residential areas, and natural (and naturalized) areas bounded by commercial and residential development. Urban horticulture concerns those landscapes as they are used for aesthetic amenity, for amelioration and control of the physical environment, for public and professional education, for conservation of biodiversity and of natural resources, and for public recreation.

Faculty in four colleges—Forest Resources, Arts and Sciences, Architecture and Urban Planning, and Engineering—are affiliated formally and informally with the Center, participating in urban horticultural research, teaching, and collections curation. The Center serves as a primary focus of the UW's curricula in urban environmental studies, which comprise the most comprehensive program in the United States.

Faculty

Professors

- Agee, James K. * 1982; PhD, 1973, University of California (Berkeley); management of natural systems, forest ecology, fire ecology.
- Allan, G. Graham * 1966; PhD, 1956, University of Glasgow (UK), DSc, 1971, University of Strathclyde (UK); creativity and innovation.
- Ammirati, Joseph F. * 1979, (Adjunct); MA, 1967, San Francisco State, PhD, 1972, University of Michigan; mycology, taxonomy and ecology of fungi.
- Bare, B. Bruce * 1969; MS, 1965, University of Minnesota, PhD, 1969, Purdue University; forest land management and valuation, taxation, finance, management science.
- Bradley, Gordon A. * 1972; MLA, 1972, University of California (Berkeley), PhD, 1986, University of Michigan; forest land use planning, Conservation area planning and design.
- Briggs, David G. * 1973; PhD, 1980, University of Washington; operations research in forest products industries.
- Brubaker, Linda B. * 1973; MS, 1967, PhD, 1973, University of Michigan; dendrochronology, forest ecology, quaternary paleoecology.
- Bryant, Benjamin S. * 1987, (Emeritus); DF, 1951, Yale University; wood utilization technology, wood gluing, plywood and board technology.
- Cole, Dale W. * 1960, (Emeritus); MS, 1957, University of Wisconsin, PhD, 1963, University of Washington; forest soils, mineral cycling in forest ecosystems.
- Conquest, Loveday L. * 1976, (Adjunct); PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.
- Dowdle, Barney * 1962, (Emeritus); PhD, 1962, Yale University; development of forest products industries, public forest land management.
- Driver, Charles H. * 1965, (Emeritus); PhD, 1954, Louisiana State University; processes of wood decay, forest diseases, range ecology.
- Edmonds, Robert L. * 1973; MS, 1968, PhD, 1971, University of Washington; forest soil microbiology, biology of forest diseases, aerobiology.
- Erickson, Harvey D. 1977, (Emeritus); PhD, 1937, University of Minnesota; wood science and technology.
- Ford, E. David * 1985; PhD, 1968, University College, London (UK); quantitative science, ecosystem analysis, forest productivity.
- Franklin, Jerry F. * 1986; MS, 1961, Oregon State University, PhD, 1966, Washington State University; forest ecosystem analysis, vegetation patterns, tree mortality in natural landscapes.
- Fridley, James * 1988; MS, 1981, University of Michigan, PhD, 1984, University of Washington; forest engineering systems design, interactive computer simulation.
- Fritschen, Leo J. * 1966, (Emeritus); PhD, 1960, Iowa State University; biometeorology, micrometeorology, measurement and instrumentation of the environment.
- Ganter, Mark * 1986, (Adjunct); PhD, 1985, University of Wisconsin; solid modeling, computer graphics and geometry, kinematics, rapid prototyping, manufacturing design.
- Gara, Robert I. * 1968; MS, 1962, PhD, 1964, Oregon State University; bark beetle, forest insect ecology, forest insect behavior, international forestry.
- Greulich, Francis E. * 1977; MS, 1967, PhD, 1976, University of California (Berkeley); forest engineering, statistics, operations research.
- Gustafson, Richard Roy * 1986; PhD, 1982, University of Washington; process modeling and optimization, fiber composites.
- Hamilton, Clement Wilson * 1985, (Affiliate); PhD, 1985, Washington University; higher plant systematics, environmental horticulture, Californian vegetation ecology.
- Hanley, Donald P. * 1983; MS, 1973, University of Montana, PhD, 1981, University of Idaho; extension forestry, small-forest management, forestry continuing education.
- Harrison, Robert B. * 1987; MS, 1981, University of New Hampshire, PhD, 1985, Auburn University; soil chemistry and fertility, mineral cycling, carbon sequestration, long-term forest productivity.
- Hatheway, William H. * 1969, (Emeritus); PhD, 1956, Harvard University; quantitative ecology, physiological ecology, tropical forestry.
- Hinckley, Thomas M. * 1980; PhD, 1971, University of Washington; forest tree physiology and autecology, subalpine ecosystems, water stress problems.
- Hodgson, Kevin T. * 1991; MS, 1980, Mellon University, PhD, 1986, University of Washington; surface and colloid science, papermaking chemistry, secondary fiber recycling.
- Hrutfjord, Bjorn F. * 1959, (Emeritus); PhD, 1959, University of North Carolina; wood extractive chemicals, air and water quality in forest products industries.
- Johnson, Jay A. * 1983; MS, 1970, State University of New York (Syracuse), PhD, 1973, University of Washington; mechanical and physical properties of wood and wood composite materials, wood quality.
- Larson, Bruce C. 2000; MFS, 1978, Yale University, PhD, 1982, University of Washington.
- Lee, Robert G. * 1978; MS, 1969, Yale University, PhD, 1973, University of California (Berkeley); natural resource sociology, multiresource management, development/change of forestry institutions.
- Leney, Lawrence * 1983, (Emeritus); PhD, 1960, State College of Forestry At Syracuse; wood anatomy, microtechniques, machining wood, photomicrography, seasoning and preservation of wood.
- Lettenmaier, Dennis P. * 1973, (Adjunct); PhD, 1975, University of Washington; systems analysis and water resources planning.
- Lippke, Bruce R. * 1990; MSEE, 1959, New Mexico State University, MSIE, 1966, University of California (Berkeley); international trade and environmental linkages, investment analysis, economics of forest industry.
- Manuwal, David * 1972; MS, 1968, University of Montana, PhD, 1972, University of California (Los Angeles); effect of forest management on birds and mammals, characteristics of high-elevation bird communities.
- McKean, William T. * 1979; PhD, 1968, University of Washington; pulp and paper science, chemical engineering.
- Naiman, Robert J. * 1988; PhD, 1974, Arizona State University; forest stream ecosystems, aquatic landscape dynamics.
- Peterson, David L. * 1989; PhD, 1980, University of Illinois; mountain ecology, subalpine forests, global climate change, forest ecology.
- Pickford, Stewart G. * 1976, (Emeritus); PhD, 1972, University of Washington; forest fire science, wildland fire management.
- Richey, Jeffrey E. * 1973; PhD, 1973, University of California (Davis); quantitative problems of aquatic ecosystems, primary Amazon River, limnology.
- Ricker, Neil L. * 1978, (Adjunct); MS, 1972, PhD, 1978, University of California (Berkeley); process control and optimization.
- Schaeffer, Walter H. 1976, (Emeritus); PhD, 1952, University of Washington; forestry.
- Schiess, Peter * 1975; MS, 1968, Swiss Federal Institute of Technology, PhD, 1975, University of Washington; forest engineering, mechanized harvest and thinning operations, forest road design and construction.
- Schreuder, Gerard Fritz * 1971; MS, 1967, University of North Carolina, PhD, 1968, Yale University; statistical analysis in resource economics, international forestry, trade, aerial photos.
- Scott, David R. M. * 1955, (Emeritus); PhD, 1950, Yale University; silviculture, forest ecology.
- Sharpe, Grant William * 1966, (Emeritus); PhD, 1956, University of Washington; wildland recreation, interpretation and management of recreation areas.
- Skalski, John R. * 1987, (Adjunct); PhD, 1985, Cornell University; environmental sampling and effects assessment on wild populations, parameter estimation.
- Sprugel, Douglas George * 1984; PhD, 1974, Yale University; forest ecology, tree ecophysiology, natural disturbance.
- Stenzel, George 1949, (Emeritus); MF, 1939, Yale University; forest resources.
- Stettler, Reinhard F. * 1995, (Emeritus); PhD, 1963, University of California (Berkeley); genetics of forest tree populations, biotechnology, biomass production.
- Strand, Stuart E. * 1982; MS, 1975, Ohio State University, PhD, 1982, Pennsylvania State University; forest biotechnology, environmental pollution control.
- Taber, Richard D. * 1968, (Emeritus); PhD, 1951, University of California (Berkeley); biology and conservation of free-living birds and mammals, wildlife and human culture.
- Thomas, David P. 1950, (Emeritus); MA, 1948, University of Washington; economics and technology of utilizing forest crops.
- Thorud, David B. * 1981, (Emeritus); MS, 1960, PhD, 1964, University of Minnesota; watershed management, international forest policy and development.
- Tukey, Harold B. * 1980, (Emeritus); PhD, 1958, Michigan State University; urban horticulture, horticultural physiology.
- Vogt, Kristiina 2000; MS, 1974, PhD, 1976, New Mexico State University.
- Wagar, John Alan * 1988; MF, 1956, PhD, 1961, University of Michigan; urban forestry, urban forest inventory and cost-effective management.

Waggener, Thomas R. * 1969, (Emeritus); PhD, 1969, University of Washington; forest policy and economics, international forestry development.

Wissmar, Robert C. * 1972; PhD, 1972, University of Idaho; ecology.

Wott, John A. * 1981; MS, 1966, PhD, 1968, Cornell University; public horticulture, horticultural education, public gardens and administration, urban horticulture.

Associate Professors

Bolton, Susan M. * 1992; MS, 1979, University of North Dakota, MS, 1985, PhD, 1991, New Mexico State University; hydrology, watershed management, stream restoration, ecological engineering.

Booth, Derek B. * 1980, (Adjunct Research); PhD, 1984, University of Washington; environmental geology, particularly human influences on hillslopes, runoff, and rivers.

Bradshaw, Harvey D. * 1984; PhD, 1984, Louisiana State University; plant molecular genetics, evolutionary biology, genetic engineering of forest trees.

Chalker-Scott, Linda * 1997; MS, 1982, PhD, 1988, Oregon State University; environmental stress physiology of woody plants.

Eastin, Ivan * 1987; MS, 1989, PhD, 1992, University of Washington; marketing strategies and international trade of forest products.

Edwards, Richard T. * 1993, (Affiliate); PhD, 1985, University of Georgia; aquatic ecology, biogeochemistry.

Ewing, Kern * 1990; MS, 1978, PhD, 1982, University of Washington; wetland plant ecology, restoration ecology, ecosystem management.

Grue, Christian E. * 1989, (Adjunct); PhD, 1977, Texas A&M University; wildlife toxicology, wildlife and fisheries science.

Halpern, Charles * 1991; PhD, 1987, Oregon State University; plant community ecology, plant succession, effects of forest management on plant diversity.

Henry, Charles L. * 1982; MS, 1977, Oregon State University, PhD, 1989, University of Washington; ecological restoration, recycling organic wastes as soil amendments, sustainable resources.

Horner, Richard R. * 1981, (Adjunct Research); PhD, 1978, University of Washington; effects of human activities on water resources in urban areas.

Marzluff, John M. * 1997; MS, 1983, PhD, 1987, Northern Arizona University; behavior, ecology, and conservation of birds and mammals.

Paun, Dorothy Ann * 1993; PhD, 1993, University of Oregon; financial performance analyses; international countertrade; business-to-business relationships.

Perez-Garcia, John * 1990; MS, 1982, Mayaguez (Puerto Rico), DF, 1991, Yale University; forest economics, analysis of trade policy, global trade modeling, climatic change, carbon cycling.

Raedeke, Kenneth J. * 1981; PhD, 1979, University of Washington; wildlife biology and conservation, population dynamics, ungulate ecology, international conservation.

Robertson, Iain M. * 1982, (Adjunct); MLA, 1975, University of Pennsylvania; designing with plants, planning and design of botanical gardens/arboreta.

Vanblaricom, Glenn R. * 1993, (Adjunct); PhD, 1978, University of California (San Diego); aquatic wildlife,

ecology of marine communities, wildlife-fisheries interactions.

Vogt, Daniel 2000; MS, 1976, New Mexico State University, PhD, 1987, University of Washington; soil ecology, nutrient cycling, carbon sequestration, ecosystem biomass and productivity.

Wasser, Samuel K. * 1982, (Adjunct Research); PhD, 1981, University of Washington; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

West, Stephen D. * 1979; MS, 1974, University of Alaska, PhD, 1979, University of California (Berkeley); vertebrate wildlife ecology and conservation.

Zabowski, Darlene * 1992; MS, 1983, PhD, 1988, University of Washington; forest soils and productivity, soil genesis and classification, biogeochemical cycling of soils.

Assistant Professors

Jacobs-Young, Chavonda J. * 1995; MS, 1992, PhD, 1998, North Carolina State University; integrating biotechnology and pulp processing to improve papermaking efficiency.

Newman, Lee A. * 1993, (Affiliate); MS, 1989, PhD, 1993, Rutgers University; phytoremediation of organics and metals, plant molecular genetics.

Northey, Robert A. * 1998; PhD, 1985, University of Washington; wood and pulping chemistry, bleaching.

Reichard, Sarah E. 1986; MS, 1989, PhD, 1994, University of Washington; conservation biology of plants, biological invasions.

Ryan, Clare * 1997; PhD, 1996, University of Michigan; natural resource policy and administration, environmental conflict management, water policy.

Turnblom, Eric * 1994; MSc, 1986, University of British Columbia (Canada), PhD, 1994, University of Minnesota; forest growth modeling, quantitative stand dynamics, biometrics and natural resources inventory.

Wolf, Kathleen L. 1994, (Research); PhD, 1993, University of Michigan; urban and community forestry, environment and behavior, urban landscape visual assessment.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

CFR 400 Natural Resource Conflict Management (3) I&S/NW *Ryan* Introduction to the causes, dynamics, and consequences of natural resource conflicts as well as the range of procedural interventions used to manage conflict. Specific cases of environmental conflict and alternative dispute resolution procedures are examined. Emphasis on developing skills to effectively analyze, manage, and resolve natural resource conflicts. Offered: W.

CFR 429 Seminar in Streamside Studies (1, max. 6) *Bolton* Discussion by invited speakers on current research and issues related to streamside studies. Speakers are a mix of on-campus and off-campus experts. Credit/ no credit only. Offered: jointly with FISH 429; AWSp.

CFR 450 Senior Planning Project (3) *Ford* How to choose a topic, develop a written plan, prepare for field or laboratory work, and write the senior project. Projects may be related to resource management, conservation, urban forestry, or scientific research. Assistance provided in selection of faculty project coordinator. Offered: A.

CFR 474 Problem Analysis in Urban Ecology (5) *NW Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with GEOG 486; A.

CFR 475 Applied Theory and Methods in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: CFR 474/GEOG 486. Offered: jointly with GEOG 487. Offered: W.

CFR 476 Research in Urban Ecology (5) NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Write and orally present revised objectives and methods sections of interdisciplinary project and present results section. Prerequisite: CFR 475. Offered: S.

CFR 480 Field Studies in Wood Utilization (1) *Briggs* Students choose 3 of 5 full day field trips offered on alternate Fridays, beginning with the second Friday of the quarter. Visits include sawmills, plywood mills, pulp mills, wood preservers, door/window manufacturers, pallet producers, modular home producers. Field trip fee for transportation expenses. Students are required to bring hard hats and suitable field clothing. Offered: S.

Courses for Graduates Only

CFR 500 Graduate Orientation Seminar (1) Introduction to graduate study. Presentations on College resources and services and current research in each College division. Division chairs share teaching responsibilities. Offered: ASP.

CFR 529 Topics in Streamside Studies (1) Discussion by invited speakers on current research related to streamside studies. Offered: jointly with FISH 529; AWSp.

CFR 574 Problem Analysis in Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: A.

CFR 575 Applied Theory and Methods in Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisites: CFR 574 or permission of instructor. Offered: W.

CFR 576 Research in Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is rele-

vant to addressing issues in urban ecology. Write and orally present revised Objectives and Methods sections of interdisciplinary project and present a draft Results section. Prerequisites: CFR 574, 575. Offered: S.

CFR 580 Advanced Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discussion of current and important theoretical and empirical papers in urban ecology. Students continue to research interdisciplinary urban ecology projects while developing publishable manuscripts and oral presentations. Offered: jointly with GEOG 588. Offered: AWSp.

CFR 590 Graduate Studies (1-5, max. 5) Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Offered: AWSpS.

CFR 591 Seminar in Resource Policy and Management (1) *Ryan* Introduction and orientation for concurrent degree program between the Evans School of Public Affairs and the College of Forest Resources. Examines research and literature on contemporary issues related to the integration of natural resource science, policy, and management, through discussion among faculty, students, and invited speakers. Offered: jointly with PB AF 591; A.

CFR 592 Environmental Policy Processes (3) *Cullen* Presents background to establish the need for environmental policy. Explores in a comparative manner, examining both successes and failures, various strategies that have been used or proposed to protect the environment. Offered: jointly with PB AF 590.

CFR 600 Independent Study or Research (*) Offered: AWSpS.

CFR 700 Master's Thesis (*) Offered: AWSpS.

CFR 800 Doctoral Dissertation (*) Offered: AWSpS.

Ecosystem Science and Conservation

ESC 402 Forest Conservation Biology (5) NW *Peterson* Management strategies for conserving natural resources are examined in forest ecosystems of the Pacific Northwest and other North American bioregions. Alternative approaches to producing and restoring sustainable flows of wildlife habitat, water, fiber, and other resources are examined in the context of forest productivity, biophysical environment, disturbance, and public policy. Offered: Sp.

ESC 410 Forest Soils and Site Productivity (5) NW *Harrison* Considers unique properties and processes occurring in forest soils throughout the world with emphasis on soils of Pacific Northwest and aspects of forest soils that affect productivity. Two all-day Saturday field trips and one Saturday-Sunday field trip required. Recommended: ESC 210. Offered: A; odd years.

ESC 411 Forest Soil Microbiology (4) NW *Edmonds* Soil organisms in forest ecosystems, decomposition, nutrient cycling. N transformation, mycorrhizae, effects of forest management. Recommended: ESC 210. Offered: even years; A.

ESC 412 Field Survey of Wildland Soils (3) NW *Harrison, Henry, Zabowski* Study of soils in remote sites about which little information is available. Focus is field trip in Cascade Mountains just north of Glacier Peak with prior study of hiking area, soil and ecosystem changes, and wilderness use. Offered: S.

ESC 413 Soil Genesis and Classification (5) NW *Zabowski* Soil formation, morphology, classification, and relationship to the environment. Labs and weekend field trips illustrate properties and processes of

forest and grassland soils in Washington. Recommended: ESC 210. Offered: Sp.

ESC 414 Forest Soil Fertility and Chemistry (3) NW *Harrison* Tree growth depends, in part, on the interaction between chemical and biological activities within a given soil: the biological and chemical parameters that influence the growth; soil solution chemistry and surface reactions; reactions and processes that control essential plant nutrient levels and forms in soil solutions. Recommended: ESC 210. Offered: Sp; odd years.

ESC 416 Introduction to Bioremediation (3) NW *Brown* Introduces bioremediation as a remediation strategy for contaminated soils and sediments, including in situ remediation with organic residuals, microbial degradation, and phytoremediation. Sources and fate of soil contaminants, conventional remediation strategies, and applications of strategies will be presented. Offered: W.

ESC 418 Compost and Organic Soil Amendments (5) NW *Henry* Introduction to the science of land application of organic soil amendments, including benefits, opportunities, and considerations for land application, management of nutrients and contaminants, and guidelines/regulations. Special focus on composting and use of compost. Offered: Sp.

ESC 421 Dendrochronology (4) NW *Brubaker, Peterson* Analysis of important physiological and environmental factors controlling annual tree-ring growth and a critical review of the applications of tree-ring analysis to study forest productivity, watershed hydrology, forest fires, insect epidemics in relation to yearly weather conditions. Laboratory and field exercises construct tree-ring chronologies to study environmental histories of selected forest stands. Prerequisite: BOTANY 113. Offered: odd years; W.

ESC 432 Forest Pathology (4) NW *Edmonds* Ecology and management of forest diseases. Abiotic diseases caused by air pollution, adverse weather, and biotic diseases caused by bacteria, fungi, viruses, parasitic plants, and nematodes. Forest health. Disease management including silvicultural, chemical, and biological control. Disease modeling. Offered: odd years; A.

ESC 440 Theory and Case Studies of Ecosystem Management (5) NW *Franklin* Applying ecological principles in ecosystem management at stand and landscape levels based on observations of problems and practices during a 10-12 day field trip held prior to beginning of quarter. Students observe innovative forest management programs and experiments and prepare written and oral scientific analyses of specific topics. Offered: A.

ESC 441 Landscape Ecology (5) NW *Franklin* Basic landscape ecology concepts, including patches, corridors, networks, spatial dynamics; island biogeographic principles; landscape analysis methods; landscape models. Applications of landscape ecology in resources management (e.g., cumulative effects, cutting, patterns, anadromous fisheries, management of wildlife populations, and open-space planning). Recommended: ESC 326. Offered: W.

ESC 445 Ecology of Managed Forests (3) NW *Ford* Defines patterns of environmental change and habitat development occurring as forests are managed with different objectives. Particular attention is paid to changing microclimates and how they influence the physical environment and biodiversity. Worldwide occurrence of large-scale, man-made forests is described and their ecological significance. Offered: A.

ESC 450 Wildlife Ecology and Conservation (5) NW *West* Covers advanced principles of wildlife ecology such as habitat selection, population viability, and landscape ecology, and illustrates how they apply to

wildlife conservation problems with terrestrial, aquatic, and marine wildlife. Students must share costs of field trips. Prerequisite: ESC 350. Offered: W.

ESC 451 Biology and Conservation of Birds (3) NW *Manuwal* Major principles of natural history, avian reproductive biology, population ecology, and national and international conservation strategies for both hunted and unhunted birds. Emphasis on western United States. Prerequisite: either BIOL 102, BIOL 180, BIOL 202, BIOL 203, or BIOL 220, any of which may be taken concurrently. Offered: odd years; A.

ESC 452 Field Ornithology (3) NW *Manuwal* Students learn field identification skills and are introduced to field methodologies through required indoor labs, field trips, and field exercises. Exercises include study of survey techniques, feeding ecology, and behavior. Students are required to share field trip costs. Prerequisite: either BIOL 102, BIOL 180, BIOL 202, BIOL 203, or BIOL 220, any of which may be taken concurrently. Offered: odd years; A.

ESC 453 Biology and Conservation of Mammals (3) NW *West* Introduction to mammals of the world: mammalian evolution, taxonomy, morphology, reproduction, population biology, ecology, and conservation. Prerequisite: ESC 350; recommended: concurrent registration in ESC 454. Offered: even years; A.

ESC 454 Biology and Conservation of Mammals Laboratory (3) *West* Identification and natural history of mammals of the Pacific Northwest. Laboratory work on morphology, taxonomy, and natural history; fieldwork on natural history and sampling methods. Two weekend field trips required; students share travel costs. Prerequisite: ESC 350; recommended: concurrent registration in ESC 453.

ESC 455 Wildlife Seminar (1, max. 4) NW *Manuwal, West* Discussion of current research and application in wildlife biology and conservation. Credit/no credit only. Prerequisite: ESC 350. Offered: AW.

ESC 456 Dynamics of Managed Wildlife Populations (3) NW *Raedeker* Advanced principles of managed wildlife populations dynamics. Application of harvest management models and regulations applied to ungulates, upland game birds, waterfowl, furbearers, carnivores. Topics include population models, compensatory mortality, predation role, sustained yield harvest models, measured populations characteristics, computer simulation models with emphasis on management issues. Prerequisite: ESC 350. Offered: W.

ESC 457 Fish and Wildlife Toxicology (3/5) NW Overview of fish/wildlife toxicology: history of the field; regulations; methods used to assess risks contaminants pose to fish/wildlife; classes of contaminants and their direct, sublethal and indirect effects; and contemporary threats of contaminants to fish/wildlife, their habitats and prey. Includes laboratory. Offered: jointly with FISH 455; W.

ESC 458 Management of Endangered, Threatened, and Sensitive Species (5) NW *Marzluff* Biological underpinnings and political realities of endangered species management, including: legal issues, recovery teams, citizen rights, extinction, rarity, proactive management, captive propagation, reintroduction, species endangered in the Pacific Northwest. Students revise endangered species recovery plans. Offered: A.

ESC 459 Wildlife Conservation in Northwest Ecosystems (3) NW *Agee, Manuwal, West* Extended field course offers Wildlife Science students personal interactions with wildlife managers and wildlife populations in strategic public and private lands in the northwestern United States and southern Canada. Students will share costs of trip. Offered when there is sufficient student demand. Prerequisite: ESC 350; may not be repeated. Offered: Sp.

ESC 460 Institutionalizing Sustainable Ecological Practices. (3) I&S/NW *Lee* The purpose of this course is to introduce how sustainable resource activities are put into practice. Case studies of successful institutional of sustainable resource practices are presented, including curb-side and biosolids recycling, ecological restoration, bioremediation, sustainable wood production, and material certification. Offered: jointly with ENVIR 460; W.

ESC 490 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

ESC 491 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

ESC 492 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

ESC 494 Wildlife Senior Project Proposal (3) Selection of research topic, literature review, and preparation of a formal research proposal. Students select a faculty advisor or a faculty committee to assist them in the proposal writing process. Prerequisite: ESC 351; may not be repeated. Offered: AWSpS.

ESC 495 Senior Project in Conservation of Wildland Resources (5) Individual study of an ecosystem science and conservation problem under direction of a faculty member. Generally taken in last year of residence. Offered: AWSpS.

ESC 496 Wildlife Senior Thesis (5) Statistical analysis and presentation of research results and discussion of results of the senior research project. Students work with faculty advisors to complete field or laboratory research and then prepare the senior thesis. Prerequisite: ESC 494; may not be repeated. Offered: AWSpS.

ESC 499 Undergraduate Research (1-5, max. 15) Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

Courses for Graduates Only

ESC 501 Forest Ecosystems-Community Ecology (5) *Brubaker* Community ecology of forest ecosystems. Quantitative methods of community description. Role of limiting factors, competition and disturbance in determining community composition, structure and stability. Introduction to forest ecosystem productivity. History and application of successional theory. Prerequisite: basic ecology course or permission of instructor. Offered: A.

ESC 502 Forest Conservation Biology (5) *Peterson* Examines management strategies for conserving natural resources in forest ecosystems of the Pacific Northwest and other North American bioregions. Examines alternative approaches to producing and restoring sustainable flows of wildlife habitat, water, fiber, and other resources in the context of forest productivity, biophysical environment, disturbance, and public policy. Offered: Sp.

ESC 507 Soils and Land Use Problems (4) *Harrison* Environmental concerns of soils; how soil properties control potential and reasonable possibilities of land use. Includes factors controlling soil stability, hydrology, fertility, and movement of pollutants. Field trip oriented with weekly activity summaries. Students also conduct field trips to soil-use problem sites. Offered: W.

ESC 509 Review of Forest Autecology (4) *Hinckley* Review of concepts of soil formation, soil fertility, microclimate, hydrology, tree anatomy and morphology, physiology, water relations, mineral nutrition, and genetic and evolutionary mechanisms, as they relate to the adaptation and manipulation of forest-tree populations. For mid-career students only. Offered: A.

ESC 510 Graduate Studies in Forest Soils (1-5, max. 5) Offered: AWSpS.

ESC 511 Advanced Forest Soil Microbiology (5) *Edmonds* Detailed examination of microbial processes in forest ecosystems; types of organisms, biomass, decomposition and nutrient cycling, microbial transformations of N, impacts of management-clear-cutting, fertilization, pesticide addition. Graduate project required. Prerequisite: general biology, basic soils or permission of instructor. Offered: even years; A.

ESC 512 Biogeochemical Cycling in Soils and Forest Ecosystems (3) *Zabowski* Elemental cycles in forests and soils. Fundamentals of processes involved in cycling are addressed along with alterations resulting from environment, vegetation, and soil types. Consideration of cycles of nutrients, metals, and other elements. Weekly discussion section reviews literature on biogeochemical cycling. Prerequisite: one soils course or permission of instructor. Offered: W.

ESC 513 Advanced Soil Genesis and Classification (5) *Zabowski* Soil formation, morphology, classification, and relationship to the environment. Labs and field trips illustrate properties and processes of forest and grassland soils in Washington. Requires two weekend field trips and a graduate project. Prerequisite: ESC 210 or permission of instructor. Offered: Sp.

ESC 514 Advanced Forest Soil Fertility and Chemistry (4) *Harrison* Chemical properties of soil, nutrient and toxic elements; supply, retention, and loss of nutrients in soils; utilization of geochemical and ecosystem models such as GEOCHEM, MAGIC, TRICLE-DOWN, and ILWAS in developing a quantitative understanding of the chemical function of forest ecosystems. Prerequisite: general chemistry and geology of soils. Offered: Sp; odd years.

ESC 515 Advanced Soil and Plant Analysis (3) *Harrison* Plants and animals must acquire nutrient elements from their environment. Quantifying the composition of samples is the first step in understanding the processes in natural and manmade systems. Sampling, handling, preparation, storage, and analysis stressed. Prerequisite: one botany or plant science course, instrumental analysis, soils. Offered: Sp.

ESC 517 Biotransformations of Hazardous Compounds (1) *Strand* Presentation and discussion of the current literature in biotransformation and biological degradation of organic and inorganic compounds, particularly in the microbial environment. Credit/no credit only. Offered: ASp.

ESC 518 Microbial Degradation of Toxic Contaminants (3) *Herwig, Strand* Detailed survey of current understanding of microbiology and degradative pathways of industrial organic compounds, pesticides, plastics, oil, and metals. Microbial requirements for bioremediation. Methods of scientific investigation of microbial transformations. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with CEE 542/MICROM 518; W.

ESC 520 Graduate Studies in Ecosystem Science (1-5, max. 5) Offered: AWSpS.

ESC 521 Current Topics in Ecosystem Science (2, max. 6) Consideration of current literature and topics

in forest ecosystems and tree physiology. Offered: AWSp.

ESC 529 Ecosystems Seminar (1) *Sprugel* Discussion by invited speakers on current research related to ecosystems. Credit/no credit only. Offered: A.

ESC 535 Fire Ecology (3) *Agee* Fire regime concept as applied to fire ecology. Methodology for fire history research. History and function of forest fire in western United States with emphasis on Pacific Northwest. One weekend field trip. Prerequisite: permission of instructor. Offered: A.

ESC 538 Graduate Studies in Forest Pathology (1-5, max. 5) Offered: AWSpS.

ESC 547 Stream and River Ecology (5) *Naiman* Characterizations of stream and river ecosystems from a watershed perspective. Emphasis on fundamental processes affecting the structure and dynamics of aquatic communities and the riparian zone. Resource conflicts, new technologies, field trips, and class projects. Recommended: general ecology, forestry-fisheries interactions. Offered: jointly with FISH 547; Sp.

ESC 548 Special Topics in Streamside Studies (2, max. 6) Contemporary problems and issues in forestry, fisheries, and wildlife management in watersheds. Topics vary, yet focus on interactions of land and water resources in the forests of the Pacific Northwest. Prerequisite: permission of instructor. Offered: jointly with FISH 548; AW.

ESC 554 Wildlife Seminar (1-2, max. 10) *Manuwal, West* Discussion of current research and application in wildlife biology and conservation. Prerequisite: permission of instructor. Offered: AW.

ESC 555 Graduate Studies in Wildlife Science (1-5, max. 5) Offered: AWSpS.

ESC 557 Topics in Wildlife Science (2, max. 6) *West* Graduate seminar on applied and basic topics in wildlife ecology and conservation. Different topics selected each offering. Offered: AWSp.

ESC 591 Graduate Teaching Practicum (1-5, max. 5) Principles of teaching and learning applied to undergraduate instruction in Ecosystem Science and Conservation. Development, delivery, and evaluation of lectures and homework assignments. Graduate teaching experience for ESC students only. Credit/no credit only. Offered: AWSp.

ESC 601 Graduate Internship in Ecosystem Science and Conservation (3-9, max. 9) Credit/no credit only. Offered: AWSpS.

Environmental Horticultural and Urban Forestry

EHUF 401 Urban Forest Management (3) I&S Explores issues of urban forest benefits, planning, administration, public policy, and career opportunities, utilizing Urban Forestry faculty and leaders of city, county, and state agencies. Emphasizes the urban forest's diverse managers and constituents and their varied responsibilities, values, and resources. Offered: W.

EHUF 402 Curation and Education in Public Gardens (3) I&S/NW *Wott* Techniques of curatorial practice relevant to living collections of plants, including documentation, policies, conservation, and display. Aspects of establishing and implementation of a public horticulture program including assessment, program tools and methods, and funding in a public environment. Offered: W; odd years.

EHUF 411 Plant Propagation: Principles, and Practice (3) NW *Wott* Science and practice of plant propagation including sexual (seed) and asexual (cutting, layering, grafting) propagation. Includes discussion of physiological effects, methodology and laboratory exercises. Wide variety of plants covered. Intended for majors in urban horticulture and urban forestry and others interested in reproducing landscape plants. Recommended: 10 credits of introductory biology or botany, or equivalent. Offered: Sp.

EHUF 451 Urban Plant Protection (5) NW *Gara* Working knowledge on insects and diseases of plants growing in the urban environment. Emphasis placed on pest and damage recognition, control methods, and integrated pest management systems. Offered: Sp.

EHUF 462 Restoration Ecology Capstone: Introduction (2) First of a three-course capstone sequence in restoration ecology. Students review and assess project plans and installations. Class meets with members of previous capstone classes to review their projects.

EHUF 463 Restoration Ecology Capstone: Proposal and Plan (3) Student teams prepare proposals in response to requests for proposals (RFPs) from actual clients. Clients may be governments, non-profit organizations, and others. Upon acceptance of the proposal, teams prepare restoration plans. Prerequisite: EHUF 462.

EHUF 464 Restoration Ecology Capstone: Field Site Restoration (5) Teams take a restoration plan developed in EHUF 463 and complete the installation. Team participation may include supervision of volunteers. Teams prepare management guidelines for the client and conduct a training class for their use. Prerequisite: EHUF 463. Offered: jointly with BES 464/TESS 464; Sp.

EHUF 470 Urban Forest Landscapes (5) NW *Bradley, Wagar, Wolf* Comprehensive view of urban forest and urban forest landscapes. Includes close examination of factors that differentiate urban forest landscapes along the urban to wildland gradient. Compare legal, social, political, administrative, physical, and biological variations. Offered: SpS.

EHUF 471 Ecological Concepts and Urban Ecosystems (3) NW Ecological concepts introduced in an urban context with emphasis on autecological relationships of plants in an urban environment. General framework for development of urban ecological concepts followed by case studies and exploring applications in new areas. Offered: W.

EHUF 473 Principles of Ecological Restoration (5) NW *Ewing* Philosophy of restoration, structural components of ecosystem degradation, analysis of restoration projects and methods, and an ecosystem by ecosystem review of how systems are restored. An ecology courses that emphasizes applied scientific knowledge of ecosystems. Recommended: BIOL 472 or BOTANY 354 or BOTANY 371. Offered: W.

EHUF 475 Wetland Ecology and Management (5) NW *Ewing, Harrison* Wetland types and functions, global and North American distribution, wetland plant types, soil chemistry. The influence of stresses on wetland composition and form. Autecology of wetland plants; response to and detection of stresses. Impacts of urbanization; management techniques. Recommended: either BIOL 472, BOTANY 354, or BOTANY 371. Offered: A.

EHUF 477 Wetland Restoration (5) *Ewing* A Web-delivered, self-paced course covering wetland science, restoration ecology, freshwater restoration, coastal restoration, monitoring/maintenance, and case histories. Completion of extensive readings, assignment and test required for each module. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203;

recommended: either EHUF 473, EHUF 475, BOTANY 354, BOTANY 456, or BIOL 472. Offered: AWSp.

EHUF 478 Horticultural Stress Physiology (3) NW *Chalker-Scott* Impact of environmental stresses (e.g., temperature, light, moisture, nutrients, allelopathy, salt, ultraviolet) on the performance of horticulture plant species and their subsequent physiological responses. Particular emphasis is given to problems common in urban and restored environments (e.g., pollution, soil compaction, heat). Group and individual projects. Prerequisite: BOTANY 371. Offered: W.

EHUF 480 Selection and Management of Landscape Plant (5) NW *Chalker-Scott* Principles of plant selection and management in urban and modified environments. Site analysis and preparation; physiological basis for plant selection; techniques for successful plant installation and aftercare; plant performance evaluation; long-term management and plant health care. Group and individual projects. Prerequisite: ESC 210; recommended: BOTANY 110. Offered: A.

EHUF 481 Field Practicum in Plant Selection and Management (2) NW *Chalker-Scott* Practical application of plant selection and management in urban and modified environments. Site analysis and preparation; evaluation of nurseries; techniques for successful plant installation and aftercare; plant performance evaluation; plant health care assessment. Group project. Prerequisite: EHUF 480, which may be taken concurrently. Offered: A.

EHUF 482 Field Practicum in Plant Selection and Management (2) *Chalker-Scott* Practical application of plant selection and management in urban and modified environments. Site analysis and preparation; evaluation of nurseries; techniques for successful plant installation and aftercare; plant performance evaluation; plant health care assessment. Group project. Prerequisite: EHUF 480, which may be taken concurrently. Offered: Sp.

EHUF 490 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

EHUF 491 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

EHUF 492 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

EHUF 495 Senior Project in Urban Forestry (5) Individual study of an urban forestry problem under direction of a faculty member. Offered: AWSpS.

EHUF 499 Undergraduate Research (1-5, max. 15) Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

Courses for Graduates Only

EHUF 502 Data Collection, Analysis, and Presentation (3) *Ewing* Design of scientific experiments, collection of data, and use of computers to store, analyze and present data. Limited by equipment availability to 8 students; UH students have priority. Offered: Sp.

EHUF 503 Current Issues in Urban Horticulture (1) Critical evaluation and discussion of published research in urban horticulture and restoration. Students and faculty present and discuss research methods and questions from current literature. Offered: AWSp.

EHUF 531 Seminar in Horticultural Taxonomy and Landscape Plant Selection (1-3, max. 12) Special topics in horticultural taxonomy (nomenclature and systematics of cultivated plants, evolution of diverse genera and families, methods of analysis) and landscape plant selection (natural ecology and biogeography of landscape plants, plant exploration, introduction and testing). Offered: W.

EHUF 549 Urban Horticulture Seminar (1, max. 6) Discussion by invited speakers on current topics in urban horticulture. Credit/no credit only. Offered: A.

EHUF 561 Public Presentation in Urban Horticulture (2) *Wott* Students learn to make public presentations in scientific, professional, and popular contexts and to interpret technical information for professional and lay audiences. Support materials, such as audiovisuals and graphics are discussed. Offered: W.

EHUF 572 Urban Ecosystem Management Seminar (1-3, max. 9) *Ewing* Graduate seminar in urban ecosystem management. Special topics of current importance in urban ecosystem management. Ecological aspects of ecosystem conservation, restoration, and management. Students participate in presentation and discussion of current work. Prerequisite: EHUF 471, EHUF 475. Offered: W.

EHUF 601 Internship in Urban Horticulture (1-9, max. 9) Credit/no credit only. Prerequisite: permission of graduate program adviser. Offered: AWSpS.

Forest Engineering

F E 404 Forest Engineering Field Seminar (1, max. 6) I&S *Bolton, Schiess* Forest engineering activities examined and discussed during three all-day site visits. Opportunity for forest engineering practitioners, faculty, and students to interact in an informal, content-rich environment. Credit/no credit only. Offered: AWSp.

F E 423 Watershed Analysis (4) NW *Schiess* Inventory and historical analysis of the interactions between natural resources, climate, and forest management. Development of management objectives and design of forest management activities based on inventory and analysis. Includes the use of modeling and simulation in predicting the influence of forest management activities on other resources. Offered: W.

F E 425 Wildland Hydrology (4) NW *Bolton* Introduction to the hydrologic cycle and basic hydrologic methods as applied to wildlands. Effects of forest management activities on hydrologic processes. Offered: W.

F E 430 Aerial Photos/Remote Sensing Natural Resources (3) NW *Schreuder* Principles of photogrammetry, interpretation, and remote sensing; and their application to management of natural resources and wildlands. Uses for watersheds, forest resources, wildlife, point and nonpoint pollution, land-use planning, and outdoor recreation. Offered: Asp.

F E 444 Introduction to Forest Engineering Design (4) *Schiess* Design process and methodology; decision making; creativity; project planning and management; engineering economics; probabilistic and statistical aspects of forest engineering design; ethical and legal issues; presentation of design project results. Lecture, laboratory, and design projects. Offered: W.

F E 445 Management Science in Forest Engineering (5) Management science methods used in data collection, analysis, and decision making examined within a systems framework. Statistical methods of point and interval estimation and regres-

sion analysis applied to logging and construction time studies and work sampling. Linear, non-linear, and dynamic programming optimization techniques are applied to forest engineering problems. Offered: W.

F E 450 Advanced Forest Engineering Design (5) *Schiess* Capstone design course emphasizes application of forest engineering design principles. State-of-the-art methods and technology used to craft an implementable natural resource development plan. Prerequisite: either 1.7 in F E 341 or 1.7 in F E 346; 1.7 in F E 444. Offered: Sp.

F E 451 GIS-based Landscape Modeling (5) I&S/NW *Schiess* Use of GIS to investigate forest operations at the landscape scale. Focus on transportation, land-use, and environmental issues. Problem definition, data collection, and data structuring strategies. As part of a design team, students develop an implementable, natural resources management plan for a client. Offered: Sp. Prerequisite: either F E 423 or F M 425.

F E 452 Stream-Road System Interactions (5) I&S/NW *Schiess* Design and evaluation of road systems and stream impacts. Road locations and decommissioning are addressed meeting management objectives and minimizing sediment delivery. Modeling and field verifications of road impacts. As part of a design team, students develop an implementable, natural resources management strategy for a client. Offered: Sp. Prerequisite: either F E 345 or F E 346.

F E 465 Introduction to Photogrammetry (2) NW Photogrammetric measurements from aerial photos. Aerial cameras and camera calibration. Interior orientation from ground control. Exterior orientation and derivation of ground coordinates. Ground control. Use of analytical equipment for stereoplottling. Offered: W.

F E 470 Wood Science and Forest Products Manufacturing (3) *Breitsprecher* Coverage of the physical and chemical properties of wood and how they relate to its use, followed by a discussion of the major manufacturing processes used to convert wood to products for society. Field trips are taken to representative processing plants. Offered: W.

F E 480 Silvicultural Engineering Systems (3) *Fridley* Engineering design of systems for establishing, nurturing, and culturing trees for eventual harvest and use as industrial feedstock. Lecture/discussion. Prerequisite: CSE 142; CEE 220; M E 230; IND E 250; F E 332; F E 368. Offered: A.

F E 490 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

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F E 492 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

F E 499 Undergraduate Research (1-5, max. 15) Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

Courses for Graduates Only

F E 523 Advanced Watershed Analysis (4) *Schiess* Inventory and historical analysis of interactions between natural resources, climate, and forest management. Develop management objectives and

design forest management activities based on inventory and analysis. Use of modeling and simulation for predicting influence of forest management activities on other resources. Site-specific mitigation design and remediation projects. Prerequisite: F E 425. Offered: W.

F E 524 Watershed Design (4) *Fridley* Study of the principles and processes related to forest engineering design of watershed scale systems. Prerequisite: F E 523 and graduate standing or permission of instructor. Offered: Sp.

F E 525 Advanced Wildland Hydrology (4) *Bolton* Advanced treatment of hydrologic cycle and basic hydrologic methods as applied to wildlands. Effects of forest management activities on hydrologic processes. Graduate focus on a detailed field or modeling hydrologic analysis. Offered: W.

F E 529 Current Topics in Wildland Hydrology (1) *Bolton* Students present detailed analysis of research papers on selected topics in wildland hydrology. Topics cover measurement techniques, experimental data, and theoretical models of hydrologic processes. Credit/no credit only. Prerequisite: senior or graduate standing and permission of instructor. Offered: AWSp.

F E 540 Graduate Studies in Forest Engineering (1-5, max. 5) Offered: AWSpS.

F E 541 Advanced Forest Engineering (5) *Fridley, Schiess* Logging organization and management; logging cost analysis and budgeting. Offered: W.

F E 542 Advanced Logging Engineering (3) Detailed consideration of problems of logging planning and truck road engineering, including the preparation and field layout of logging plans; location, design, and construction of forest roads. Offered: Sp.

F E 591 Graduate Teaching Practicum (*, max. 5) Principles of teaching and learning applied to undergraduate instruction in forest engineering. Development, delivery, and evaluation of actual lectures and homework assignments in the student's area of expertise are required. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

Forest Management

F M 400 Forest Science Inquiry for Teachers (5) *Lee* Inquiry-based scientific methods for K-12 instruction; asking how and why questions; stating answerable questions; forming hypothesis to answer questions; testing hypothesis by making observations, making measurements, and conducting experiments; displaying results. Writing curriculum plans to implement district and state requirements. Offered: S.

F M 402 Forest and Economic Development in the Developing World (3) Examines the relationship between forests and economic development in tropical countries. Topics include the role of population growth, poverty, land tenure, and international trade on forest use as well as theories of economic development. Case examples of forest-based economic development in different countries and regions.

F M 422 Marketing of Forest Products (3) I&S/NW *Eastin* Introduction to forest products marketing in North America. Examines products marketing, industry structure, and strategic management issues utilizing marketing concepts. Topics include product management, distribution channels, strategic industry analysis, and marketing research techniques. Case studies used to understand forest products industry decision making. Offered: W.

F M 423 International Marketing of Forest Products (3) I&S/NW *Eastin* Introduction to international marketing concepts and their application to forest prod-

ucts. Analysis of forest products trade patterns, resource base changes, policy, industrial policies, and environmental concerns. Discussion of market distorting practices including log export bans and tariff and non-tariff barriers. Offered: Sp.

F M 424 Forest Stand Dynamics (3) NW Forest stand development and manipulation response. Forest stand dynamics and stand structure in pure and mixed species forests, response to minor and major disturbances, interactive changes with time, and patterns and response to manipulation. Offered: A.

F M 425 Ecosystem Management (3) NW Advanced concepts and practices in ecosystem management, integrating landscape management principles, inventory, planning, silviculture, objective/tradeoff/policy considerations, stand growth, adaptive management, and systems organization and management. Case study emphasizes integration. Prerequisite: F M 323. Offered: W.

F M 435 Forest Entomology (3) NW *Gara* Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects. Offered: A.

F M 436 Laboratory in Forest Entomology (2) NW *Gara* Introduction to the insect orders; identification of forest insects and their damage. One field trip to study insect problems required. Offered: A.

F M 461 Forest Management and Economics II (4) I&S/NW *Bare* Basic concepts of timber harvest scheduling, sustained-yield models, contemporary analytical techniques, timber supply, and forest product markets. Prerequisite: F M 360. Offered: W.

F M 464 Economics of Conservation (3) I&S/NW Economic principles and their use in the analysis of contemporary conservation problems. Particular emphasis directed toward the conservation of forest resources in the Pacific Northwest and related policy issues.

F M 466 Economics of Timber Production (3) I&S/NW Application of basic economic concepts to the production of timber as a commercial land use. Analysis of timber investments, alternative management programs, and regulation models. Prerequisite: F M 360.

F M 469 Forest Biometry (5) NW *Turnblom* Quantitative techniques commonly used in forecasting future forest conditions and developing volume equations: site quality assessment methods, development of site index equations, measurement of stand density and its effects on growth, growth and yield prediction, and familiarization with current computerized forest growth simulation models. Prerequisite: Q SCI 381. Offered: odd years; A.

F M 470 Natural Resource Policy Processes (5) I&S/NW *Ryan* Introduction to and analysis of environmental policy-making processes, with a focus on forest and land policy and law. Use of policy models to examine the interaction of agencies, interest groups, Congress, and the courts in the legislative process. Policy implementation, evaluation, and change are also addressed. Offered: A.

F M 481 Management of Wildland Recreation and Amenities (3) NW *Lee* Introduction and overview of wildland recreation and amenities management. Agency history and objectives explored along with integration of recreation with other land uses. Water, forestry, wildlife, and wilderness resources for recreational uses discussed along with role of private enterprise in recreation and amenities. Topics of current and local interest. Offered: W.

F M 490 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is

not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

F M 491 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

F M 492 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

F M 495 Senior Project in Forest Management (5) Individual study of a forest management problem under the direction of a faculty member. Students utilize knowledge gained in field studies and required course work to present possible solutions to a specific forest management problem. Prerequisite: F E 345; F M 323; F M 362. Offered: AWSpS.

F M 496 Forest Management Case Studies (5) Focus on preparation and presentation of management plan for forested area. All aspects of multiple use and ecosystem health considered within multiplicity of economic, biological, legal, social, and political constraints. Case studies to familiarize students with complexities of modern decision making. Offered: Sp.

F M 499 Undergraduate Research (1-5, max. 15) Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

Courses for Graduates Only

F M 503 Advanced Forest Stand Dynamics (3) *Oliver* Emphasizes current research and sources of knowledge about forest stand development and responses to manipulations. Development of pure and mixed species forests, even-aged and uneven-aged stands. Responses to disturbances, interactive changes with time, patterns and responses to manipulation, growth and yield quantification. Prerequisite: previous ecology courses. Offered: A.

F M 504 Research Processes in Forest Resources (4) *Lee* Comprehensive survey of research processes for entering graduate students. Diagnostic and prescriptive evaluation of student research capabilities. Problem and hypothesis formulation, study design, multi-method strategies for gathering and analyzing data, and interpretation and presentation of results. Prerequisite: graduate standing. Offered: A.

F M 520 Fundamentals of Marketing and Management from a Forest Products Perspective (3) *Paun* Overview of business concepts as they relate to the following topics in the context of the forest products industry: launching a business and entrepreneurship; marketing; human resources management; and global business. Offered: A

F M 521 Fundamentals of Finance and Accounting from a Forest Products Perspective (3) *I&S/NW Paun* Provides an overview of business concepts as they relate to the following topics in the context of the forest products industry: business economics; financial planning and management; securities and insurance; accounting; and operations management. Offered: W

F M 522 Current Topics in Silviculture/Protection (2, max. 6) *Edmonds, Gara* Detailed study of current issues, information, and literature in silviculture/protection. Offered: AWSp.

F M 528 International Silviculture (3) *Gara* Background of biological, social, and economic basis for silvicultural practices in different areas; case examples of silvicultural practices in different localities; consideration of selected international issues in

silviculture. Prerequisite: permission of instructor. Offered: even years; W.

F M 530 Graduate Studies in Forest Fire Control (1-5, max. 5) Offered: AWSpS.

F M 537 Graduate Studies in Forest Entomology (1-5, max. 5) Offered: AWSpS.

F M 541 Readings in Silviculture (1-5, max. 6) Detailed study of national and international literature pertaining to silviculture. Offered: AWSpS.

F M 545 Principles of Forest Entomology (3) *Gara* Historical perspective of the discipline, introduction to general entomology and taxonomy, forest insect ecology, integrated pest management concepts for defoliators, bark beetles, wood borers, and urban forestry pests. Prerequisite: general biology, botany, zoology or permission of instructor. Offered: A.

F M 552 Seminar in Forest Products Marketing (3) *Eastin, Paun* Evaluate and discuss current research topics in marketing, marketing research, and international marketing of forest products. Presentation of a critical review of published research or administration of an empirical project. Offered: AWSp.

F M 553 Graduate Studies in Forest Product Marketing (1-5, max. 5) Independent study and research conducted on issues related to forest products marketing. Offered: AWSp.

F M 562 Advanced Forest Resources Management (3) *Bare* Overview of concepts and procedures involved in managing forested lands for the production of commodity and amenity values. Use of systems analysis techniques for evaluating alternative land-use programs and manipulations of the forest ecosystem. Prerequisite: graduate standing. Offered: A.

F M 563 Graduate Studies in Forest Mensuration (1-5, max. 5) Offered: AWSpS.

F M 564 Advanced Forest Biometry (3/5) *Turnblom* Classical problems in analysis of forest populations and growth theory, and principles of parametric analysis and estimation processes in forest biometry. Offered: odd years; A.

F M 565 Graduate Studies in Forest Management (1-5, max. 5) Offered: AWSpS.

F M 566 Graduate Studies in Forest Photogrammetry (1-5, max. 5) Offered: AWSpS.

F M 568 Graduate Studies in Forest Economics (1-5, max. 5) Topical issues including log export controversy, capturing value added products, economics of environmentalism, sustainable forestry, and forest products certification. Offered: AWSpS.

F M 570 Graduate Studies in Forest Policy Analysis (1-5, max. 5) Offered: AWSpS.

F M 571 Policy Analysis Design (5) Study based on understanding of the actors, arenas, issues, and policy communities that form the context for policy development and implementation. Exploration of approaches to policy inquiry. Consideration of implications for both policy and management. Students develop a study design for course project. Offered: jointly with PB AF 592.

F M 572 Graduate Studies in Forest Resource Planning (1-5, max. 5) Offered: AWSpS.

F M 573 Forest Environmental Resource Planning (3) *Bradley* Origins and evolution of environmental planning in the forest environment. Discussion of the planning process and methodologies for environmental management and planning; selected case studies of environmental resource plans. Prerequisite: graduate standing. Offered: even years; A.

F M 575 Advanced Natural Resources Sociology (3) *Lee* Comparative study of institutional and organizational aspects of natural resources management, with special attention to forest resources. Development, persistence, and change of selected institutions in the context of pre-industrial, industrial, and advanced industrial societies. Implications for policy formulation, decision making, and technology transfer. Offered: even years; A.

F M 576 Current Topics in Forest Policy and Management (1-2, max. 2) *Ryan* Contemporary problems in forest policy and management. Topics vary but focus on the development of specific political or philosophical issues; empirical questions of concern to the forestry profession; or the development of new tools for management, planning, or policy analysis. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

F M 577 Global Forest Resource and Environmental Markets (3) *Perez-Garcia* Economic analysis of global forest resource markets. Models of timber supply and international trade. Linkages to environmental resources including carbon, biodiversity, and climate change. Offered: Sp.

F M 579 Graduate Studies in Forest Sociology (1-5, max. 5) Offered: AWSpS.

F M 587 Current Topics in International Forest Products Trade: Marketing Research (2, max. 6) *Eastin* Current research topics in marketing, market research, and technology related to the forest products sector. Presented by faculty and invited professionals, supplemented by student presentations. Offered: Sp.

F M 588 Current Topics in International Forest Products Trade (2, max. 6) *Perez-Garcia* Current research topics in a variety of business related areas, including international marketing of forest products, forest economics, international business and global trade modeling. Seminars by faculty and invited professionals supplemented by student presentations. Credit/no credit only. Offered: A.

F M 589 Current Topics in International Forest Products Trade: Forest Economics (2, max. 6) *Perez-Garcia* Current research topics in forest economics as related to forest products sector. Presented by faculty and invited professionals, supplemented by student presentations. Credit/no credit only. Offered: W.

F M 591 Graduate Teaching Practicum (1-5, max. 5) Principles of teaching and learning applied to undergraduate instruction in Forest Management. Development, delivery, and evaluation of actual lectures and homework assignments are required in the student area of expertise. Credit/no credit only. Offered: AWSp.

F M 601 Graduate Internship in Forest Management (*) Credit/no credit only. Offered: AWSpS.

Paper Science and Engineering

PSE 400 Wood Properties and Utilization (4) *I&S/NW Breitsprecher, Briggs* Relationship of physical and chemical properties of wood to its use. Role of silviculture and genetics in modifying wood products and value of products. Manufacturing processes of major wood products, examining material and energy balances and environmental effects. Comparison of wood with steel, concrete, plastics, and other materials. Offered: A.

PSE 401 Wood and Fiber Identification (2) NW *Briggs* Laboratory in identification of wood fibers of

North American species. Use of microscope and image analyzer in obtaining wood and fiber measurements. Offered: A.

PSE 402 Paper Properties and Additives (4) NW McKean Material science of paper and paperboard. Measurement and characterization of structural, mechanical, and optical properties of paper. Standard testing methods, paper colorants, effect of additives on paper properties, and relationship of fundamental paper properties to end use requirements. Offered: A.

PSE 406 Wood Chemistry I (3) NW Chemistry of cellulose, hemicellulose, and lignin. Pulping and bleaching chemistry of wood. Prerequisite: either CHEM 237 or CHEM 335. Offered: A.

PSE 407 Wood Chemistry I Laboratory (2) NW Proximate analysis of wood. Use of instrumental methods for wood component analyses. Prerequisite: PSE 406. Offered: W.

PSE 409 Wood Extractives Chemistry (2) NW Northey Nature, origin, and occurrence of the extraneous components of wood, their influence on pulp and paper preparation, and their utilization. Prerequisite: either CHEM 237 or CHEM 335. Offered: even years; Sp.

PSE 450 Paper Science and Engineering Seminar (1) Discussion of current topics in the science and technology of pulp and paper production. Emphasis on employer expectations of students in the paper science industry. Offered: AWSp.

PSE 475 Microtechnique (3) Breitsprecher Covers the principles and the practice of specimen preparation for light and electron microscopy. Tailored to meet the research interests of the participants. Students prepare mounts by several techniques and examine them with the appropriate instrumentation. Offered: odd years; Sp.

PSE 476 Pulping and Bleaching Processes (3) Gustafson Conversion of wood to mechanical and chemical pulps. Kraft, sulfite, and semi-chemical pulping processes. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered: jointly with CHEM E 471; W.

PSE 477 Papermaking Processes (3) McKean Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Offered: jointly with CHEM E 472; A.

PSE 478 Pulp and Paper Laboratory (2) Jacobs-Young Laboratory experiments in chemical and semi-chemical pulping of wood. Bleaching of chemical and high-yield pulps. Physical and chemical characteristics of pulp fibers. Prerequisite: PSE 476. Offered: jointly with CHEM E 473; Sp.

PSE 479 Pulp and Paper Laboratory II (3) McKean Paper testing, paper additives, flocculation, drainage, retention, heat transfer, and fluid dynamics in papermaking from virgin and recycled raw materials. Prerequisite: PSE 402; PSE 477. Offered: W.

PSE 480 Pulp and Paper Process Control (3) Gustafson Control of pulp and paper processes. Sensors, actuators, interface equipment, and computer control strategies common to this industry. Prerequisite: PSE 476; PSE 477. Offered: W.

PSE 481 Pulp and Paper Unit Operation (3) Unit operations of particular interest in the pulp and paper

industry in addition to those covered in CHEM E 330 and 340. Prerequisite: CHEM E 340. Offered: W.

PSE 482 Paper Science and Engineering Design I (3) I&S/NW Briggs, Gustafson Basic engineering economics applied to design of pulp and paper facilities. Analysis of engineering alternatives based on use cost analysis and accounting tools. Introduction to process and mill design. Prerequisite: 2.0 in PSE 406; 2.0 in PSE 476; 2.0 in PSE 477. Offered: W.

PSE 483 Paper Coating and Converting (3) Barlow Coatings and their preparation, rheology, process equipment, drying, and product evaluation. Prerequisite: PSE 477. Offered: A.

PSE 484 Secondary Fiber (3) Hodgson Recycling of paper. Sources of secondary fiber. Processing methods for contaminants and ink removal. Properties and uses of recycled fiber. Prerequisite: PSE 406; PSE 476; PSE 477. Offered: Sp.

PSE 485- Undergraduate Research (1-, max. 3) Johnson Undergraduate research or independent study project under the supervision of the faculty; usually one credit per quarter. Offered: AWSp.

PSE 486 Environmental Management (3) I&S/NW Effects of pollution and environmental regulations on industry and community. Sources, regulations, and control of air, water, solid waste emissions as generated by the paper science industry. Offered: W.

PSE 487 Paper Science and Engineering Design II (5) Comprehensive design of pulp and paper processes, including: economic feasibility studies; process equipment design, optimization, and control; and overall process integration and layout. Safety and ethics in the design process. Prerequisite: PSE 482. Offered: Sp.

PSE 488 Polymer Chemistry (3) Allan Fundamental review of synthetic and natural polymers, including kinetics of formation, molecular weight distributions, and solid-state and solution properties. Prerequisite: either CHEM 237 or CHEM 335. Offered: W.

PSE 490 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSp.

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PSE 492 Undergraduate Studies (1-5, max. 5) Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

PSE 497 Pulp and Paper Internship (1-2, max. 3) Technical and economic analysis of commercial pulp and paper installations. Structured visits to industrial operations to observe technical aspects of pulp and paper curriculum in practice. Preparation of visitation reports and analysis in seminar setting. Offered: AWSpS.

Courses for Graduates Only

PSE 502 Pulp and Paper Technology (4) Hodgson, Jacobs-Young Overview of the sources of fiber raw material and processes for pulp and papermaking (mechanical and chemical pulping, papermaking and bleaching processes). Laboratory study of converting raw materials to pulp and paper products. Offered: A.

PSE 505 Biotechnology in Pulp and Paper Industry (3) Jacobs-Young Explores biotechnology terminology, the utilization of biological agents in pulp processes, and analytical testing methods, as well as the economic and environmental impacts of bioprocesses.

PSE 508 Advanced Wood Chemistry (3) Biogenesis of lignins and isotope labeling methods. Oxidative coupling phenols. Alkaline degradation of polysaccharides and oxygen-based bleaching chemistry. Prerequisite: PSE 406. Offered: odd years; A.

PSE 514 Pulp and Paper Process Simulation (3) Gustafson Presentation of process simulation techniques currently used in the pulp and paper industry. Large-scale simulations of pulp and paper unit operations developed and analyzed. Use of simulations for control, process optimization, and statistical quality control purposes. Offered: even years; A.

PSE 555 Surface and Colloid Science of Papermaking (3) Hodgson Introduction to principles of surface and colloid science, particularly as they pertain to the wet end of the papermaking process. Surface and colloidal properties of wet end additives. Examination of specific examples and case studies in papermaking situations. Prerequisite: PSE 477 or equivalent. Offered: odd years; A.

PSE 570 Graduate Studies in Forest Products (1-5, max. 5) Offered: AWSpS.

PSE 576 Microscopy and Photomicrography (3) Breitsprecher Principles of microscopy as well as the techniques of using microscopes and taking photographs with them. Darkroom practice for black and white photography included. Students take photographs, develop negatives, and make enlargements. Offered: even years; Sp.

PSE 577 Wood and Paper Science Seminar (1, max. 6) Discussion of current topics in the science and technology of pulp and paper production, including wood and polymer chemistry. Offered: ASP.

PSE 579 Wood Properties and Utilization (4) Breitsprecher, Briggs Biology of wood formation and basic properties of wood, processes that create wood products, performance attributes required of these products, understanding of linkages between biology, silviculture, and product technology and performance. Offered: AW.

PSE 580 Field Studies in Wood Utilization (2) Briggs Five-day field trips visiting a diverse mix of wood products industries in the Puget Sound region. Students observe manufacturing technologies for various products, learn about markets from these products, and discuss resource, market, and technical issues with management in these facilities. Offered: Sp.

PSE 589 Wood Biosynthesis (3) Biosynthesis of carbohydrates, phenolic and terpenoid compounds in forest trees, and biochemistry of wood degradation. Prerequisite: PSE 406. Offered: even years, Sp.

PSE 591 Graduate Teaching Practicum (*, max. 5) Principles of teaching and learning applied to undergraduate instruction in paper science and engineering. Development, delivery, and evaluation of actual lectures and homework assignments. Graduate teaching experience for PSE students only. Credit/no credit only. Offered: AWSp.

The Information School

Dean

Michael Eisenberg

Associate Dean

Harry Bruce

370 Mary Gates Hall



General Catalog Web page:

www.washington.edu/students/gencat/academic/Info_School.html



School Web page:

www.ischool.washington.edu

The Information School is dedicated to preparing individuals for professional careers and leadership roles in the information professions. As a broad-based information school, the School embraces a wide range of academic interests reflected in its main academic degree areas: information science, library science, information management, and informatics. Graduates of the School assume a variety of professional roles in the public and private sectors, with positions that span from information architects to children's librarians, from taxonomists to Web developers.

The signature of the School is its human-centered approach to information studies and technology. This focus holds the human perspective as a critical and integral component in the study of information and technology; it encourages increasing understanding of human involvement with information and its social and technological ramifications.

Through its specific goals and objectives in instruction, research, service, and outreach, the School creates and continues to foster a dynamic learning environment dedicated to preparing our students for emerging opportunities and challenges of the 21st century.

Degrees Offered

The School offers degree programs leading to the Bachelor of Science in Informatics, the Master of Library and Information Science (MLIS), the Master of Science in Information Management (MSIM), and the Doctor of Philosophy in Information Science. The School also provides continuing education opportunities for professionals as well as service courses for undergraduates in information fluency, research strategies, and technology.

History

Originally established as the School of Librarianship in 1911, the Information School is the oldest library and information school west of the Mississippi. The School has been continuously accredited by the American Library Association since 1926 and offers the most extensive ALA-accredited library and information science degree program in the Northwest region of the United States.

In 1998, the University set out to transform the School by charging it with a new mission, to become what it is today: a broad-based information school that meets the challenges and opportunities of the infor-

mation age. With the addition of three new degree programs, a new dean, an esteemed faculty, and state-of-the-art facilities, the Information School became the University's sixteenth independently organized school and college in 2001.

Continuing its long tradition of excellence and innovation, the School continues to explore the theoretical and applied cutting edges of the information field and to nurture the best of both worlds: traditional library values and ever-changing information frontiers.

The vision statement adopted by the School is "*People and Knowledge: Building Information Connections*. The faculty, staff, students, and alumni of the Information School believe that connecting people with knowledge is of fundamental individual and societal importance; further, we believe access to information is a basic human right. We commit ourselves to sustain this vision."

The Information School is actively committed to cultivating diversity in the School and in the information professions.

Graduate Programs

Graduate Program Coordinator
470 Mary Gates Hall, Box 352840
206-543-1794
info@ischool.washington.edu

The School offers graduate programs leading to the Master of Library and Information Science, the Master of Science in Information Management, and the Doctor of Philosophy in Information Science.

Admission Requirements:

Minimum requirements for admission to the graduate programs in the School are a baccalaureate degree from an accredited institution, a GPA of 3.00 in the last two years of college work, and approval of the School and the UW Graduate School. A master's degree is expected for applicants to the Ph.D. program. Students enter the School from varied disciplines.

A complete application file includes the copy of the UW Graduate School application for admission; official transcripts; Graduate Record Examination general test scores (GMAT scores are acceptable for MSIM applicants only); three letters of recommendation; a curriculum vitae or resume, and a personal statement.

International applicants, must also meet requirements outlined by the UW Graduate Admissions for international students, including requirements for the Test of English as a Foreign Language (TOEFL). For additional information, see www.grad.washington.edu/admissions/index.htm.

Deadlines for admissions vary by program. For more information and to request application materials, visit the School's Web site at www.ischool.washington.edu.

Financial Aid

The University of Washington Financial Aid Office administers a variety of government and University funded financial aid programs for which applicants must submit the Free Application for Federal Student Aid form (FAFSA). For more information, contact the UW Financial Aid Office, 105 Schmitz Hall. Information on the FAFSA is also available online at www.fafsa.org.

Graduate Assistantships and Scholarships

Financial aid options for full-time students may include graduate assistantships and scholarships. Graduate assistants generally work 20 hours per week and receive a tuition waiver as well as a monthly stipend and medical benefits. To apply for a MLIS Graduate Assistantship, prospective students should submit a cover letter and resume along with their application to the MLIS program. Ph.D. students are automatically considered for graduate assistantships, upon request.

MLIS scholarships are awarded on a basis of financial need, based on information from the Free Application for Federal Student Aid (FAFSA) and academic merit.

Information regarding additional sources of financial aid, from sources outside of the Information School, is available at the Information School Financial Resources Web pages at www.ischool.washington.edu/services/finaidgeneral.htm.

Special Research Facilities

Located on the third and fourth floors of Mary Gates Hall, one of the University's flagship high-technology buildings, the School offers an extensive software collection, a state-of-the-art computer classroom, an innovative Technology Exploration (TE) Lab, and excellent network connectivity. Students have access to software applications including titles for database and text management, programming, graphics, Web page creation, Internet exploration and collaboration, and office productivity. Students also have access to a large number of bibliographic databases and commercial information services.

The TE Lab is a unique facility that includes twenty-four student stations and thirty-two servers on a "server wall." The lab is designed to promote exploration of a variety of technologies. Students can install alternative operating systems such as Linux, setup their own file, Web, or database server, and become the system administrator of their machine. Each machine includes a removable hard drive so that students can use either a "production setup" with all software previously installed and configured, or an "experimental setup" where students are free to do as they desire.

For more information, visit the School's Web site at www.ischool.washington.edu/technology/.

Continuing and Professional Education

The Information School works with UW Educational Outreach to offer classes, workshops, and certificate programs for continuing education and professional development. Current certificate programs include Web technology essentials; data resource management; electronic information and records management; Web administration; and small-business Webmaster. Those interested in continuing education or certificate programs should contact UW Educational Outreach, 5001 25th Avenue N.E., Box 354221, University of Washington, Seattle, WA 98105; phone 206-616-0783; or see www.extension.washington.edu.

Master of Library and Information Science

The MLIS program prepares graduates for an ever-expanding variety of information professions including information architecture, school library media, knowledge management, librarianship, and other information-related positions.

The 63-credit MLIS degree includes three program options: full-time (day), part-time (evening), and the

distance program. In addition, the Information School offers a 45-credit law librarianship program for individuals who have an earned J.D. degree.

The curriculum includes nine core courses, which cover theoretical and applied aspects of the information life cycle. The remaining 29 elective credits allow student to pursue their preferred areas of interest or emphasis.

The Distance MLIS is a part-time program that generally requires three years to complete. The delivery of instruction is primarily Internet-based with a brief, quarterly, on-campus residency. Students attend course meetings in-residence at the University of Washington in Seattle for two to five days each quarter, excluding summer quarter.

Law Librarianship Program

The law librarianship program is designed to prepare lawyers to serve as law librarians in courts, federal and state units of government, law schools, corporations, and law firms. Attorneys enrolled in the program earn the Master of Library and Information Science degree after successful completion of 45 quarter credits. The highly structured law librarianship program includes seven MLIS core courses, five law librarianship courses and a directed fieldwork experience.

Law MLIS applicants, who must hold a degree from an accredited U.S. law school or from a law program in one of the common-law countries, are encouraged to submit LSAT rather than GRE scores.

The law librarianship program begins in the autumn quarter and is sequential, ending with the following summer quarter. Please contact Professor Penny Hazelton (206-543-4089; pennyh@u.washington.edu) for further information.

School Library Media Specialist

Requirements for the Washington State Library Media endorsement may be pursued concurrently with the MLIS degree. Individuals interested in earning a Library Media endorsement without pursuing the MLIS should contact UW Educational Outreach at 206-685-6404 or see www.extension.washington.edu. In Washington, Library Media Specialists working in public schools must hold a current state teaching certificate.

Master of Science in Information Management

The Master of Science in Information Management is a mid-career degree that combines information management and information technology with a focus on the user perspective. Prospective students are professionals in management, information technology and library and information science, from both the public and private sectors, who wish to deepen their understanding of information technology, further their education and advance professionally. The Friday-evening and Saturday course scheduling enables students to maintain full-time workloads.

MSIM students must complete 47 credits of graduate coursework to obtain the degree. Degree requirements feature the foundation, core, integration, and elective coursework. Students generally take two courses each quarter during autumn, winter, and spring to graduate in two years. Summer attendance is not required, but the elective requirement can be satisfied during the summer.

MSIM degree requirements include the following components:

Foundations (4 credits): Students begin with IMT 510, a signature course that introduces user-centered

concerns. Basic concepts and core areas covered throughout the curriculum are introduced.

Information Management and Technology Core (35 credits): The core course work provides students with a concrete understanding of the relationship between the technical and organizational aspects of information management. *Information Technology core courses:* IMT 530, 540, 546, 548. *Information Management core courses:* IMT 551, 580, 581, 582, 598.

Integration (5 credits): The MSIM curriculum requires a capstone experience, IMT 595. The capstone addresses the increasing demand for the application of IT to the information needs of diverse user groups. Integration offers students the opportunity to synthesize the ideas presented earlier in the program and to help implement comprehensive information systems within an organization.

Electives (3 credits): MSIM students select electives from a broad range of academic disciplines in consultation with the Student Services Administrator or the program chair.

Admission to the MSIM program is for autumn quarter. The application deadline for autumn admission is May 15.

Doctor of Philosophy in Information Science

The Ph.D. in Information Science is a theoretical, research-based doctorate that focuses on creating and advancing new knowledge that makes a difference. The program provides research education and scholarly mentoring for doctoral students who have an interest in the issues and concerns that are central to the domain of the discipline of information science. Students are selected on their ability to engage in theoretical discourse and to conduct empirical investigation.

The areas of inquiry for doctoral research in the Information School are aimed at increasing our understanding of human involvement with information and its social and technological ramifications. It addresses those issues that affect the transfer and use of information by people in social, organizational and individual contexts. This may include areas such as information and technology literacy, access to information, human-computer interaction, information organization and knowledge management, information systems design, information retrieval, information policy, social aspects of information technology, and information behavior.

Many of these issues are associated with information and communication technologies and for this reason students are highly competent and creative users of technology.

Admission to the doctoral program is for autumn quarter only. The application deadline is February 1 for U.S. citizens and eligible residents. International applicants are strongly encouraged to submit their applications by November 1 for full consideration. A master's degree is required, but this may be waived under exceptional circumstances evidenced by significant professional or research experiences. The program does not have a point of exit within the Ph.D. course work program to take a master's award.

Degree Requirements: To be awarded a Ph.D. in information science, the following requirements must be met:

1. Pass a Preliminary Examination determined by a school-based advisory committee at the end of the required first-year of full-time study.

2. Successfully complete (minimum cumulative GPA 3.25) all course requirements as stipulated by the School.
3. Complete the School's requirement for teaching and research practica.
4. Pass the General Examination upon completion of course work and practica components to attain formal candidacy for the Ph.D. program (candidate's certificate).
5. Successfully defend a dissertation proposal before a Supervisory Committee.
6. Successfully defend a dissertation before a Reading Committee (Final Exam).

For more information and to request application materials, visit the School's Web site at www.ischool.washington.edu/phd/.

Faculty

Professors

Benne, Mae M. * 1971, (Emeritus); MS, 1955, University of Illinois; children's literature, public library services for children.

Borning, Alan H. * 1980, (Adjunct); MS, 1974, PhD, 1979, Stanford University; human-computer interaction; constraint-based languages and systems.

Eisenberg, Michael B. * 1998; MLS, 1973, State University of New York (Albany), PhD, 1986, Syracuse University; information problem-solving; use of information and information technology; information science.

Fidel, Raya * 1982; PhD, 1982, University of Maryland; information systems, systems analysis, user interaction, classification research.

Fuller, Sherrilynne S. * 1988; PhD, 1984, University of Southern California; analysis, representation and mapping of research findings (data mining).

Grudin, Jonathan T. 1999, (Affiliate); PhD, 1981, University of California (San Diego); computer-supported cooperative work, collaboration technologies, human-computer interaction.

Hazelton, Penny A. * 1985, (Adjunct); JD, 1975, Lewis And Clark College, MLL, 1976, University of Washington; law librarianship, legal bibliography, computer-assisted legal research, law, Indian law.

Hiatt, Peter * 1974, (Emeritus); PhD, 1963, Rutgers University; adult services, special populations, library education, staff development, continuing education.

Levy, David M. * 2000; PhD, 1979, Stanford University; nature of documents and the tools and practices through which they are created and used.

Pejtersen, Annelise Mark 2002; PhD, 1971, University of Copenhagen (Denmark); human-work interaction, cognitive work analysis, collaborative information systems.

Shaw, Spencer G. * 1970, (Emeritus); BLS, 1941, University of Wisconsin; librarianship.

Wilson, Lizabeth A. 1992, (Affiliate); MLS, 1978, University of Illinois (Urbana-Champaign).

Associate Professors

Brooks, Terrence A. * 1986; PhD, 1981, University of Texas (Austin); interest scripting and programming, Web page design, post-alphabetic information designs.

Bruce, Harry * 1998; PhD, 1996, University of New South Wales(Australia); human factors in information and communication technology.

Efthimiadis, Efthimis * 1997; PhD, 1992, City University, London (England); user-centered design and evaluation of information retrieval systems.

Friedman, Batya * 1999; PhD, 1988, University of California (Berkeley); value-sensitive design, social-cognitive and cultural aspects of information systems.

Johnson, Ronald A. 1986; MA, 1972, University of Chicago, MS, 1975, University of Southern California; information sciences.

Mignon, Edmond * 1970, (Emeritus); PhD, 1976, University of California (Berkeley); information retrieval, bibliographic organization, information studies, methods of research.

Skelley, Grant T. * 1969, (Emeritus); PhD, 1968, University of California (Berkeley); bibliography and reference, subject literature, history of the book.

Sutton, Stuart A. * 1999; JD, 1981, Golden Gate University, LLM, 1982, MLS, 1987, PhD, 1991, University of California (Berkeley); metadata and networked information discovery and retrieval, law and policy of intellectual property.

Assistant Professors

Carlyle, Allyson * 1996; MLS, 1986, PhD, 1994, University of California (Los Angeles); online catalog use and design, conceptual foundations of descriptive cataloging.

Green, Maurice W. * 1998; PhD, 1999, State University of New York (Albany); information decision systems, leadership and analysis.

Janes, Joseph W. * 1998; MLS, 1983, PhD, 1989, Syracuse University; evolution of models of practice of digital reference.

Kim, Jeffrey Y. * 2000; PhD, 2000, University of California (Irvine); computer-supported cooperative work, ubiquitous computing.

Mai, Jens-Erik * 2000; PhD, 2000, University of Texas (Austin); philosophy, theory and practice of organization and representation of information.

McDonald, David W. 2002; PhD, 2000, University of California (Irvine); social impacts of computing, ethnographic field study, CSCW, HCI, system design and implementation.

Nelson, Jerold A. * 1971, (Emeritus); PhD, 1971, University of California (Berkeley); interpersonal relations in libraries, intellectual freedom.

Pettigrew, Karen E. * 1999; MLS, 1991, PhD, 1998, Western Ontario University (Canada); information behavior.

Pratt, Wanda 2002; PhD, 1999, Stanford University; information retrieval, human-computer interaction, text mining, medical informatics.

Saxton, Matthew * 2000; MLS, 1994, PhD, 2000, University of California (Los Angeles); evaluation of information services, intermediation, collection management, information competencies.

Senior Lecturers

Barker, Scott F. 1999; MS, 1987, Syracuse University; computer networks, Internet applications, information management.

Jones, William P. 2000; PhD, 1982, Carnegie Mellon University; personal information management,

human factors in information and communication technology.

Smith, Sharyl G. 1999; MLS, 1970, University of Washington, DLS, 1985, Columbia University; materials for children and the field of school library media.

Lecturers

Boiko, Robert B. 2000; MS, 1989, University of Utah; content management, sociology of information management, self-generating metadata systems.

Oyler, Mel R. 1993; MS, 1985, University of California (Davis), PhD, 1997, University of Washington; database systems, technology strategy, commercial applications of information science.

Whiteaker, Grace B. 2001; MLIS, 2000, University of Washington; database design, information literacy, socio-cultural effects of technology, technology in education.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Informatics

INFO 414 Information Behavior (5) Advanced study of information behavior. Focus on the user-centered approach and the research literature of human information behavior. Introduces methods for evaluating and translating the results of user behavior studies into the design of information services and systems. Prerequisite: INFO 310.

INFO 419 Special Topics in Social Aspects of Information (1-5, max. 10) Various topics in the social aspects of information. Offered by visitors or resident faculty.

INFO 424 Information Visualization and Aesthetics (5) VLPA Examines the visualization of information: the effects of human perception, the aesthetics of information design, the mechanics of visual display, and the semiotics of iconography. Examples may include census, epidemiological, crime, earth satellite, and medical data in the contexts of special computer applications, user populations, and cultures. Prerequisite: CSE 143.

INFO 440 Information System Design (5) NW Theoretical and practical examination of the information systems design process. Techniques for assessing the need for technology, specifying the system design, and involving users in the design process are explored. Design methods include social impact statements, future scenarios, mock-ups, rapid prototyping, field-testing, heuristic evaluation. Prerequisite: CSE 373.

INFO 444 Value-Sensitive Design (5) Introduction to value-sensitive design (VSD), information system design that accounts for human values in a principled and comprehensive manner. Examination of existing systems from a VSD perspective. Explores VSD research methods including conceptual, technical, empirical investigations. Key values include accountability, autonomy, consent, privacy, property, trust, sustainability. Prerequisite: CSE 373.

INFO 445 Advanced Database Design, Management, and Maintenance (5) Advanced perspectives on DBMS theory, architecture, and implementation. Conceptual, logical, physical modeling. Index structures, query optimization and perform-

ance tuning, relational algebra, transaction processing, and concurrency control. Operational databases, decision support systems, and data warehousing. Projects in database implementation and integration. Social implications of large distributed database systems. Prerequisite: INFO 340; CSE 373.

INFO 446 Advanced Search Engine Systems (5) Focus on design, development and evaluation of search engines. Theories and models in information retrieval for text and multimedia databases, Web search engines, recommendation systems, and digital libraries. Topics include language issues, datamining, machine learning, user-profiling, visualization, user interfaces, usability. Coursework involves analytical comparisons of search engines. Prerequisite: INFO 340.

INFO 447 Computer Supported Cooperative Work (5) Focuses on design and use of collaboration technologies to communicate, share information, and coordinate activity. Emphasis on behavioral and social aspects of adopting and using these technologies. Topics include the history of work in this and related fields, collaboration support for teams, organizations, and communities. Prerequisite: INFO 310.

INFO 449 Special Topics in Information Technology (1-5, max. 10) Various topics in information technology. Offered by visitors or resident faculty.

INFO 454 Information Policy: Domestic and Global (5) National and international information policy: public and private sector policy in terms of privacy, access, and exploitation; technology infrastructures and policies supporting the information industries; digital convergence and the emerging mega-industries. Prerequisite: INFO 311.

INFO 459 Special Topics in Information Policy (1-5, max. 10) Various topics in information policy. Offered by visitors or resident faculty.

INFO 484 Information Entrepreneurship (5) Investigates the development of innovative human-centered informatics products, with emphasis on the unique challenges and opportunities in high-value information products. Includes competition, strategic planning, tactical marketing, informatics product launches, and applied infopreneurship. Teamwork to create and present plans for innovative informatics products/services. Prerequisite: either INFO 300, INFO 310, or INFO 311.

INFO 489 Special Topics in Information Management (1-5, max. 10) Various topics in information management, offered by visitors or resident faculty.

INFO 490 Design and Development of Interactive Systems (5-8) Design and formative evaluation of an interactive information system to solve a real problem. Student-organized team projects are encouraged. Must be taken for a minimum of 5 credits. Prerequisite: INFO 340; INFO 381; INFO 440.

INFO 491 Research in Informatics (5-8) Provides hands-on experience conducting a research project related to information behavior and technology. This project may be carried out in a natural setting or in the laboratory by preparing students to carry out similar research projects in their professional work. Prerequisite: INFO 370.

INFO 495 Internship in Informatics (1-5, max. 12) Internship in the private or public sector, as approved by faculty member. Work jointly supervised by faculty member (or approved academic sponsor) and an on-site work supervisor.

INFO 498 Special Topics in Informatics (1-5, max. 15) Various topics in informatics. Offered by visitors or resident faculty. Topics vary.

INFO 499 Independent Study (1-5, max. 15) Readings, design projects, or research under faculty supervision.

Information Management and Technology

Courses for Graduates Only

IMT 510 Human Aspects of Information Systems (4) Social, cognitive, behavioral and contextual aspects of information technology, including information behavior, interpersonal interaction, and social responses to information technology. Emphasis on human well-being and information exchange as a communicative event. Exposure to experimental and interview methodologies.

IMT 530 Taxonomy, Classification, and Metadata (4) Introduction to principles of taxonomy construction using classification theory. Examines conceptual foundations underlying a wide variety of indexing languages. Surveys the use of metadata and metadata standards for the management of information systems. Considers technological frameworks to support the implementation of metadata standards and taxonomies, such as CXML and RDF.

IMT 540 Information Systems, Architectures, and Retrieval (5) Introduction to user-centered information system development processes. Overview of Web-based, stand-alone, and distributed search engines, database management systems, architectures, and retrieval models. Prerequisite: IMT 510.

IMT 546 Data Communications and Networking (4) Local and wide area computer networking including network topologies and hardware, packet switching, client/server architectures, network protocols, and network servers and applications. Addresses server operating systems, management, security, authentication, and policy issues associated with distributed networks. Prerequisite: IMT 510.

IMT 548 Information System Design (5) Theoretical and practical examination of information systems analysis and design processes as they apply in the workplace. Explores techniques for assessing the need for technology, defining specifications, and involving users in the design process. Design methods include social impact statements, future scenarios, mock-ups, rapid prototyping, and field-testing. Prerequisite: IMT 540.

IMT 551 Law and Ethics in Information Management (3) Select concepts, processes, and issues related to the organizational contexts within which information professionals practice. Topics include information as public/private good, intellectual property, privacy, confidentiality, information liability, and information policy. Focus on contemporary issues affecting the role of the information manager.

IMT 580 Management of Information Systems (4) Information technology context, planning, decision-making, unit organization, CIO leadership, unit controls related to managing information resources to achieve organizational goals. Topics include information technology management challenges, operational, strategic planning, decision-making, unit infrastructure, CIO competence, aligning information technology initiatives with organizational objectives.

IMT 581 Leadership and the Management of Change (4) Recognizing the need for change, preparing for change initiatives, and institutionalizing change. Topics include vision development, shared vision, transforming the vision into reality. Prerequisite: IMT 510.

IMT 582 Strategic Planning and Evaluation (3) Strategic planning, information system resources, information technology functions, and the chief information officer as critical components for leveraging

information to achieve organizational goals. Topics include vision, mission and goals, strategic planning, information technology functions, chief information officer competence, and aligning information technology initiatives with organizational objectives. Prerequisite: IMT 510.

IMT 589 Special Topics in Information Management (1-4, max. 12) Special study and research in topics of current concern to faculty and students.

IMT 595 Stakeholders, Information, and Technology (5) Capstone experience. Addresses system integration and the increasing demand to apply a broad range of technologies to the information needs of diverse user groups during the implementation of comprehensive information systems across an organization. Student-organized individual/team projects are encouraged. Credit/no credit only. Prerequisite: all MSIM core courses.

IMT 598 Emerging Trends in Information Management and Technology (3) Focus on emerging trends in information management and information technology. Attention given to their impact on the functions of the chief information officer and others managing the acquisition, retention, use and disposition of information and the enabling technologies. Exploration of methods and resources for trend discovery and tracking. Prerequisite: IMT 510.

IMT 590 Fieldwork in Information Management (1-4, max. 12) Supervised fieldwork. May be taken in as many as six consecutive quarters. Prerequisite: enrollment in the MSIM program.

IMT 600 Independent Study or Research in Information Management (1-4, max. 12) Supervised independent study or research. May be taken in as many as six consecutive quarters. Prerequisite: enrollment in the MSIM program.

Information Science

Courses for Graduates Only

INSC 500 Theoretical Foundations of Human Information Behavior (5) Study of constructs, concepts, models, and theories information scientists use in studying human information behavior. Socio-cognitive aspects of individuals needing, seeking, giving, and using information. Models of information behavior, conceptual frameworks, assumptions, analytical tools, and the factors that differentiate groupings of information users and predict or influence information behavior.

INSC 530 Knowledge Representation (5) In-depth survey of the various approaches to knowledge representations in areas such as taxonomy, library classification, anthropology, cognitive psychology, linguistics, and artificial intelligence.

INSC 540 Information Retrieval and Systems (5) Seminar in theories and models in information retrieval. Reviews user-centered and system-centered approaches and issues involved in system design, development, and evaluation of information retrieval and systems. Includes methods and tools for document analysis, retrieval techniques, search engines, interfaces, usability, and evaluation. Prerequisite: permission of instructor.

INSC 550 Information Policy (5) Doctoral seminar in the foundations of information policy including intellectual freedom, public/private good, intellectual property, privacy, and digital convergence, and the reshaping of information practices and information industries. Prerequisite: Permission of instructor.

INSC 565 Teaching Practicum I (3) Doctoral student participation in teaching in a faculty-taught course. Credit/no credit only.

INSC 566 Teaching Practicum II (3) Doctoral student takes primary teaching responsibility for a course under supervision of a faculty liaison. Credit/no credit only. Prerequisite: INSC 565.

INSC 570 Research Design (5) Introduction to empirical research, basics of theory construction and research design, types of research, ethical issues, instruments and techniques for descriptive research, measures of association. Employs an integrated (qualitative and quantitative) and focused approach.

INSC 571 Quantitative Methods in Information Science (5) Describes uses, characteristics, and theoretical bases of research methods and data analysis techniques used in quantitative research, emphasizing uses in information and library science. Topics include experimental design, descriptive and inferential statistics, the normal distribution, elementary probability, nonparametric statistics, and exploratory data analysis techniques. Prerequisite: INSC 570.

INSC 572 Qualitative Methods in Information Science (5) Principles and approaches to conducting qualitative research in information science, including how to design a qualitative study, role of context, methods of data collection and analysis, increasing the trustworthiness of data, minimizing observer effect, how to incorporate and build theory. Exposure to field research and data analysis. Prerequisite: INSC 570.

INSC 575 Research Practicum I (3) Students work with a researcher from the Information School as an active member of a research team. Credit/no credit only.

INSC 576 Research Practicum II (3) Students will work with an approved researcher as an active member of a research team. Credit/no credit only. Prerequisite: INSC 575 or permission of instructor.

INSC 600 Independent Study or Research (*) Credit/no credit only.

INSC 800 Doctoral Dissertation (*) Credit/no credit only.

Library and Information Science

LIS 498 Special Topics (1-5, max. 15) Library service and information science subject matter in seminars, workshops, or other appropriate formats. Topics vary and may be repeated for credit. Credit/no credit only.

Courses for Graduates Only

LIS 500 The Life Cycle of Information (2) Overview of the major concepts, processes and systems, actors, and operations in the life cycle of information. Introduction to the creation, publishing and distribution, evaluation and selection, organization, access, retrieval, and use of information. Exploration of the social context in which these processes and their stakeholders interact. Credit/no credit only.

LIS 505 Archival and Manuscript Services (3) Selection, organization, and uses of archival and manuscript collections. Emphasis on the principles and techniques; some attention to the administration of state archival and historical institutions' collections. Lecture, demonstration, and laboratory.

LIS 507 Preservation and Conservation of Library Materials (3) Consideration of the many factors contributing to the physical vulnerability of library materials of all kinds and an overview of resources and strategies for those who determine preservation policy or manage the application of such policy. No technical background necessary.

LIS 508 History of Recorded Information (4) Exploration of the history and ongoing transforma-

tion of recorded information within three broad spheres of human life: public communication, administrative and commercial operation, and personal communication.

LIS 510 Information Behavior (4) Introduction to the user-centered approach to information behavior. Theoretical foundations of various information behaviors such as information need, utilizing, gathering, seeking, and evaluating. Synthesis of user studies, construction of user profiles, performance of gap analysis, and application of the results of user studies to improve services and system design. Prerequisite: LIS 500.

LIS 511 Systems Analysis (4) Introduction to the systems approach including basic concepts in the approach, dimensions of systems and steps in systems design. Emphasis is on the analysis, evaluation and design of information systems and services. Prerequisite: LIS 500.

LIS 519 Special Topics in Information Behavior (1-4, max. 18) Introduction to innovative and specialized topics in information behavior. Course may be offered irregularly and may be repeated for credit. Prerequisite: LIS 510; others as determined by the specific topics covered.

LIS 520 Information Resources, Services, and Collections (4) Concepts, processes, and skills related to parts of the life cycle of knowledge involving creation, production, distribution, selection, collection, and services to facilitate access. Specific discussion topics include characteristics of recorded knowledge; organizations and services devoted to managing access to recorded knowledge; principles associated with development of recorded knowledge and collections. Prerequisite: LIS 500.

LIS 521 Principles of Information Services (4) Analysis of the information mediation process, including determination and analysis of information needs; searching for, evaluation, and presentation of appropriate results; modalities for delivery of services; and current and future techniques. Prerequisite: LIS 520.

LIS 522 Collection Development (3) Access to materials as context for development and management of library collections in academic, public, school libraries. Community analysis, library mission; collection development policies, criteria, levels, responsibilities; aids to selection; collection evaluation, use studies; controversial materials.

LIS 523 Advanced Information Services (4) Investigation of the development, administration, and evaluation of information services for supporting the research process both within and across organizations. Prerequisite: LIS 521 or permission of instructor.

LIS 526 Government Publications (3) Government publications of the United States and foreign countries, their acquisition, organization, and use. Credit/no credit only.

LIS 527 Business Information Resources (3) Survey of the extent and nature of business information and its sources, and of business information producers and consumers. Study and use of both print and on-line sources.

LIS 528 Information Access in Health Sciences (3) Characteristics of users of health sciences information, environments including academic health sciences centers, hospitals, clinics, and public libraries, evaluation of information resources, types of uses of information management systems, health information policy, professional standards, education and certification of health professionals including health science librarians. Credit/no credit only. Prerequisite:

LIS 520, LIS 521, or permission of instructor. Offered jointly with MEDED 570.

LIS 529 Special Topics in Information Resources, Services and Collections (1-5, max. 18) Introduction to innovative and specialized topics in information resources, services and collections. Prerequisite: LIS 500, LIS 520; others as determined by the specific topic covered.

LIS 530 Organization of Information and Resources (4) Introduction to issues in organization of information and documents including: analysis of intellectual and physical characteristics of documents; principles and practice in surrogate creation, including standards and selection of metadata elements; theory of classification, including semantic relationships and facet analysis; creation of controlled vocabularies; and display and arrangement. Prerequisite: LIS 500, which may be taken concurrently.

LIS 531 Catalogs, Cataloging, and Classification (4) Develops an understanding of library catalogs as information retrieval systems. Introduces library cataloging and classification. Focus on principles and standards in the creation of catalogs and cataloging records. Includes practice in descriptive and subject cataloging and classification. User perspective emphasized throughout. Prerequisite: LIS 500, LIS 530.

LIS 533 Advanced Cataloging and Classification (4) In-depth theory and practice in library cataloging and classification. Includes introduction to cataloging materials in a variety of formats. Prerequisite: LIS 500, LIS 530, and LIS 531.

LIS 535 Classification Theory (3) Survey of classificatory principles from bibliographic, philosophical, socio-cognitive, and linguistic perspectives. Overview of history of bibliographic classification and exploration of some existing bibliographic classification systems. Ramification of theoretical approach for classification practice. Prerequisite: LIS 530.

LIS 536 Indexing and Abstracting (3) Exploration of issues in subject representation. Survey of different approaches, techniques, and methods for representing the subject matter of documents, including an evaluation of the role of users and context in subject representation. Formulation of policies for indexing and abstracting services. Prerequisite: LIS 530.

LIS 537 Construction of Indexing Languages (4) Exploration of the design, construction, evaluation, and maintenance of controlled indexing languages, including studies of how users are integrated into the design process. Through completion of thesaurus construction project, prepares students to design index languages, plan and implement a design project, and evaluate indexing languages. Prerequisite: LIS 530.

LIS 539 Special Topics in Organization of Information and Resources (1-4, max. 18) Introduction to innovative and specialized topics in the organization of information and resources. Prerequisite: LIS 500, LIS 530; others as determined by the specific topic covered.

LIS 540 Information Systems, Architectures and Retrieval (5) Introduction and overview of information systems, system architectures, and retrieval models. Emphasis given to the role of users in the design, development, and evaluation of information retrieval and database management systems. Prerequisite: LIS 500, which may be taken concurrently.

LIS 541 Internet Technologies and Applications (3) Overview of Internet technologies including networking hardware, the TCP/IP protocol suite,

addressing, packets and routing, the client/server model. End-user applications for communication and collaboration such as telnet, FTP, email, conferencing, and streaming media. Web site creation, development, and management. Credit/no credit only.

LIS 542 Conceptual Database Design (3) Preliminary design of data bases for decision support systems. Introduces methods of collecting user requirements, requirement analysis, data dictionary, the entity-relationship model, methods for database integration, preparation for data collection, and evaluation. Credit/no credit only.

LIS 543 Design of Information Systems (3) Discusses how theories of conceptual data modeling affect design of database and information systems, examines relationships between modeling and implementation, and bridges gaps between theoretical understanding of database design and implementation issues. Implements conceptual schemata development in 542.

LIS 544 Information Retrieval System (3) Covers theories and models in information retrieval (IR) and reviews user-centered and system-centered approaches. Issues involved in the design, development and evaluation of IR systems are examined including: methods and tools for document analysis, retrieval techniques, search engines, interfaces, usability, evaluation.

LIS 545 Programming for Information Systems (5) Introduction to structured object-oriented programming for information systems. Focus on fundamental principles of programming with attention to elementary algorithms and data structures, interface design, user testing, and knowledge representation. Prerequisite: LIS 540 or permission of instructor.

LIS 546 Network System Administration (4) Introduction to local area network hardware, topologies, operating systems, and applications. Covers aspects of network setup and management including network and application protocols, system configuration, security and Internet connectivity. Hands-on experience with network applications and operating systems. Prerequisite: LIS 500.

LIS 549 Special Topics in Information Systems, Architectures, and Retrieval (1-4, max. 18) Introduction to innovative and specialized topics in information systems, architectures, and retrieval. Prerequisite: LIS 540, plus others as determined by topic.

LIS 550 Information in Social Context (4) Concepts, processes, and issues related to the larger social context within which the life cycle of knowledge is played out. Discussion topics include intellectual freedom, information as public/private good, intellectual property, privacy, confidentiality, information liability, information and telecommunications policy, the economics of information, and other professional values. Prerequisite: LIS 500, which may be taken concurrently.

LIS 551 Intellectual Freedom in Libraries (3) Analysis of issues related to intellectual freedom, particularly to implications for libraries and librarians. Consideration of current legal climate, conformity versus freedom in modern world, librarian as censor, social responsibility and individual freedom, intellectual freedom of children, prospects for future. Credit/no credit only.

LIS 554 Information Policy: Domestic and Global (5) National and international information policy: public and private sector policy in terms of privacy, access, and exploitation; technology infrastructures and policies supporting the information industries; digital convergence and the emerging mega-industries. Prerequisite: LIS 550 or permission of instructor.

LIS 559 Special Topics in the Social Context of information (1-4, max. 18) Introduction to innovative and specialized topics in the social context of information. Course may be offered irregularly and may be repeated for credit. Prerequisite: LIS 550 and others as determined by the specific topic covered.

LIS 560 Instructional and Training Strategies for Information Professionals (3) Develops knowledge and skills in instruction and training functions for library and information settings. Issues and strategies for learning and teaching. Design, development, and evaluation of information and technology literacy programs. Addresses the needs of users when designing and delivering instruction. Prerequisite: LIS 500, which may be taken concurrently.

LIS 561 Storytelling: Art and Techniques (3) Storytelling, past and present, noting its development as an art form. Analyzing storytellers materials (folk literature and literary forms) throughout historical periods. Essential techniques necessary to this artistic skill. Planning storytelling programs for various ages, interest groups, and situations, utilizing folk, classic, and contemporary literature.

LIS 565 Children's Materials: Evaluation and Use (4) Library materials for children from infancy through elementary grades. Focus on resources in all media that serve informational, educational, cultural, and recreational needs of the young. Focuses on standard bibliographies and other resources designed to meet informational needs of adults serving children. Prerequisite: LIS 500, LIS 510, LIS 520, or permission of instructor.

LIS 566 Young Adult Materials: Evaluation and Use (4) An overview of materials reflecting adolescents' interest in media and addressing their educational, cultural, and recreational needs. Students evaluate print literature, electronic and other non-print media for young adults. Content also designed to assist adult caregivers of adolescents. Prerequisite: LIS 500, LIS 510, and LIS 520 or permission of instructor.

LIS 567 Public Library Services for Youth (3) Administration of youth departments in public libraries; planning and promoting programs and services; evaluation of library collections; community and professional roles of the youth librarian. Prerequisite: LIS 500 or permission of instructor.

LIS 568 Information Literacy for Teaching and Learning (5) Theories, process, and practical applications of information literacy. Development of information literacy programs for libraries, community agencies, business, education or other information settings. Intrinsic themes include the integral relationship between technology and information literacy, and continual evaluation.

LIS 569 Special Topics in Instructional and Training Strategies for Information Professionals (1-5, max. 18) Introduction to innovative and specialized topics in instructional and training strategies for information professionals. Prerequisite: LIS 560 and others as determined by the specific topic covered.

LIS 570 Research Methods (4) Research as a process from problem definition and formulation of questions to design, data collection, analysis, and reporting. Students recognize research opportunities, translate them into researchable frameworks, design research projects, and implement results in

libraries and other information agencies. Prerequisite: LIS 500, which may be taken concurrently.

LIS 579 Special Topics in Research Methods (1-4, max. 18) Introduction to innovative and specialized topics in research methods. Prerequisite: LIS 500, LIS 570; others as determined by specific topic covered.

LIS 580 Management for Information Organizations (4) Introduction to internal and external management issues and practices in information organizations. Internal issues include organizational behavior, organizational theory, personnel, budgeting, planning. External issues include organizational environments, politics, marketing, strategic planning, funding sources. Prerequisite: LIS 500, which may be taken concurrently.

LIS 581 Marketing and Planning for Libraries (3) Approaches to planning and marketing library products/services. Examines partnerships that can be forged between elements of marketing and appropriate futures strategies for libraries. Discusses marketing and planning as integrated processes with attention to short- and long-term goals and objectives. No particular library institutional setting is assumed. Prerequisite: LIS 500, which may be taken concurrently.

LIS 582 Strategic Planning and Management of Information Technology (3) Exploration of methods of strategic planning for managing information resources and technology to support online information services and the role of the systems librarian and CIO. Topics include mission and goals, strategic planning, the information technology function within organizations, and the desirable abilities of managers and leaders. Prerequisite: LIS 580.

LIS 583 Staffing Information and Information Technology Positions (3) Staffing and human resources related to information organizations and the information technology unit. Examination of demand for and supply of information and information technology workers, recruitment, training, and retention. Prerequisite: LIS 580.

LIS 585 Administration of the School Library Media Program (3) Develops competency in administering materials, equipment, and services of library media program as integral part of educational process of school. Focuses on developing skills in acquiring, organizing, and managing full range of learning resources for access and use, and communicating the program to users. Required for school library media specialists. Prerequisite: LIS 580.

LIS 586 Public Libraries and Advocacy (3) Examines the purpose and role of public libraries in an information society. Includes governance, services, and planning with special emphasis on advocacy for the library and community.

LIS 587 Library Technology Systems (4) Developing criteria for selection and design of information technology systems for libraries and information centers. Applying criteria in evaluation of hardware and software. Examining related management challenges, such as vendor relations, financing options, personnel requirements, and design of auxiliary activities. Prerequisite: LIS 540, LIS 580, or permission of instructor.

LIS 588 Special Librarianship (3) Seminar in the practice of special librarianship in business and industrial firms, government agencies, and the freelance sector. User services and information resources. Credit/no credit only. Prerequisite: LIS 580.

LIS 589 Special Topics in Management of Information Organization (1-4, max. 18) Introduction to innovative and specialized topics in management of information organizations. Prerequisite: LIS 500, LIS 580; others as determined by the specific topic covered.

LIS 590- Directed Fieldwork (2-4, max. 8) Minimum of 100 hours, maximum of 200 hours of professional, supervised fieldwork in a library or professional information setting. May be taken in one quarter or as many as three consecutive quarters. May be repeated once in a different setting. Library and Information Science majors only. Credit/no credit only. Prerequisite: 30 credits in Library and Information Science program.

LIS 591 Legal Research I (3) Introduction to legal bibliography and law librarianship. Basic primary and secondary legal bibliographic tools. Integration of manual and computer resources for effective legal research. Emphasis on state materials. Offered jointly with LAW A 598.

LIS 592 Legal Research II (4) Legal tools that answer more complex legal research problems, such as federal legislative histories, sources of administrative law, specialized subject research. Federal emphasis. Builds on skills and techniques taught in LIS 591/LAW A 598. Extensive work with online resources. Prerequisite: LIS 591 or permission of instructor. Offered: jointly with LAW A 599.

LIS 593 Selection and Processing of Law Library Materials (3) Study of tools for collection development and collection development plans in law libraries. All law library technical processes, including acquisitions, budgeting, cataloging, and serials. Credit/no credit only. Prerequisite: LIS 591 or permission of instructor.

LIS 594 Law Library Administration (4) Administration in law libraries, including organization, personnel, and management issues (e.g., interviewing, hiring, firing), communications, library planning, and bookkeeping. Credit/no credit only. Prerequisite: LIS 591 or permission of instructor.

LIS 595 Current Issues in Law Librarianship (1) From a list of current topics in law librarianship, students select a topic, research it fully, write a major paper, and present their paper. Topics may include citation reform, ethics, and publisher practices. Credit/no credit only. Prerequisite: Law Librarianship majors or permission of instructor.

LIS 598 Special Topics in Information and Library Science (1-6, max. 18) Seminar dealing with various topics in information and library science. Offered by visitors or resident faculty. Topics are changed from quarter to quarter. May not be offered every quarter. May be repeated for credit. Credit/no credit only. Prerequisite: determined by specific course.

LIS 600 Independent Study or Research (*) Credit/no credit only.

LIS 700 Master's Thesis (*) Credit/no credit only.

Interdisciplinary Graduate Degree Programs

These programs are administered by interdisciplinary groups of the Graduate School. Certain courses carrying the particular program prefix appear below; other courses with the same prefix appear elsewhere as indicated. Other courses included in these programs are selected from many disciplines throughout the University and carry the prefix of the respective discipline.

Biology Teaching

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/Biology_Teaching.html

 *Program Web page:*
www.biology.washington.edu/teachers/

Graduate Program Coordinator
222 Hitchcock, Box 355320
206-543-1689

The Graduate School Biology Teaching Group offers an interdisciplinary program that leads to the degree of Master of Science in biology for teachers. Although designed specifically for biology teachers in K-12 schools and community colleges, other life science educators, such as those in environmental learning centers, may find the program especially worthwhile. The program emphasizes broadening the student's understanding of the various fields of biological science, with the improvement of the student's effectiveness as a teacher as the primary goal. Opportunities for course work within the departments of the University in biological science and science education are provided. Each student is asked to perform an in-depth study of a biological science problem in the context of its relevance to the teaching of biological science. Facilities and guidance are provided by a sponsoring professor and advisory committee drawn from the Biology Teaching Group and the several biological science departments of the University.

Special Requirements

Prospective candidates for the degree should have an initial or continuing certificate for teaching biology at the secondary level, or be able to demonstrate professional commitment in the area of biology education.

Assistantships and fellowships are generally not provided under the aegis of this program.

Faculty

Chair

John M. Palka

Professors

Ammirati, Joseph F. * 1979; MA, 1967, San Francisco State, PhD, 1972, University of Michigan; mycology, taxonomy and ecology of fungi.

Armstrong, David A. * 1978; MS, 1974, Oregon State University, PhD, 1978, University of California (Davis); crustean ecology and fisheries, estuarine habitat protection, impacts on dragging, pesticides.

Boersma, P. Dee * 1974; PhD, 1974, Ohio State University; population, ecology.

Cleland, Robert E. * 1964, (Emeritus); PhD, 1957, California Institute of Technology; physiology of plant growth.

Deyrup-Olsen, Ingrith J. * 1964, (Emeritus); PhD, 1944, Columbia University; general physiology cell-membrane phenomena.

Edwards, John S. * 1967, (Emeritus); PhD, 1960, Cambridge University (UK); arthropod neurobiology, insect physiology and development, tundra and alpine biology.

Hille, Merrill B. * 1976; PhD, 1965, Rockefeller University; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis.

Laird, Charles D. * 1971; PhD, 1966, Stanford University; cell and developmental biology, human genetics.

Leopold, Estella B. * 1976, (Emeritus); PhD, 1955, Yale University; paleoecology, pollen and seed analysis, late Cenozoic environments and climate history.

Nester, Eugene W. * 1962; PhD, 1959, Case Western Reserve University; genetics and biochemistry, of bacterial-plant cell interactions.

Olson, Maynard V. 1992; PhD, 1970, Stanford University; methods and applications of large-scale DNA analysis.

Palka, John M. * 1969; PhD, 1965, University of California (Los Angeles); neurophysiology, sensory physiology, developmental neurobiology.

Van Volkenburgh, Elizabeth * 1982; PhD, 1980, University of Washington; leaf growth and development, photobiology and electrophysiology.

Wakimoto, Barbara T. * 1984; PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.

Associate Professor

Windschitl, Mark A. * 1996; MS, 1993, PhD, 1995, Iowa State University; the impact of technology, constructivism, and epistemological beliefs on learning.

Conservation Biology Policy

274 Mary Gates Hall

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/cons_bio_pol.html

 *Program Web page:*
depts.washington.edu/conbiol/

If present trends continue, the Earth may lose one-quarter of its species, much of its temperate forests and other critical habitats, along with many of the resources and services that biological systems provide to humanity. Civilization depends on living resources, but ongoing environmental degradation demonstrates the need for fundamental changes in the relationship between human society and biological resources.

The graduate certificate in conservation biology policy provides students with education and skills to assess impacts on biological diversity and to develop practical approaches to prevent species extinction. Conservation biology is a synthesis of many disciplines, including anthropology, biogeography, ecology, environmental studies, genetics, molecular biology, population biology, sociology, and taxonomy. By integrating ecology and natural science with studies in law, public policy, and social sciences, the program prepares students to balance competing interests in developing effective conservation programs.

Eligibility

Any matriculated graduate student at the University of Washington is eligible for the graduate certificate in conservation biology policy. Students must submit a statement of interest form with the proposed course sequence prior to being enrolled in the program.

Steering Committee

The Steering Committee for Conservation Biology Policy oversees the structure and content of the graduate certificate in conservation biology policy, and periodically reviews course requirements. The committee is assisted in these tasks by the graduate program coordinator. The committee is also responsible for admission policy. Advising is shared among the Steering Committee and the graduate program coordinator.

Graduate Program

Graduate Program Coordinator
274 Mary Gates Hall
Box 352802
206-221-6129
conbiol@u.washington.edu

Program Requirements: One course in conservation biology; one course each in two of the following three core areas: law and policy, economics, and social Ecology; one capstone course; and additional courses from the approved list to complete the required 21 credits.

The graduate certificate is awarded upon successful completion of all program and degree requirements.

Environmental Management

274 Mary Gates Hall

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/Env_Mang.html

 *Program Web page:*
depts.washington.edu/envsmgt/

The graduate certificate in environmental management (EM) is an interdisciplinary program designed to prepare students to contribute to sustainable utilization and enhancement of the natural and human environment. Through coursework, seminars, and a capstone experience, students acquire the tools to solve real-world environmental problems via the three avenues of science, policy, and business. The program provides an excellent education and training opportunity for a diverse array of graduate students preparing for careers in the broad field of environmental affairs.

Key benefits of the program are:

- Students participate in a community of faculty and students from a multitude of departments

who share the common goal of environmental stewardship and sustainability.

- Students explore environmental problems, and develop solutions, in a multidisciplinary environment, incorporating a wide range of perspectives and priorities.
- Students receive a printed certificate and record in their transcript from the Graduate School to document completion of the interdisciplinary program in Environmental Management.

The flexible curriculum is suitable for students from many backgrounds, such as engineering, physical and natural sciences, public policy, economics, geography, public health, and political science, to name a few.

There is no other such interdisciplinary educational experience available to graduate students at the University of Washington at this time.

Eligibility

All students enrolled in graduate and professional degree programs in any school of the University of Washington are eligible to apply.

Prior to admission, students must have completed a one-quarter upper-level or graduate-level course in applied quantitative methods (e.g., microeconomics, numerical modeling, applied statistical methods) or pure quantitative methods (e.g., mathematics or statistics); and social or natural science.

Faculty with written argument and communication is a prerequisite. This requirement is demonstrated in the letter of application.

Steering Committee

The program is governed by the Steering Committee for Environmental Management.

Graduate Program

Graduate Program Coordinator
274 Mary Gates Hall
Box 352802
206-221-6129
envirmgt@u.washington.edu

The certificate's courses and projects have been chosen to prepare students to contribute legal, scientific, social science, and technical expertise to environmental decision making at the local, national, and international scales. Students are required to broaden their knowledge and skills base beyond their home discipline; to read material from other fields with critical faculty; to understand and appreciate the goals and analysis methods common to other fields; and, perhaps most importantly, to appreciate, communicate with, and collaborate with experts from other fields, who have different perspectives and priorities.

Program Requirements: Three core courses (10-12 credits); a capstone project completed as part of the core course in business; the spring quarter seminar series (1 or 2 credits); and 6 credits of electives. Award of the certificate is contingent on completion of the student's graduate degree. Further details on these requirements can be found by visiting the Environmental Management homepage.

Global Trade, Transportation, and Logistics Studies

2 Smith



General Catalog Web page:
www.washington.edu/students/gencat/academic/Global_Trade.html



Program Web page:
depts.washington.edu/gttl/

The aim of the graduate certificate program in Global Trade, Transportation, and Logistics (GTTL) is to enable graduate students to augment their degree programs in preparation for careers that demand the combined knowledge of trade, transportation, and logistics. Particular attention is directed to the study of activities involved in the flow of goods from point of origin to point of consumption on a global scale. The wide range of issues addressed include the management of the intermodal connections among maritime, aviation, and overland modes of transport; environmental and energy concerns; advancements in telecommunications; and the legal, regulatory, and technological infrastructures that facilitate global commerce and transportation.

The GTTL graduate certificate program is responsive to the needs of government and industry for trained university graduates. The program is overseen by the Interdisciplinary Committee on Global Trade, Transportation, and Logistics. Members come from the University and the private and public sectors. GTTL works with leaders in business and government organizations to develop internships and jobs, in addition to offering a number of scholarship opportunities for graduate students. The GTTL certificate is based on a set of course requirements to be fulfilled in conjunction with the student's existing graduate degree program.

Interdisciplinary Committee

The Interdisciplinary Committee periodically reviews the content of the core courses, recommends instructors, maintains the list of eligible electives, and coordinates with course instructors regarding scheduling and prerequisites. The committee is assisted in these tasks by the lead core-course instructor, the program director, the program assistant director, and the Graduate School staff, as appropriate. The committee also oversees the policy on admission to the graduate certificate program.

Graduate Program

Graduate Program Coordinator
2 Smith, Box 353585
206-616-5778
gttl@u.washington.edu

Students associated with GTTL receive the Graduate Certificate upon completing the program's requirements and obtain their degrees through cooperating academic units. Students admitted into graduate degree programs in the following units are eligible for the GTTL graduate certificate: Aeronautics and Astronautics, Business Administration, Civil and Environmental Engineering, Communications, Economics, Education, Forest Resources, Geography, International Studies, Law, Marine Affairs, Political Science, Public Affairs, Technical Communication, and Urban Design and Planning. Graduate students from other departments may be admitted on an ad hoc basis. GTTL prepares students for careers in international trade, transporta-

tion, and logistics by offering a comprehensive program encompassing selected courses from the aforementioned separate disciplines. Those students completing the graduate certificate receive an appropriate notation on their transcript and a Letter of Achievement, signed by the head of the student's academic unit and the Dean of the Graduate School.

Certificate Requirements

The requirements consist of a minimum of 20 credits: two core courses (8 credits) and four elective courses (at least 12 credits).

The core courses—GTTL 501 and 502—provide a basic overview of the academic theories, political-economic structures, industrial dynamics, public policies, and strategic issues concerning the study, business, and regulation of global trade, transportation, and logistics.

Students select electives from a continually updated list. Most electives (and core courses) may also satisfy a student's home department requirements. At least one elective must come from outside the home department to reinforce the interdisciplinary objective of the certificate program. A substitution policy developed by the committee assures that an appropriate mix of electives can be found for each student. GTTL 600 (Independent Study) and GTTL 601 (Internship) provide an alternative means to gain elective credits.

Faculty

Director

Thomas G. Schmitt

Associate Professor

Schmitt, Thomas G. * 1979; MBA, 1974, University of Cincinnati, DBA, 1979, Indiana University; management of service and manufacturing operations.

Lecturer

McKay, Mark 1992; MS, 1989, Clemson University, PhD, 1999, University of Washington.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

GTTL 501 Global Logistics Management (4)

Provides an overview of the concepts and substance of trade, transportation, and logistics. Deals with management of physical, documentation, and information flows within supply chains, including purchasing, distribution, intermodal transportation, ERP e-commerce and e-fulfillment, financial transactions, and regulations. Prerequisite: permission of instructor. Offered: jointly with OPMGT 535; AW.

GTTL 502 Seminar in Global Trade, Transportation, and Logistics (4)

Interdisciplinary seminar that brings together students with academics and practitioners at the forefront of trade, transportation, and logistics in discussions of selected topics. Additionally, students research issues of special interest. Prerequisite: OPMGT 535, GTTL 501, or permission of instructor. Offered: jointly with OPMGT 536; Sp.

GTTL 599 Special Topics in Global Trade, Transportation, and Logistics Studies (1-5, max.

15) Selected topics with special emphasis on issues of pressing importance to the world trading community. Topics vary with departmental discretion. Prerequisite: Graduate students or permission of instructor.

GTTL 600 Independent GTTL Studies(*, max. 30) Opportunity to pursue GTTL-related issues that may not be explored in established UW courses. May involve projects undertaken in conjunction with entities beyond the University, subject to instructor approval.

GTTL 601 Internship in GTTL Studies(3-5, max. 9) Opportunity to pursue relevant research or to gain practicum experience in the employment of a department-approved public or private entity.

Health Services Administration



General Catalog Web page:
www.washington.edu/students/genccat/academic/Health_Svc_Admin.html



Program Web page:
depts.washington.edu/mhap/

Graduate Program Coordinator – In-Residence and Executive Programs
H672 Health Sciences, Box 357660
206-616-2976
mhap@u.washington.edu

The Health Services Administration Group offers two programs of study leading to the Master of Health Administration (M.H.A.) degree: a two-year in-residence program and a three-year evening/week-end executive program. The M.H.A. degree is fully accredited by the Accrediting Commission for Education in Health Services Administration. It provides the educational foundation for careers in management, planning, consulting and policy-making in ambulatory care organizations, hospitals, long-term care facilities, mental health care organizations, government agencies, planning agencies, and other organizational settings in the health field. The curriculum is designed to be interdisciplinary with a faculty drawn from the Graduate Schools of Public Health and Community Medicine, Business Administration, Public Affairs, Nursing, Medicine, and Law. Concentrations of study vary according to the student's academic interests and career objectives. In addition to academic work, students are required to participate in an internship experience in a health facility or agency under the preceptorship of the administrator or director of that organization.

Concurrent degree programs combining health administration with business administration, medicine, nursing, or public administration are also offered. These curricula (with the exception of the M.H.A./M.D.) typically require three years of intensive academic study and culminate in joint degrees (M.H.A./M.B.A., M.H.A./M.D., M.H.A./M.N., M.H.A./M.P.A.).

The Executive Master of Health Administration program, launched in January 1998, is an evening/week-end program designed primarily for mid-career physicians, other clinical practitioners, and experienced health services-oriented professionals who have demonstrated interest or competency in administration or management. It offers advanced curriculum in planning, organizing, and implementing programs that improve the cost-effectiveness and quality of patient care. The program structure allows practicing professionals to continue their careers while gaining a graduate degree.

Course listings may be found under the School of Public Health and Community Medicine, Department of Health Services section of this catalog.

Special Requirements

Applicants to the in-residence program must submit, in addition to Graduate School admission requirements, a narrative statement of objectives, a resume, at least three letters of recommendation, and scores from either the GRE or the GMAT. Interviews by members of the program faculty may also be requested. Relevant health services experience is preferred. Applicants are accepted only for autumn quarter of each year. The application deadline is February 15. Applications received after this date (U.S. and Canadian only) will be considered on a space-available basis.

Applicants to the executive program must submit, in addition to Graduate School admission requirements, a narrative statement of objectives, a resume, three letters of recommendation, and either GRE or GMAT scores (excluding applicants with doctoral-level degrees from U.S.-accredited institutions). Priority of admission is given to applicants with medical/clinical training and professional experience. Applicants are accepted only for autumn quarter of each year. Applications for autumn quarter are reviewed following the preferred deadline of April 30. Applications received after this date (U.S. and Canadian only) are reviewed on a space-available basis. Applicants can expect to hear about the status of their application within four to six weeks of submission. Those interested in applying should contact the program office as soon as possible to inquire about availability and the application process.

Financial Aid

Financial support for current M.H.A. students is available from several areas: loans, work study positions, internships, a limited number of competitive scholarships in the program, possible outside fellowships, and possible teaching or research assistantships outside the program. For more information on financial aid, contact the UW Office of Student Financial Aid (105 Schmitz Hall, Box 355880, 206-543-6101, osfa@u.washington.edu) or the M.H.A. program office.

Research Facilities

In addition to its University facilities, the program makes extensive use of community health facilities and agencies for research and training.

Faculty

Director

William E. Welton

Professors

Conrad, Douglas A. * 1977; MHA, 1973, University of Washington, MBA, 1977, PhD, 1978, University of Chicago; alternative vertical and horizontal market structures in health care.

Dowling, William L. * 1982; MBA, 1961, University of Chicago, MA, 1970, PhD, 1971, University of Michigan; strategic management of health-care organizations, managed care.

Grembowski, David * 1981; MA, 1975, Washington State University, PhD, 1982, University of Washington; health services research, survey research, program evaluation, performance of health care systems.

Klasterin, Theodore * 1974; PhD, 1973, University of Texas (Austin); operations management, facility loca-

tion, project management, waiting lines, logistics, inventory.

Kuszler, Patricia Carol * 1994; MD, 1978, Mayo Medical School/graduate School, JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.

Martin, Diane P. * 1978; MA, 1972, Temple University, PhD, 1979, University of Washington; research methods, health services quality, use, and outcomes.

Mitchell, Pamela H. * 1971; MS, 1965, University of California (San Francisco), PhD, 1991, University of Washington; neuroscience nursing, diagnostic strategies.

Ross, Austin, Jr. 1982, (Emeritus); MPH, 1955, University of California (Berkeley); ambulatory care, health care delivery systems.

Sundem, Gary L. * 1971; PhD, 1971, Stanford University; managerial accounting.

Watts, Carolyn A. * 1975; MA, 1974, Johns Hopkins University, PhD, 1976, Johns Hopkins University; health economics and policy.

Wickizer, Thomas M. * 1988; MSW, 1974, University of Washington, MPH, 1979, MA, 1987, PhD, 1989, University of Michigan; health economics, health policy, program evaluation, quality improvement, occupational health.

Associate Professors

Klawitter, Marieka * 1990; MPP, 1982, University of Michigan, PhD, 1992, University of Wisconsin; family and employment policy, women's studies, sexual orientation discrimination.

Kopjar, Branko 1997; PhD, 1996, University of Oslo (Norway); prevention effectiveness, outcomes research, health care reform, quality of care.

Lafferty, William E. 1988; MD, 1978, University of Kansas; STDs, HIV/AIDS, surveillance and epidemiology of STD, managed care.

Richardson, Mary L. * 1977; MHA, 1978, PhD, 1984, University of Washington; organization, management, and analysis of policy relevant to health services.

Assistant Professors

Mastroianni, Anna C. * 1996, (Adjunct); JD, 1986, University of Pennsylvania, MPH, 1997, University of Washington; law, ethics and policy genetics, reproduction, human subjects research.

Zierler, Brenda * 1988, (Adjunct); PhD, 1996, University of Washington; research in patient with venous thromboembolism; clinical outcomes, process outcomes.

Senior Lecturers

Cormick, Gerald W. 1975; PhD, 1971, University of Michigan; mediation and negotiation.

Katz, Aaron 1988; CPH, 1975, University of Toronto (Canada); health policy, public health, determinants of health.

Thompson, John (Jack) R. 1989; MSW, 1976, University of Washington; public health practice, health policy analysis, work force development.

Welton, William E. 2001; MHA, 1972, DPH, 1999, University of Michigan; strategic and organizational effectiveness of health systems.

Lecturers

Masuda, David 1997, (Adjunct); MD, 1980, University of North Dakota, MS, 1996, University of Wisconsin; biomedical and health informatics.

Sappington, Jeremy L. 1992; MPH, 1964, University of North Carolina; systems theory, human resources management, undergraduate studies in public health.

Stillman, Dennis 1987; MHA, 1979, University of Washington; health care financial management, management development.

Molecular and Cellular Biology



General Catalog Web page:

www.washington.edu/students/genocat/academic/Molec_Cell_Biol.html



Program Web page:

depts.washington.edu/mcb/

Graduate Program

Graduate Program Coordinator
T466 Health Sciences, Box 357275
206-543-0253
mcb@u.washington.edu

The Molecular and Cellular Biology Program (MCB) is a leader in applying the techniques of molecular and cellular biology to advance the understanding of basic biological sciences. The goal of the doctoral program is to broadly train students to think about science in a rigorous and critical manner. Since scientific methods, equipment, and knowledge are changing rapidly, students learn to focus on important issues in an evolving research environment. This program is appropriate for students interested in future careers in research and teaching in academia as well as biotechnology and pharmaceutical companies.

Thirteen departments across three schools have faculty members actively pursuing research in molecular and cellular biology. The departments participating in the program include Biochemistry, Bioengineering, Biological Structure, Botany, Environmental Health, Genome Sciences, Immunology, Microbiology, Pathobiology, Pathology, Pharmacology, Physiology and Biophysics, and Zoology.

At the Fred Hutchinson Cancer Research Center (FHCRC), the divisions of Basic Sciences and Molecular Medicine participate in the joint Molecular and Cellular Biology graduate program. Shared FHCRC facilities are available for electron microscopy, flow cytometry, tissue culture, and image analysis. A biotechnology center for DNA and protein synthesis and sequencing, animal facilities, a biological production facility that focuses on monoclonal antibody production, extensive libraries, and a bio-computing center provide further support for the research effort.

Faculty Interests

Over 160 faculty members from the UW and FHCRC are researching molecular and cellular biology and are skilled in the training of graduate students. Faculty research interests encompass both prokaryotic and eukaryotic cells in the following general areas: genetics, cell biology, neurobiology, immunology, virology, molecular structure, developmental biology, cancer biology, plant biology, genomics/proteomics, and microbiology.

Admission

The Molecular and Cellular Biology Program is a highly competitive interdisciplinary program which receives applications from outstanding students nationwide. MCB Program information and requirements are listed at its Web site. Applications are due January 2 each year and are available on-line via a link from the program homepage (depts.washington.edu/mcb/). Applications can also be requested by email (mcb@u.washington.edu) or by calling 206-543-0253. Applicants may apply both to the MCB Program and to any of the thirteen participating UW departments. Since application requirements or deadlines may differ, applicants should contact the participating departments for information.

In addition to the Graduate School application requirements, prospective students must submit an MCB Program application form, a personal statement of research interests and career goals, three letters of recommendation, and Graduate Record Examination scores with a subject test.

Financial Aid

The MCB Program provides a stipend plus tuition for the first year of study. At the end of the first year of study, students choose a doctoral committee, and subsequent years of support are provided by the department of the committee chair. Students maintaining satisfactory academic progress receive funding for the duration of their graduate training.

Ph.D. Requirements

The program, which culminates in the Ph.D. degree, includes training in laboratory research, supervised teaching experience, lectures and seminars on current research topics, rigorous course work in molecular and cellular biology, and graduate-level electives in the student's area of interest. During the first year, students participate in research rotations in three laboratories. Lab rotations offer students an opportunity to learn basic research techniques and to become familiar with the various research areas in molecular and cellular biology of participating faculty members. First-year course work includes a three quarter series of modular courses in molecular and cellular biology and a three-quarter literature review course. Selection from a large list of elective courses is based on the student's background and interests. During the summer of the first year, students choose their permanent advisor and form their Doctoral Supervisory Committee. Students may also elect to participate in a summer biotechnology externship course during their first summer.

During the second year, students generally complete their supervised teaching experience and their elective course work. Autumn quarter of the third year, students take the General Examination. Formal course work is usually completed by this time, although students may take elective courses of interest. Students continue to participate in various department seminar courses and journal clubs.

After completing their course work and General Exam during autumn quarter of the third year, students work full-time on the dissertation research project. The final requirements for the Ph.D. degree include a written dissertation and an oral dissertation defense.

MCB Program students participate in a monthly seminar program which involves student and faculty presentations. The purpose of these seminars is to acquaint students with the research carried on in many laboratories involved in the program and to give students practical experience in making presentations before their peers. In addition, MCB Program students are invited to seminar programs in the participating departments and the Fred Hutchinson Cancer Research Center.

Faculty

Professors

Aderem, Alan A. * 1996, (Affiliate); PhD, 1979, University of Capetown (South Africa); signal transduction and the cytoskeleton.

Bassingthwaite, James * 1975; MD, 1955, University of Toronto (Canada), PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Beavo, Joseph A. * 1977; PhD, 1970, Vanderbilt University; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function.

Bendich, Arnold J. * 1970; PhD, 1969, University of Washington; structure and replication of chromosomal DNA molecules in mitochondria, chloroplasts, and bacteria.

Berger, Albert J. * 1978; MA, 1965, PhD, 1967, Princeton University, PhD, 1976, University of California (San Francisco); neural and chemical control of respiration, neurobiology, synaptic transmission.

Bevan, Michael J. * 1990; PhD, 1972, National Institute for Medical Research (UK); T lymphocyte development and specificity.

Bomszyk, Karol 1983; MD, 1977, University of Rochester; role of cytokine-induced protein kinases in the regulation of gene expression.

Bornstein, Paul * 1967; MD, 1958, New York University; structure and function of connective tissue macromolecules, wound healing.

Bothwell, Mark A. * 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology.

Bowen-Pope, Daniel * 1979; PhD, 1979, University of California (Berkeley); gene regulation, growth factors and receptors.

Byers, Breck E. * 1970; PhD, 1967, Harvard University; cell biology: mitosis and meiosis, mechanisms of nuclear division and crossing-over in yeast.

Byers, Peter H. * 1976; MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics.

Campbell, Lee Ann * 1985; PhD, 1982, Pennsylvania State University; molecular biology and pathogenic mechanisms of chlamydiae.

Carlson, Steven S. * 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of synaptic transmission.

Carter, William G. * 1981; PhD, 1974, University of California (Davis); elucidation of components in cell attachment and cell spreading in normal cells.

Catterall, William A. * 1977; PhD, 1972, Johns Hopkins University; molecular biology of ion channels, molecular pharmacology and neurobiology.

Cattolico, Rose A. * 1975; PhD, 1973, State University of New York (Stony Brook); signal transduction and calcium cycle processes in toxic marine algae.

Champoux, James J. * 1972; PhD, 1970, Stanford University; DNA replication, tumor virology.

Chavkin, Charles * 1984; PhD, 1982, Stanford University; cell and molecular mechanisms of psychoactive opiate drugs to understand normal and pathophysiology.

- Clark, John I. * 1982; PhD, 1974, University of Washington; development and maintenance of lens transparency.
- Collins, Steven J. * 1982; MD, 1973, Columbia University; retinoic acid receptors and the pathogenesis of malignancy.
- Comai, Luca * 1989; PhD, 1980, University of California (Davis); chromatin and gene regulation, genetics of polyploidy, functional genomics, plant transformation.
- Cooper, Jonathan A. * 1987; PhD, 1976, University of Warwick (UK); regulation of cellular metabolism and proliferation by protein phosphorylation.
- Corey, Lawrence * 1977, (Adjunct); MD, 1971, University of Michigan; DX, therapy and pathogenesis of viral infections, AIDS/herpes viruses.
- Costa, Lucio Guido * 1983; PharmD, 1977, University of Milan (Italy); neurotoxicology; developmental and molecular mechanisms/biological markers of neurotoxicity.
- Dale-Crunk, Beverly A. * 1972; PhD, 1968, University of Michigan; keratin biochemistry, epithelial differentiation, antimicrobial peptides.
- Davie, Earl Warren * 1962; PhD, 1954, University of Washington; protein synthesis, mechanism of blood clotting, cloning of plasma proteins.
- Davis, Trisha Nell * 1987; PhD, 1983, Yale University; control of the cell cycle, chromosome segregation, proteomics.
- Detwiler, Peter B. * 1977; PhD, 1970, Georgetown University; physiology of photoreceptors.
- Disteche, Christine M. * 1980; PhD, 1976, University of Liege (Belgium); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics.
- Ebrey, Thomas 1997; PhD, 1968, University of Chicago; light energy transduction by retinal proteins, especially visual pigments and bacteriorhodopsin.
- Eisenman, Robert M. * 1982; PhD, 1971, University of Chicago; viral oncology, oncogenes, retrovirus multiplication.
- Elkon, Keith B. * 2001; MD, University of Witwatersrand (South Africa), MRCP, 1978, University of London; rheumatology.
- Emerman, Michael 1994; PhD, 1986, University of Wisconsin; molecular biology of HIV.
- Farr, Andrew G. * 1982; PhD, 1975, University of Chicago; cell interactions governing lymphocyte production and function.
- Faustman, Elaine M. * 1981; PhD, 1980, Michigan State University; developmental toxicology, risk assessment methodologies, toxicology of N-nitroso compounds.
- Fausto, Nelson * 1994; MD, 1960, Sao Paulo State University (Brazil); liver regeneration, tumor biology, carcinogenesis, growth factors.
- Fields, Stanley * 1995; MA, 1978, PhD, 1981, Cambridge University (UK); yeast molecular biology and genetics.
- Froehner, Stanley C. 2000; PhD, 1973, California Institute of Technology; molecular mechanisms of synapse formation and muscle disease.
- Furlong, Clement E. * 1977; PhD, 1968, University of California (Davis); human biochemical genetics in biochemistry of membrane transport systems.
- Galloway, Denise A. * 1982, (Research); PhD, 1976, City University of New York; viral pathogenesis and neoplasia.
- Gelb, Michael H. * 1985; PhD, 1982, Yale University; mechanistic enzymology, bioorganic and medicinal chemistry.
- Gordon, Albert M. * 1964, (Emeritus); PhD, 1961, Cornell University; skeletal and cardiac muscle physiology/biophysics.
- Gordon, Milton * 1959; PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants.
- Gottschling, Daniel E. * 1996; PhD, 1984, University of Colorado; dissection of telomere attributes and understanding telomerase in *S. Cerevisiae*.
- Graubard, Katherine * 1979; PhD, 1973, University of Washington; cellular neurophysiology, neural basis of behavior.
- Groudine, Mark * 1982; MD, 1975, PhD, 1976, University of Pennsylvania; chromatin structure and gene activity.
- Hall, Benjamin D. * 1963; MA, 1956, PhD, 1959, Harvard University; the evolution of nuclear genes in plants and fungi.
- Hauschka, Stephen D. * 1967; PhD, 1966, Johns Hopkins University; regulation of skeletal muscle differentiation, growth factor-receptor signaling mechanisms.
- Hille, Bertil * 1968; PhD, 1967, Rockefeller University; receptors and ion channels of excitable membranes; cell signaling; intracellular calcium dynamics.
- Hille, Merrill B. * 1976; PhD, 1965, Rockefeller University; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis.
- Hol, Wilhelmus G. J. * 1992; PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.
- Hughes, Kelly T. * 1989; PhD, 1984, University of Utah; genetics, gene regulation, microbial physiology, and metabolism.
- Hurley, James Bryant * 1985; PhD, 1979, University of Illinois; molecular basis of vision.
- Katze, Michael Gerald * 1987; PhD, 1980, Hahnemann Medical College; regulation of viral gene expression at the translational level.
- Kimelman, David * 1989; PhD, 1985, Harvard University; molecular biology of early development in the frog, *Xenopus laevis*, and the fish, *Danio rerio*.
- King, Mary-Claire * 1995; PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.
- Klevit, Rachel E. * 1983; DPhil, 1981, Oxford University (UK); protein structure and function; molecular recognition; protein NMR.
- Laird, Charles D. * 1971; PhD, 1966, Stanford University; cell and developmental biology, human genetics.
- Lernmark, Ake * 1988; MD, 1970, PhD, 1971, University of Umea; immunogenetics of organ-specific autoimmunity with emphasis on insulin-dependent diabetes.
- Lidstrom, Mary E. * 1995; MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.
- Linial, Maxine L. * 1982; PhD, 1970, Tufts University; retroviral replication and genetics, retroviral transformation.
- Loeb, Lawrence A. * 1978; MD, 1961, New York University, PhD, 1967, University of California (Berkeley); DNA replication, cancer and AIDS.
- Luchtel, Daniel L. * 1972; PhD, 1969, University of Washington; electron microscopy and cell biology, lung anatomy/pathophysiology, fiber toxicology.
- Maizels, Nancy * 2000; PhD, 1974, Harvard University; recombination and repair in mammalian cells, especially activated B cells.
- Manoil, Colin C. * 1986; PhD, 1979, Stanford University; molecular genetics, protein localization in bacteria.
- Martin, George * 1957; MD, 1953, University of Washington; somatic cell genetics, pathobiology of aging, neurodegenerative disorders.
- McElrath, Margaret Juliana * 1990; PhD, 1978, MD, 1980, Medical University of South Carolina; infectious diseases.
- McKnight, G. Stanley * 1979; PhD, 1976, Stanford University; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches.
- Miller, Arthur D. * 1987; PhD, 1982, Stanford University; retrovirus biology, gene transfer, gene therapy.
- Miller, Samuel I. * 1995; MD, 1979, Baylor University; salmonella pathogenesis and bacterial-eucaryotic cell interactions.
- Monnat, Raymond J, Jr. * 1982; MD, 1976, University of Chicago; somatic mutation, somatic cell molecular genetics, human genetic disease.
- Moody, William J. * 1982; PhD, 1977, Stanford University; single cell electrophysiology, development of electrical properties in embryos.
- Moon, Randall T. * 1985; PhD, 1982, University of Washington; embryonic development; signal transduction; cancer biology.
- Morris, David R. * 1966; PhD, 1964, University of Illinois; regulation of growth in eukaryotes and prokaryotes, translational control.
- Nathanson, Neil M. * 1979; PhD, 1975, Brandeis University; neurobiology; molecular analysis of neural signal transduction by muscarinic and neurokinin receptors.
- Neiman, Paul E. * 1971, (Adjunct); MD, 1964, University of Washington; oncology.
- Olson, Maynard V. 1992; PhD, 1970, Stanford University; methods and applications of large-scale DNA analysis.
- Omicinski, Curtis J. 1983; PhD, 1980, University of Washington; molecular toxicology, genetic regulation/expression of drug/chemical metabolizing enzymes.
- Overbaugh, Julie Maureen *; PhD, 1983, University of Colorado (Boulder); molecular mechanisms of virus-host cell interactions/retroviral pathogenesis/AIDS.
- Palczewski, Krzysztof * 1992; MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.
- Palmiter, Richard D. * 1974; PhD, 1968, Stanford University; regulation of gene expression in transgenic mice.

- Parsons, Marilyn * 1981; PhD, 1979, Stanford University; parasite cell biology.
- Rabinovitch, Peter S. * 1980; MD, 1979, University of Washington, PhD, 1980, University of Washington; cellular aging, preneoplastic disease, cell cycle abnormalities, DNA change.
- Reh, Thomas A. * 1989; PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.
- Reid, Brian J. * 1983; PhD, 1975, MD, 1980, University of Washington; genetic and cell cycle abnormalities in neoplastic progression in Barrett's esophagus.
- Riddiford, Lynn M. * 1973; PhD, 1961, Cornell University; insect development and physiology, invertebrate endocrinology.
- Roberts, James Michael * 1989; PhD, 1984, MD, 1984, Columbia University; regulation of DNA replication by cyclin-kinase complexes.
- Roberts, Marilyn C. * 1981; PhD, 1978, University of Washington; antibiotic resistance genes, plasmids, sexually transmitted diseases, oral microbiology.
- Rohrschneider, Larry R. * 1982; PhD, 1973, University of Wisconsin; control of growth, differentiation, transformation by the c-fms proto-oncogene.
- Rosenfeld, Michael E. * 1992; PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.
- Schubiger, Gerold A. * 1972; PhD, 1968, University of Zurich (Switzerland); developmental biology of insects, embryonic determination in *Drosophila*.
- Schwartz, Stephen Mark * 1974; MD, 1967, Boston University, PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.
- Sibley, Carol Hopkins * 1976; PhD, 1974, University of California (San Francisco); molecular parasitology and drug resistance.
- Smith, Gerald R. * 1983; PhD, 1970, Massachusetts Institute of Technology; molecular biology of genetic recombination and regulation of gene expression.
- Staley, James T. * 1971; PhD, 1967, University of California (Davis); freshwater bacteriology, microbial ecology, general microbiology.
- Stamatoyannopoulos, George 1964, (Adjunct); MD, 1958, DrMedS, 1960, University of Athens (Greece); medical genetics.
- Stayton, Patrick S. * 1992; PhD, 1989, University of Illinois; engineering proteins for biotechnology, biomaterials, and biomedical therapies/diagnostics.
- Steiner, Robert A. * 1977; PhD, 1975, University of Oregon; neuroendocrinology, neuroscience, endocrinology.
- Storm, Daniel R. * 1978; PhD, 1971, University of California (Berkeley); molecular basis of neuroplasticity; cAMP and Ca²⁺ signal transduction systems in the CNS.
- Stuart, Kenneth Daniel * 1985; PhD, 1969, University of Iowa; molecular biology of parasites.
- Tempel, Bruce L. 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.
- Thomas, James H. * 1988; PhD, 1985, Massachusetts Institute of Technology; genetics of development and the nervous system in nematodes.
- Trask, Barbara J. * 1992; PhD, 1985, University of Leiden (Netherlands); in situ hybridization, analytical cytogenetics, analysis of large-scale DNA polymorphism.
- Truman, James W. * 1973; PhD, 1970, Harvard University; hormones and invertebrate behavior, insect physiology, circadian rhythms.
- Van Volkenburgh, Elizabeth * 1982; PhD, 1980, University of Washington; leaf growth and development, photobiology and electrophysiology.
- Van Voorhis, Wesley C. * 1986; PhD, 1983, Rockefeller University, MD, 1984, Cornell University; infectious diseases.
- Varani, Gabriele * 2001; PhD, 1987, University of Milan (Italy); physical biophysical.
- Wakimoto, Barbara T. * 1984; PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.
- Weiner, Alan * 2000; PhD, 1973, Harvard University; genome structure, function of small nuclear and cytoplasmic RNA species, CCA-adding enzyme.
- Westrum, Lesnick E. * 1966; MD, 1963, University of Washington, PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.
- Wight, Thomas * 1978; PhD, 1972, University of New Hampshire; connective tissue biology and pathology, proteoglycans metabolism, atherosclerosis.
- Willows, A. O. Dennis * 1969; PhD, 1967, University of Oregon; invertebrate neurophysiology, neural mechanisms underlying behavior.
- Wilson, Christopher B. * 1980; MD, 1972, University of California (Los Angeles); immunology, infectious diseases.
- Wolf, Norman S. * 1968; DVM, 1953, Kansas State University, PhD, 1960, Northwestern University; hematopoietic stem cell dynamics and transplantation in radiation biology.
- Yablonka-Reuveni, Zipora * 1982; MSc, 1975, Weizmann Institute for Science (Israel), PhD, 1979, University of Windsor (Canada); myogenesis during growth, aging, and regeneration of skeletal muscle.
- Yao, Meng Chao * 1988; PhD, 1975, University of Rochester; regulation of gene amplification and chromosome rearrangements in *Tetrahymena*.
- Young, Elton * 1969; PhD, 1967, California Institute of Technology; regulation of gene activity in the yeast *Saccharomyces cerevisiae*.
- Zagotta, William N. * 1993; PhD, 1989, Stanford University; molecular mechanisms of ion channel function.
- Zarbl, Helmut * 1996; PhD, 1983, McGill University (Canada).
- Associate Professors**
- Baker, David * 1993; PhD, 1989, University of California (Berkeley); protein folding, genomics.
- Bakken, Aimee * 1973; PhD, 1970, University of Iowa; developmental and cell biology, chromosome structure and function in oogenesis and embryogenesis.
- Berg, Celeste A. * 1990; PhD, 1986, Yale University; *Drosophila* developmental genetics: Cell communication and cell migration during oogenesis.
- Bornfeldt, Karin E. * 1991; PhD, 1991, Linköping University (Sweden); cardiovascular disease in diabetes, focusing on vascular muscle cells.
- Braun, Robert Elmer * 1986; PhD, 1985, Tufts University; mammalian genetics, germ cell development and reproduction.
- Breeden, Linda 1994; PhD, 1981, University of California (Boulder); cell cycle regulation in budding yeast.
- Concannon, Patrick J. * 1989; PhD, 1984, University of California (Los Angeles); development of the human T cell receptor repertoire, genetics of diabetes and ataxia-telangiectasia.
- Cooper, Mark S. * 1990; PhD, 1985, University of California (Berkeley); cellular physiology and cell motility in developing tissues.
- Cunningham, Michael L. * 1988, (Adjunct); MD, 1988, University of Vermont, PhD, 1996, University of Washington; molecular, development, craniofacial, malformation, human, mouse, craniosynostosis, birth defects.
- Edwards, Scott V. 1994; PhD, 1992, University of California (Berkeley); molecular evolution and population genetics; evolutionary history of birds.
- Feagin, Jean E. * 1993; PhD, 1982, Stanford University; molecular parasitology, emphasizing gene organization and expression in protozoans.
- Fink, Pamela J. * 1990; PhD, 1981, Massachusetts Institute of Technology; T cell differentiation, tolerance induction, molecular and cellular immunology.
- Foote, Jefferson * 1994; PhD, 1985, University of California (Berkeley); biophysics of immune maturation, antibody engineering and immunotherapy, x-ray crystallography.
- Geballe, Adam Philip * 1988; MD, 1978, Duke University; translational regulation of viral and cellular gene expression.
- Giachelli, Cecilia * 1982; PhD, 1987, University of Washington; adhesion molecules and vascular biology processes.
- Giniger, Edward Scott * 1994; PhD, 1988, Harvard University; neural development, mechanism of axon guidance, genetic specification of brain structure.
- Gorman, Joan M. * 1992; PhD, 1981, University of California (Los Angeles); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity.
- Hahn, Steven M. * 1994; PhD, 1984, Brandeis University; transcription initiation in yeast.
- Haigwood, Nancy L. * 1994; PhD, 1980, University of North Carolina; host immunity in the control and prevention of AIDS.
- Henikoff, Steven 1982; PhD, 1977, Harvard University; chromosome organization, epigenetic effects, analysis of protein sequence information.
- Hockenbery, David M. * 1994; MD, 1982, Washington University; gastroenterology.
- Horwitz, Marshall S. * 1983, (Adjunct); PhD, 1988, MD, 1990, University of Washington; inherited white blood cell disorders, including leukemia.
- Kapur, Raj P. * 1988; MD, 1988, University of Southern California; normal and abnormal development of the enteric nervous system.
- Kruglyak, Leonid * 1998; PhD, 1990, University of California (Berkeley); population genetics, statistical genetics, genomics, computational biology.
- Lampe, Paul D. * 1996; PhD, 1984, University of Minnesota; regulation of intercellular communication via gap junctions.

Leigh, John A. * 1985; PhD, 1983, University of Illinois; bacterial physiology, biochemistry, genetics.

Mandoli, Dina F. * 1988; PhD, 1982, Stanford University; plant development and morphogenesis using genetics, molecular biology, physiology.

Moseley, Stephen L. * 1985; PhD, 1981, University of Washington; molecular basis of pathogenesis in *E. coli* diarrhea.

Mullins, James I. * 1994; PhD, 1978, University of Minnesota; retroviruses and AIDS, molecular virology.

Murry, Charles E. * 1989; PhD, 1989, MD, 1989, Duke University; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation.

Ostrander, Elaine A. * 1994; PhD, 1987, Oregon Health Sciences University; genetic mapping of simple and complex traits.

Parkhurst, Susan M. 1994; PhD, 1995, Johns Hopkins University; developmental, genetic and molecular analysis of *Drosophila* embryogenesis.

Porter, Peggy L. * 1987; MD, 1987, University of New Mexico; identifying/understanding the molecular events associated with the initiation/progression of cancer.

Priess, James R. * 1993; PhD, 1983, University of Colorado (Boulder); reliability models, fault trees.

Raible, David W. * 1995; PhD, 1989, University of Pennsylvania; zebrafish neural development.

Roelink, Henk * 1996; MSc, 1985, University of Groningen (Netherlands), PhD, 1991, University of Amsterdam (Netherlands); role of signaling molecules in mediating neural tissue differentiation during vertebrate development.

Rose, Timothy M. * 1991; PhD, 1981, University of Geneva (Switzerland); molecular biology of tumor viruses, cell growth, differentiation, and transformation.

Roth, Mark * 1994; PhD, 1988, University of Colorado (Boulder); nuclear proteins involved in the regulation of gene expression.

Rudensky, Alexander Y. * 1992; PhD, 1986, Gabrichevsky Institute for Epidemiology and Microbiology; antigen processing and presentation, T-cell recognition, T cell development.

Ruohola-Baker, Hannele * 1993; PhD, 1989, Helsinki University (Finland); oogenesis, developmental genetics.

Soriano, Philippe 1994; PhD, 1978, University of Paris (France); vertebrate developmental genetics.

Stenkamp, Ronald E. * 1978; PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, rhodopsin, G-protein coupled receptors.

Stoddard, Barry L. * 1994; PhD, 1990, Massachusetts Institute of Technology; physical and structural studies of biological macromolecules.

Swalla, Billie J. 1999; PhD, 1988, University of Iowa; how developmental and evolutionary processes influence animal body plans.

Tapscott, Stephen J. * 1986; PhD, 1982, MD, 1982, University of Pennsylvania; molecular and developmental biology.

Thouless, Margaret E. * 1980; PhD, 1974, University of Birmingham (UK); retroviruses, herpes viruses, enteric viruses, immunodiagnosis, virus variability.

Traxler, Beth A. * 1992; PhD, 1987, Carnegie Mellon University; bacterial physiology, genetics, and membrane protein biochemistry.

Verlinde, Christophe L. M. J. * 1992; PhD, 1988, Catholic University of Leuven (Belgium); structure-based drug design and protein crystallography.

Vogel, Viola * 1990; Doct, 1987, Johann Wolfgang Goethe University (Germany); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, nonlinear optics, microscopy.

White, Theodore C. * 1996; PhD, 1984, University of Michigan; molecular mechanisms of virulence and drug resistance in pathogenic yeasts.

Wordeman, Linda * 1994; PhD, 1988, University of California (Berkeley); mitosis and myofibril formation.

Wright, Robin L. * 1990; PhD, 1985, Carnegie Mellon University; membrane dynamics and regulation of sterol biosynthesis in yeast.

Xia, Zhengui * 1987; MS, 1985, Wuhan University (China), PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

Assistant Professors

Bajjalieh, Sandra M. * 1995; PhD, 1989, University of Wisconsin; molecular neurobiology.

Biggins, Susan 2000; PhD, 1995, Princeton University.

Clurman, Bruce E. * 1991; PhD, 1988, MD, 1989, Cornell University.

Cookson, Brad T. * 1996; PhD, 1991, MD, 1991, Washington University; cellular immune response to intracellular bacteria; microbial pathogenesis; clinical microbiology.

Dong, Chen * 2000; PhD, 1996, University of Alabama; molecular mechanisms of immune and autoimmune responses.

Edgar, Bruce A. 1994; PhD, 1987, University of Washington; cell cycle control in *Drosophila*.

Ferre-D'Amare, Adrian Riu * 1999; PhD, 1994, Rockefeller University; structural biology of RNA, X-ray crystallography, biological catalysis.

Gordon, Sharona E. * 1993; PhD, 1994, Brown University; molecular mechanisms of ion channel gating in visual and olfactory transduction.

Kemp, Christopher James * 1996; PhD, 1989, University of Wisconsin; genetic and environmental influence on multistage cancer in the mouse.

La Spada, Albert R. 1998; PhD, 1993, MD, 1993, University of Pennsylvania; inherited neurodegenerative disease.

Lagunoff, Michael * 2001; PhD, 1995, University of Chicago; molecular virology of Kaposi's sarcoma-associated herpesvirus.

Moens, Cecilia B. * 1998; PhD, 1993, University of Toronto; development of segmentation and segment identity in the vertebrate hindbrain.

Muchowski, Paul J. 2001; PhD, 1998, University of Washington; molecular chaperones, neurodegeneration.

Nelson, Peter S. * 1993; MD, 1986, University of Kansas; the study of human carcinogenesis using tools of genomics and bioinformatics.

Olson, James M. 1991; MD, 1991, University of Michigan; hematology, oncology.

Pallanck, Leo J. * 1997; PhD, 1992, Albert Einstein College of Medicine; genetic and molecular analysis of symptomatic transmission in *Drosophila melanogaster*.

Ramakrishnan, Lalita * 2001; MD, 1983, Baroda Medical College (India), PhD, 1990, Tufts University; contributions of mycobacteria and hosts to maintenance of chronic tuberculosis.

Rutherford, Suzanne L. 1999; PhD, 1995, University of California (San Diego); developmental canalization and the evolution of networks of signal transduction pathways.

Salama, Nina R. 2001; PhD, 1995, University of California (Berkeley).

Samudrala, Vaikuntanath V. * 2001; PhD, 1997, Center for Advanced Research in Biotechnology; modeling the structure and function of whole genomes.

Sherman, David R. * 1998; PhD, 1987, Vanderbilt University; molecular genetics, microbiology and biochemistry of pathogenic mycobacteria.

Simon, Julian A. * 1996; PhD, 1991, Columbia University; identification and characterization of new anticancer agents.

Stella, Nephi * 1999; PhD, 1995, Ecole Polytechnique Federale De Lausanne; microglia cells activation; involvement of endogenous cannabinoid ligands and their allied receptors.

Strong, Roland K. * 1994; PhD, 1990, Harvard University; structural immunology; analysis of the functions of proteins mediating immune responses.

Torii, Keiko * 1999; PhD, 1993, University of Tsukuba (Japan); Arabidopsis developmental genetics; receptor-mediated signal transduction in higher plants.

Tsukiyama, Toshio * 1999; PhD, 1991, University of Hiroshima (Japan).

Wang, Edith H. * 1996; PhD, 1991, Columbia University; regulation of genes that control cellular proliferation and differentiation.

Xu, Wenqing * 1999; PhD, 1995, Massachusetts Institute of Technology; structural studies of proteins involved in cancer, immune dysfunction and neuronal diseases.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

MCB 511 Cell Cycle Control (3) *Breedon, Roberts, Edgar* Studies recent advances in understanding cell-cycle control, arising from genetics and biochemical studies of fission and budding yeast, marine invertebrates, *Drosophila*, amphibians, and cultured cells. Addresses the biochemical processes and molecular interactions and the rate-limiting events in the cell cycle, and the coupling of those events to physiological signals. Offered: A.

MCB 514 Molecular and Cellular Biology Literature Review (2) *Roelink, Stoddard* Emphasizes critical evaluation of the original literature orally and in writing. Open only to first-year students in the Molecular and Cellular Biology Program.

MCB 515 Molecular and Cellular Biology Literature Review (2) *Roelink, Stoddard* Emphasizes critical

evaluation of the original literature orally and in writing. Open only to first-year students in the Molecular and Cellular Biology Program. Offered: W.

MCB 516 Molecular and Cellular Biology Literature Review (2) *Roelink, Stoddard* Emphasizes critical evaluation of the original literature orally and in writing. Open only to first-year students in the Molecular and Cellular Biology Program. Offered: S.

MCB 517 Topics in Molecular and Cellular Biology (1-5, max. 12) Advanced in-depth coverage of specific areas of molecular and cellular biology of current interest. Lectures by University of Washington faculty and invited speakers involved in research in this area. A basic knowledge of principles of molecular and cellular biology assumed.

MCB 519 Topics in Cancer (1, max. 6) Examination of ways to integrate basic, clinical, and public health sciences to increase understanding of human biology and disease. Seminars in introduction to cancer research as viewed by basic, clinical, and public health sciences, origins of cancer, cancer prevention, cancer progression, and therapies for cancer. Credit/no credit only.

MCB 520 Tutorial in Molecular and Cellular Biology (1-2, max. 2) *Stoddard* Special topics reading and discussion. Offered: A.

MCB 521 Embryos, Genes and Development (4) *Parkhurst, Priess, Soriano* Introduction to vertebrate and invertebrate development emphasizing cellular, genetic, and molecular mechanisms. Focuses on development of fruit flies, nematodes, and mice. Emphasizes embryological processes including induction, determination, pattern formation. Relationship between development and evolution. Technologies include transgenic animals, genetics, mosaic analysis, homologous recombination, somatic cell genetics, embryonic manipulations. Offered: W.

MCB 532 Human Pathogenic Viruses (3) *Galloway, Linail* Replication, regulation, and pathogenesis of several groups of human viruses, including human immunodeficiency virus and papillomaviruses. Emphasis on the unique aspects of the viral-like cycles as they relate to effects on infected cells and organisms. Guest lecturers focus on viral immunology, measles, herpes simplex virus and HHV-8. Offered: Sp.

MCB 542 Structural Molecular Biology (3) *Strong, Stoddard* Overview of structure/function studies and methods, and current results in key areas of molecular biology. Introduction to the methods of structural biology, with emphasis on how to read and assess a structural paper. Analysis and discussion of recently published studies of macromolecular structure/function relationships. Extensive, interactive computer modeling and graphics tutorials. Offered: A.

MCB 560 Biotechnology Externship (2-12, max. 12) *Moon* Supervised research in a biotechnology company. Prerequisite: permission of instructor and doctoral candidacy. Offered: AWSpS.

MCB 562 Cell Signaling and Oncogenesis (3) *Cooper, Tappscott* Discusses the roles of cell architecture, signal transduction, and the nucleus in homeostasis of normal tissues and in cancer. Regulation of cell proliferation and differentiation in normal tissues. Protooncogenes and oncogenes. Tumor suppressor genes. Cell-cell and cell-matrix interactions. The development, vascularization, metastasis of tumors. Offered: Sp.

MCB 580 Teaching Practicum in Molecular and Cellular Biology (3, max. 6) Supervised training in the teaching of molecular and cellular biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MCB 599 Introduction to Research in Molecular and Cellular Biology (*, max. 20) The student rotates through one research laboratory involved in the Molecular and Cellular Biology Program per quarter. Open only to first-year students in the Molecular and Cellular Biology Program. Credit/no credit only. Offered: AWSpS.

MCB 600 Independent Study or Research (*)

MCB 700 Master's Thesis (*) Offered: AWSpS.

MCB 800 Doctoral Dissertation (*)

Museology



General Catalog Web page:

www.washington.edu/students/gencat/academic/museology.html



Program Web page:

www.grad.washington.edu/inter/museo.htm

Graduate Program Coordinator
Burke Museum, Box 353010
206-543-9680

The Museology Program is designed to provide the generalized training, knowledge, and skills necessary to pursue a professional career in museum work. The program is directed toward the training of a broad range of museum professionals interested in curation and management of collections in anthropology, art, botany, geology, history, and zoology as well as in interpretive programs and museum administration.

Courses include required core museology subjects as well as a range of classes offering students the chance to specialize in interest areas. Course work is divided between the theoretical and practical aspects of museum operations. Classes take the form of lecture courses, seminars, special lectures by guest speakers, field trips, laboratory and collection management courses, practicums and internships. Since admission to the program is highly selective, classes are small and students have close contact with faculty.

Practical experience, an essential component of the program, is provided by several museological institutions at the University of Washington, including the Thomas Burke Memorial Washington State Museum, the Henry Art Gallery, the Herbarium, the Arboretum, the Fish Collection, and the University Libraries. The Burke Museum acts as the coordinating unit of the program. Located on the campus of the University of Washington, the Burke Museum is Washington state's natural-history and anthropology museum, and is the oldest and largest natural-history museum in the Northwest. It has nationally and internationally ranked collections focusing on the anthropology, geology, and zoology of the Pacific region and Pacific Rim.

Program Requirements

The graduate program in museology is designed to take two years to complete, consisting of six quarters of academic study and research. During the first year, students carry on average between 10 and 15 credits each quarter; during the second year, the number of credits may vary depending on research, practicum, and internship work. Students may enroll for part-time study, but this is discouraged during the first year.

Requirements for successful completion of the Master of Arts degree include:

1. Completion of a minimum of 36 quarter credits, including 27 course credits and 9 thesis or thesis-project credits, with at least 18 credits of course

work numbered 500 or above, including a thesis or thesis project.

2. A minimum of three quarters of full-time residence credit or part-time equivalent.
3. Demonstration of reading competence in one foreign language, if required by the student's supervisory committee due to the student's area of specialization.
4. Completion of an internship in an off-campus museum or related agency approved by the supervisory committee prior to submission of the student's thesis or thesis project.
5. Presentation of a thesis proposal by the beginning of the fourth quarter of study.
6. Successful completion of an oral examination, covering both the thesis topic and the field of museology in general, following submission of the thesis or thesis project.
7. Completion of all degree requirements within six years.

The following courses are required of all students unless exempted by petition to the Program Coordinating Committee or credited for relevant course work completed at other universities: MUSEUM 480, 481 or 490 or 491, 482, 483, 498, 590, 591, 592, 593 or 594, 595, 600, 700 or 710. In addition, two or more courses are required in an academic discipline relevant to the area of specialization.

The Museology Program also offers a Graduate Certificate in Museum Studies as an option for graduate students in other degree programs at the University. To qualify, students must take a specified minimum set of four key courses in areas that emphasize either collection research and management, or museum administration and interpretation, and that include hands-on work experience. Information and application materials for the certificate can be obtained from the Museology Program office.

Admission Deadline

The application deadline for autumn quarter admission is February 1. Applications completed and post-marked on or before this date will be reviewed by the appropriate admission committee. Late applications may be submitted until April 15, although consideration is not guaranteed if enrollment targets have been met.

Faculty

Director

James Nason

Professors

Failing, Patricia A. * 1982; MA, 1974, University of California (Berkeley); contemporary art and criticism.

Fidel, Raya * 1982; PhD, 1982, University of Maryland; information systems, systems analysis, user interaction, classification research.

Kahn, Miriam * 1986; PhD, 1980, Bryn Mawr College; museum exhibits, cultural representations, senses of place, tourism, Pacific Islands.

Kerr, Stephen T. * 1985; PhD, 1975, University of Washington; information technology and telecommunications.

Kingsbury, Martha 1968; MA, 1963, PhD, 1969, Harvard University; nineteenth- and twentieth-century art.

Lockard, Joan S. * 1971; PhD, 1963, University of Wisconsin; primate social behavior, animal behavior, sociobiology, human ethology, neurobehavior.

Nason, James * 1970; PhD, 1970, University of Washington; sociocultural anthropology, museology, material culture, cultural heritage, Micronesia, North America.

Pietsch, Theodore W. * 1978; PhD, 1973, University of Southern California; systematic ichthyology, zoogeography, behavior, functional morphology, biotic survey.

Stein, Julie K. * 1980; MA, 1976, PhD, 1980, University of Minnesota; New World archaeology, Northwest coast archaeology, geoarchaeology, shell middens.

Winn, William David * 1985; PhD, 1972, Indiana University; educational technology, instructional theory, instructional design, visual information processing.

Associate Professors

Minah, Galen F. * 1970; MArch, 1968, University of Pennsylvania; design process, design, color and light, professional practice.

Olmstead, Richard G. * 1996; PhD, 1988, University of Washington; plant molecular systematics and evolution.

Wright, Robin K. 1990; MA, 1977, PhD, 1985, University of Washington; Native American art, Native art of the Pacific Northwest Coast, Haida art.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

MUSEUM 480 Introduction to Museology (3) I&S Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Offered: jointly with ANTH 480.

MUSEUM 481 Museum Collection Management: Ethnology (3) I&S Lecture and work experience in museum collection management in the ethnology collections of the Burke Memorial Washington State Museum, including identification, cataloging, fumigation, storage, cleaning, inventory, and specimen preparation for exhibition of archival and nonarchival museum specimens from North America, the Pacific, and Pacific Rim areas. Offered: jointly with ANTH 481.

MUSEUM 482 Museum Conservation (3) I&S Lecture and demonstrations in the recognition and treatment of museum conservation problems for specimens of all types. Application of basic principles to specific preventive and active conservation and restoration problems encountered by curatorial personnel. Offered: jointly with ANTH 482.

MUSEUM 483 Museum Operations Practicum (3, max. 9) Provides students with the opportunity to apply their general museological training in one or more areas of supervised museum operation areas, e.g., registration, education, or exhibition through project-oriented work in the Burke Museum.

MUSEUM 488 Special Topics in Museology (3-5) In-depth examination of selected current issues within the field of museology.

MUSEUM 490 Museum Curation Practicum (1-5, max. 15) Application of museological training in cura-

tion of ethnographic, archeological, geological, or zoological collection materials in the Burke Museum. Supervised work ranges from fundamental collection documentation and research to preventive conservation, storage, and other special curation projects: Offered: jointly with ARCHY 490.

MUSEUM 491 Museum Curation Practicum: General Collections (1-5, max. 15) The application of museological training in the curation of art, botanical, geological, historic, zoological, or other collections. Work under the supervision of faculty curators ranges from fundamental collection documentation to preventive conservation or storage.

MUSEUM 498 Museum Internship (3-15, max. 15) Faculty supervised off-campus internships in museums and allied institutions. Each internship is individually established and provides students with practical experience and the opportunity to apply and learn new professional skills. Prerequisite: permission of instructor.

Courses for Graduate Students Only

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

MUSEUM 591 Seminar in Museum Operations (3) Designing hypothetical museums and creating a first year of operations. Design elements include architectural plan, staffing plan, initial and recurring budgets, security system, records system, educational plan, and policy making. Recommended: 590. Offered: jointly with ANTH 591.

MUSEUM 592 Seminar in Museum Specimen Documentation (3) Seminar discussion of museum specimen documentation research approaches, including technological and raw material analyses, contextual studies, and esthetic studies. Documentation of a collection and reference work. Recommended: 590 and 591. Offered: jointly with ANTH 592.

MUSEUM 593 Museum Exhibition Seminar (3) Review of critical issues in the planning, design, preparation, and installation of museum exhibits, including exhibit conservation, visitor-based design factors, ideological aspects of interpretation, and community relations. Readings and examination of exhibits are combined with case study work.

MUSEUM 594 Seminar in Museum Education (3) Focus on museums as educational institutions with consideration of the place of education in the mission of museums, the educational role of museums compared to that of other institutions, the museum's diverse audiences and their needs, and the educational methods and techniques museums may employ in pursuing their goals. Recommended: 480.

MUSEUM 595 Museum Legal and Ethical Issues (3) Survey of the legal and ethical issues regarding international and national museum operations, including the control and movement of cultural property, artistic and intellectual rights and copyright, concepts of patrimony and issues of repatriation, as well as other relevant policies and regulations.

MUSEUM 600 Independent Study or Research (1-10, max. 10)

MUSEUM 700 Master's Thesis (1-10, max. 10)

MUSEUM 710 Master's Project (1-10, max. 10) Credit/no credit only.

Near and Middle Eastern Studies



General Catalog Web page:

www.washington.edu/students/gencaf/academic/Near_Middle_East.html



Program Web page:

www.grad.washington.edu/inter/nme.htm

Graduate Program Coordinator
34A Communications Building, Box 353770
206-543-6398

The interdisciplinary Ph.D. program in Near and Middle Eastern Studies is designed for students who wish to pursue research with a comparative perspective in Near Eastern languages and literature: Arabic, Hebrew, Persian (or Dari or Tajik), Turkish and Central Asian Turkic languages; Near Eastern linguistics; Islamic topics, namely, Islamic law, history, institutions, theology, and mysticism; comparative religion: Judaism, Christianity, and Islam; and interdisciplinary investigations of modern topics using the social sciences. The program is administered by an interdisciplinary Graduate School faculty group. The program of studies includes courses offered in the Department of Near Eastern Languages and Civilization, the Jackson School of International Studies, and other departments on campus. Students in the program must take courses in both the humanities and social sciences.

Degree Requirements and Satisfactory Progress

Specific course work and areas of concentration will be determined by the student's interests within the framework of the degree and satisfactory progress requirements listed below.

1. Within 18 months of admission, demonstration of a general knowledge of history and culture in one of the following general fields: Islamic civilization; Arabic, Hebrew, Persian, Turkish, or Central Asian Turkic languages and literature; the modern Middle East; or comparative religion either through previous degree work or through examination administered by the program.
2. Within three years of admission, completion of two advanced courses in the humanities, one of which must be in the Department of Near Eastern Languages and Civilization (NELC), and two advanced courses in the social sciences, one of which must be in the Department of History. These courses are in addition to work the student may have done at the B.A. and M.A. level.
3. Within three years of admission, completion of a graduate seminar. Two graduate seminars are required if none was taken at the M.A. level.
4. A student will be expected to have studied three languages, two of which must be regional languages and one of which must be a "Western" European language other than English, such as French, German, Italian, Russian, or Spanish. The student's Supervisory Committee will decide whether a fourth language will be required and whether the fourth required language will be European or regional. Students pursuing language-related work may anticipate a fourth required language, whereas those pursuing social-science-related studies may not. Before the General Exam listed below may be taken, the student must complete the language requirements including the second-year level in a regional language different from the two languages offered at the time of admission if both were not regional languages.

5. **Disciplinary Method and Theory Requirements.** For all students conducting field work or working with documents, whether social science or humanities focused, and for all social science-oriented students, the following courses are strongly encouraged: (a) ANTH 550, Field Techniques of Anthropology, and (b) POL S 491, Political Research Design and Analysis; or (c) their equivalents in appropriate disciplines.

For those students doing both humanities-oriented research and not conducting field work, two method and theory courses in the appropriate discipline or disciplines (e.g., comparative literature, philosophy) are required.

6. **Disciplinary Core Courses.** Each student is required to take two disciplinary core courses in the appropriate fields. Core courses (or field courses) survey the literature, methods, and theoretical issues involved in a broad field of inquiry, as opposed to elective topical courses, which cover a much smaller area. Core courses should be chosen according to the anticipated research interests and fields for preliminary examination of each student. For example, these core disciplinary courses might focus on comparative politics, comparative religion, feminist theory, ethnicity and nationalism, analysis of linguistic structures, seminar in cognitive anthropology, comparative legal institutions, or international political economy. Courses on a narrow field of inquiry (such as Arab-Israeli conflict) do not constitute field or core courses, though they may contribute to a student's general field.

Annual Review

A subcommittee of the Near and Middle Eastern Studies program faculty will meet each spring to review the progress of all students in the Ph.D. program. Either the chair of the student's committee, the program's graduate adviser, or the program's director will inform students of the results of this annual review.

Ph.D. Examinations and Dissertation

The student will be expected to take the following examinations: (1) preliminary exams consisting of an area of specialization exam and a theory and discipline exam; (2) a General Examination, consisting of a take-home part and an oral part; and (3) a Final Examination, which is the Ph.D. thesis defense.

Students must meet the general University requirements concerning admission to candidacy for the doctoral degree, the dissertation, and final examinations, including an oral examination.

A student's Ph.D. supervisory committee shall consist of no less than three members of the University of Washington's Graduate School faculty as well as a representative of the Graduate School (GSR). The chair of the committee must be an active member of the Graduate School faculty. At least two members of the committee must be members of the Near and Middle Eastern Studies faculty group. Additional members may be asked to join the committee.

Students will write a dissertation as the final requirement for the Ph.D. degree. The topic of the dissertation will be set in consultation with the Ph.D. candidate's supervisory committee.

Admission Deadline

The application deadline for autumn quarter admission is February 1. Applications which are completed and postmarked on or before this date will be reviewed by the appropriate admission committee. Late applications may be submitted until April 15, although consideration is not guaranteed if enrollment targets have been met.

Faculty

Director

Ellis Goldberg

Professors

Andrews, Walter G. 2001, (Research); PhD, 1970, University of Michigan.

Bacharach, Jere L. * 1967, (Adjunct); MA, 1962, Harvard University, PhD, 1967, University of Michigan; history of the Near East.

Brame, Michael K. * 1970; PhD, 1970, Massachusetts Institute of Technology; syntax, phonology, structure of Arabic and English, cross-linguistic comparisons, poetics.

Bravmann, Rene A. 1972; MA, 1963, University of Wisconsin, PhD, 1971, Indiana University; African art.

Cirtautas, Ilse D. * 1968; PhD, 1958, University of Hamburg (Germany); Turkic languages and literatures.

Close, Angela E. * 1995; MA, 1974, PhD, 1976, Cambridge University (UK); archaeology; lithic analysis; prehistory of North Africa; human origins.

Heer, Nicholas L. * 1965, (Emeritus); PhD, 1955, Princeton University; Arabic language and literature, Islamic theology and philosophy.

Jaffee, Martin S. * 1987, (Adjunct); PhD, 1980, Brown University; Rabbinic religion and literature in late antiquity.

Kaisse, Ellen * 1976; PhD, 1977, Harvard University; phonology, historical linguistics, ancient and modern Greek/Spanish, syntax-phonology interface.

Karimi-Hakkak, Ahmad * 1985; PhD, 1979, Rutgers University; Persian language and literature, Iranian culture and civilization.

Kartsonis, Anna D. 1983; MA, 1968, PhD, 1982, New York University; Byzantine and medieval art.

Kasaba, Reşat * 1985; PhD, 1985, State University of New York (Binghamton); historical sociology, world systems, social change in the Middle East.

Mackay, Pierre A. * 1966, (Emeritus); PhD, 1964, University of California (Berkeley); Greek literature, post classical and Byzantine Greek literature, numismatics.

Migdal, Joel S. * 1980; MA, 1968, PhD, 1972, Harvard University; state and society in the Third World; Middle East politics.

Murray, James W. * 1973; PhD, 1973, Massachusetts Institute of Technology; marine geochemistry, aquatic chemistry.

Sokoloff, Naomi B. * 1985; PhD, 1980, Princeton University; Hebrew language and literature.

Wenke, Robert J. * 1975; PhD, 1975, University of Michigan; archaeology of Egypt, the Middle East, and quantitative methods.

Williams, Michael A. * 1976; PhD, 1977, Harvard University; early Christianity and religions of antiquity.

Ziadeh, Farhat J. * 1966, (Emeritus); LLB, 1940, University of London (UK); Arabic language and literature, Islamic law, Islamic institutions.

Zumbrunnen, Craig * 1977; PhD, 1973, University of California (Berkeley); resource analysis, Russia and NIS, environment, mathematical programming, urban ecology.

Associate Professors

Deyoung, Terri L. * 1991; PhD, 1988, University of California (Berkeley); Arabic language and literature.

Goldberg, Ellis * 1985; PhD, 1983, University of California (Berkeley); political economy of the Middle East, comparative politics.

Noegel, Scott B. * 1995; PhD, 1994, Cornell University; Ancient Near Eastern languages, literatures, cultures and history.

Schuyler, Philip D. 1999; MA, 1974, PhD, 1979, University of Washington; Near Eastern musics and cultures; contemporary music and art in the United States.

Waugh, Daniel Clarke * 1972; PhD, 1972, Harvard University; medieval Russian history.

Wheeler, Brannon M. * 1996; PhD, 1993, University of Chicago; Islamic studies, comparative religion, late antique, Jewish studies and legal studies.

Assistant Professors

Kuru, Selim Sirri 1999; PhD, 2000, Harvard University; Ottoman, Turkish, Language, Literature.

McLaren, Brian 2001; MSc, 1986, Columbia University, PhD, 2001, Massachusetts Institute of Technology; architectural history, theory and design.

Walker, Joel T. 1997, (Adjunct); PhD, 1998, Princeton University; late antiquity, Byzantine, early Middle Ages.

Senior Lecturer

Green, James W. * 1975; PhD, 1972, University of Washington; cross cultural, mental health, comparative aging, religion, West Indies, Pakistan, Islam.

Salehi-Esfahani, Haideh 1990; PhD, 1985, University of Pennsylvania; international economics, economic development.

Neurobiology and Behavior

 *General Catalog Web page:*
www.washington.edu/students/gencat/academic/Neurobiology_Behavior.html

 *Program Web page:*
depts.washington.edu/behneuro/

Graduate Program

Graduate Program Coordinator
K546 Health Sciences, Box 357750
206-685-1647
neubehav@u.washington.edu

Understanding the brain represents both a major scientific challenge and a wonderful research opportunity. Investigations into the mechanisms of neural function require an interdisciplinary approach using the knowledge base and techniques of anatomy, biochemistry, molecular biology, physiology, pharmacology, and the behavioral sciences. Neuroscientists and their students must use these different approaches in their research and training if they are to make inroads to solving the major questions in neuroscience.

The University of Washington has met this challenge by emphasizing neuroscience research in many departments in both the School of Medicine and the

College of Arts and Sciences, and by establishing the interdisciplinary graduate program in Neurobiology and Behavior. The laboratories of more than 90 faculty members in 15 departments have combined efforts to form the doctoral training program, continuing a long history of collaborative efforts that cross both departmental and University boundaries.

The program is designed to allow students to obtain both broad training in the neurosciences and more intensive course work in specific areas of interest. The program emphasizes flexibility and encourages students to take responsibility in the design of their own curriculum. Students have the opportunity to work with faculty whose interests span the breadth of neuroscience research. Graduates of the program are well prepared for a variety of careers involving academic, research, industrial, and public policy positions.

Key aspects of the graduate program that are common to all students include (1) a year-long course which provides a core of knowledge in the neurosciences, (2) quarterly first-year laboratory rotations and rotation talks attended by all students in the program, (3) a biweekly seminar series featuring both visiting and local scientists, (4) a biweekly journal club designed to provide students with an introduction to the subsequent week's seminar, and (5) a program-wide retreat, combined with a campus-wide poster session where students and postdoctoral candidates can present their Society for Neuroscience Annual Meeting posters. Thus, the program exposes students throughout their graduate career to the most exciting and current research and concepts covering all areas of neuroscience.

Application Process

Students who have emphasized either biological or physical sciences in their undergraduate careers are invited to apply. Applicants are requested to send a copy of their academic record; GRE scores, including, if possible, scores on a subject test such as chemistry, physics, molecular and cellular biology, psychology, or biology; and three letters of recommendation from the persons who can best evaluate their potential for success in graduate study. New students enter the graduate program September 15. Applications received on or before the deadline are given full consideration. Applications received after the deadline are considered at the discretion of the directors.

Research Facilities

Participating departments are located in the Health Sciences Center and in the College of Arts and Sciences. Because the program is interdisciplinary, extensive research facilities in all areas of neurosciences are available to the student. The University maintains two major natural and health-sciences libraries in addition to individual departmental libraries. Facilities in the participating departments include electronics and machine shops, instrumentation for synthesis and sequence determination of nucleic acids and proteins, calcium imaging, confocal microscopy, and computer facilities. Equipment for ultrastructural studies is readily available. The resources of the Regional Primate Research Center, the W. M. Keck Center for Advanced Studies in Neural Signaling, and the Friday Harbor Laboratories are also available to the student.

Financial Aid

The program offers full stipend and tuition support to students through traineeships derived from NIH training grants and private foundation support and through research assistantships supported by the University or research grant funds. Students with satisfactory academic progress can anticipate that funding will continue for the duration of their program.

Faculty

Directors

Thomas Reh
Michael Shadlen

Professors

Anderson, Marjorie E. * 1971; PhD, 1969, University of Washington; physiology of basal ganglia and thalamus; neural control of movement.

Baskin, Denis G. * 1979; PhD, 1969, University of California (Berkeley); neuroendocrinology; obesity; CNS regulation of body weight; histochemistry; expression of receptors.

Beavo, Joseph A. * 1977; PhD, 1970, Vanderbilt University; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function.

Beecher, Michael D. * 1978; MA, 1965, PhD, 1970, Boston University; animal behavior, animal communication, sensory processes.

Berger, Albert J. * 1978; MA, 1965, PhD, 1967, Princeton University, PhD, 1976, University of California (San Francisco); neural and chemical control of respiration, neurobiology, synaptic transmission.

Bernstein, Ilene L. * 1974; MA, 1967, Columbia University, PhD, 1972, University of California (Los Angeles); neurobiology of taste aversion learning; developmental and genetic contributions to taste preference.

Binder, Marc D. * 1978; PhD, 1974, University of Southern California; organization of spinal reflexes.

Bothwell, Mark A. * 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology.

Brenowitz, Eliot A. * 1987; PhD, 1982, Cornell University; animal behavior, neuroethology, neuroendocrinology, animal communication.

Buck, Steven L. * 1979; PhD, 1976, University of California (San Diego); human visual psychophysics, color vision, animal learning.

Byers, Margaret R. * 1972, (Research); PhD, 1969, Harvard University; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions.

Carlson, Steven S. * 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of synaptic transmission.

Casseday, John H. * 1996; MA, 1963, PhD, 1970, Indiana University; neuroethology of sensory systems, echolocation and function of auditory midbrain.

Catterall, William A. * 1977; PhD, 1972, Johns Hopkins University; molecular biology of ion channels, molecular pharmacology and neurobiology.

Chavkin, Charles * 1984; PhD, 1982, Stanford University; cell and molecular mechanisms of psychoactive opiate drugs to understand normal and pathophysiology.

Dacey, Dennis M. * 1986; PhD, 1983, University of Chicago; the neural basis of vision and the organization of primate retina.

Daniel, Thomas L. * 1984; PhD, 1982, Duke University; functional morphology, biomechanics, mechanics and energetics of animal locomotion.

Detwiler, Peter B. * 1977; PhD, 1970, Georgetown University; physiology of photoreceptors.

Diaz, Jaime * 1978; PhD, 1975, University of California (Los Angeles); psychological brain development, neurophysiology, developmental psychopharmacology, effects of drugs.

Fetz, Eberhard * 1975; PhD, 1966, Massachusetts Institute of Technology; cortical regulation of movement.

Froehner, Stanley C. 2000; PhD, 1973, California Institute of Technology; molecular mechanisms of synapse formation and muscle disease.

Fuchs, Albert F. * 1969; PhD, 1966, Johns Hopkins University; oculomotor physiology, vision.

Graubard, Katherine * 1979; PhD, 1973, University of Washington; cellular neurophysiology, neural basis of behavior.

Hendrickson, Anita E. * 1969; PhD, 1964, University of Washington; neuroanatomy, morphology and development of primate visual system.

Hille, Bertil * 1968; PhD, 1967, Rockefeller University; receptors and ion channels of excitable membranes; cell signaling; intracellular calcium dynamics.

Hurley, James Bryant * 1985; PhD, 1979, University of Illinois; molecular basis of vision.

Kuhl, Patricia K. * 1976; MA, 1971, University of Minnesota, PhD, 1973, University of Minnesota; speech perception.

Mackie, Kenneth P. * 1987; MD, 1984, Yale University; molecular and cell biological studies of cannabinoid receptor signaling.

McKnight, G. Stanley * 1979; PhD, 1976, Stanford University; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches.

Moody, William J. * 1982; PhD, 1977, Stanford University; single cell electrophysiology, development of electrical properties in embryos.

Moon, Randall T. * 1985; PhD, 1982, University of Washington; embryonic development; signal transduction; cancer biology.

Morrison, Richard S. * 1994; PhD, 1982, University of California (Los Angeles); genetic pathways regulating neuronal cell death in disease and injury.

Nathanson, Neil M. * 1979; PhD, 1975, Brandeis University; neurobiology; molecular analysis of neural signal transduction by muscarinic and neurokinin receptors.

Palczewski, Krzysztof * 1992, (Adjunct); MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Palmiter, Richard D. * 1974; PhD, 1968, Stanford University; regulation of gene expression in transgenic mice.

Ransom, Bruce Robert * 1995; PhD, 1972, MD, 1972, Washington University; neurology, neuroscience research.

Reh, Thomas A. * 1989; PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.

Riddiford, Lynn M. * 1973; PhD, 1961, Cornell University; insect development and physiology, invertebrate endocrinology.

Rubel, Edwin W. * 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special

emphasis on vertebrate auditory system development.

Steiner, Robert A. * 1977; PhD, 1975, University of Oregon; neuroendocrinology, neuroscience, endocrinology.

Storm, Daniel R. * 1978; PhD, 1971, University of California (Berkeley); molecular basis of neuroplasticity; cAMP and Ca²⁺ signal transduction systems in the CNS.

Teller, Davida Y. * 1965; PhD, 1965, University of California (Berkeley); vision, psychophysics, development of vision.

Tempel, Bruce L. 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

Thomas, James H. * 1988; PhD, 1985, Massachusetts Institute of Technology; genetics of development and the nervous system in nematodes.

Truman, James W. * 1973; PhD, 1970, Harvard University; hormones and invertebrate behavior, insect physiology, circadian rhythms.

Westrum, Lesnick E. * 1966; MD, 1963, University of Washington, PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

Willows, A. O. Dennis * 1969; PhD, 1967, University of Oregon; invertebrate neurophysiology, neural mechanisms underlying behavior.

Wingfield, John C. * 1985; PhD, 1973, University College of North Wales (UK); hormone-behavior interactions; environmental and hormonal control of life history cycles of vertebrate.

Winn, H. Richard * 1983; MD, 1968, University of Pennsylvania; physiology of cerebral blood flow regulation.

Zagotta, William N. * 1993; PhD, 1989, Stanford University; molecular mechanisms of ion channel function.

Associate Professors

Cooper, Mark S. * 1990; PhD, 1985, University of California (Berkeley); cellular physiology and cell motility in developing tissues.

Corina, David P. * 1993; PhD, 1991, University of California (San Diego); cognitive neuropsychology, psycholinguistics, computational modeling.

Covey, Ellen * 1996; MS, 1976, University of Houston, PhD, 1980, Duke University; structure and function of the central auditory system.

Diorio, Christopher J. * 1997; MS, 1984, California Institute of Technology; silicon learning chips, neural networks and learning algorithms.

Giniger, Edward Scott * 1994; PhD, 1988, Harvard University; neural development, mechanism of axon guidance, genetic specification of brain structure.

Hicks, Ramona R. * 1999; PhD, 1993, University of Connecticut; brain injury, neural plasticity, cell death and regeneration.

Mizumori, Sheri J. 2000; PhD, 1985, University of California (Berkeley); plasticity of neural and behavioral function during learning and memory.

Neumaier, John F. 1983; PhD, 1989, MD, 1990, University of Washington; neurobiology of stress and depression; regulation of serotonin receptors.

Olavarria, Jaime F. * 1990; MD, 1974, State University of Chile, PhD, 1984, University of California (Berkeley); neurophysiological and neuroanatomical basis of vision.

Osterhout, Lee E. * 1991; PhD, 1990, Tufts University; psycholinguistics, cognitive psychophysiology.

Raible, David W. * 1995; PhD, 1989, University of Pennsylvania; zebrafish neural development.

Robinson, Farrel R. * 1986; PhD, 1982, Brown University; study of the cerebellum via monkey eye movements.

Roelink, Henk * 1996; MSc, 1985, University of Groningen (Netherlands), PhD, 1991, University of Amsterdam (Netherlands); role of signaling molecules in mediating neural tissue differentiation during vertebrate development.

Shadlen, Michael N. * 1995; PhD, 1985, University of California (Berkeley), MD, 1988, Brown University; neurobiology of vision and cognition.

Sherk, Helen * 1982; PhD, 1978, Massachusetts Institute of Technology; neural mechanisms underlying vision, especially visual guidance during locomotion.

Spain, William * 1981; MD, 1977, Columbia University; signal transduction in the central nervous system.

Terman, Gregory W. * 1987; MA, 1981, PhD, 1985, University of California (Los Angeles), MD, 1987, University of Miami (Florida).

Assistant Professors

Bajjalieh, Sandra M. * 1995; PhD, 1989, University of Wisconsin; molecular neurobiology.

Bosma, Martha * 1987; PhD, 1986, University of California (Los Angeles); electrophysiological and secretory development of central nervous system neurons.

Cramer, Steven C. 1997; MD, 1988, University of Southern California, MMSc, 1997, Harvard University; stroke, sensorimotor human brain mapping, in healthy and diseased subjects.

Garden, Gwenn A. 2000; PhD, 1994, MD, 1994, University of Washington; caspase enzymes and apoptosis in HIV neural injury.

Gordon, Sharona E. * 1993; PhD, 1994, Brown University; molecular mechanisms of ion channel gating in visual and olfactory transduction.

Horner, Philip J. 2001; PhD, 1995, Ohio State University; stem cells and regeneration of the central nervous system.

Jagadeesh, Bharathi * 1999; PhD, 1993, Northwestern University; neural basis of visual learning and memory.

La Spada, Albert R. 1998; PhD, 1993, MD, 1993, University of Pennsylvania; inherited neurodegenerative disease.

Moeller, Thomas 2000, (Research); PhD, 1996, Freie University of Berlin (Germany); neurophysiology.

Moens, Cecilia B. * 1998, (Affiliate); PhD, 1993, University of Toronto; development of segmentation and segment identity in the vertebrate hindbrain.

Muchowski, Paul J. 2001; PhD, 1998, University of Washington; molecular chaperones, neurodegeneration.

O'Donnell, Sean * 1996; PhD, 1993, University of Wisconsin; genotypic and endocrine effects on social organization and division of labor in insects.

Pallanck, Leo J. * 1997; PhD, 1992, Albert Einstein College of Medicine; genetic and molecular analysis of symptomatic transmission in *Drosophila melanogaster*.

Perkel, David J. 2000; PhD, 1992, University of California (San Francisco); neural mechanisms of learning; focus on vocal learning in songbirds.

Pham, Tony A. 2000; PhD, 1993, MD, 1993, Baylor University; development and plasticity of neural connections in the mammalian forebrain.

Rao, Rajesh P. N. 2000; MS, 1994, PhD, 1998, University of Rochester; neural computing, machine vision and learning, robotics, computational neuroscience.

Rieke, Frederick Martin * 1997; PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Stella, Nephi * 1999; PhD, 1995, Ecole Polytechnique Federale De Lausanne; microglia cells activation: involvement of endogenous cannabinoid ligands and their allied receptors.

Von Der Emde, Gerhard 2000; PhD, 1997, University of Erlangen (Germany); neurobiology, behavioral science, sensory physiology, sensory-motor integration, electroreception.

Xia, Zhengui * 1987; MS, 1985, Wuhan University (China), PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

NEUBEH 501 Introduction to Neurobiology (3)
Survey of all aspects of neuroscience, including molecular and cellular neurobiology. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: A.

NEUBEH 502 Introduction to Neurobiology (4)
Survey of all aspects of neuroscience, including an introduction to neuroanatomy and modules on sensory and motor systems. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: W.

NEUBEH 503 Introduction to Neurobiology (4)
Survey of all aspects of neuroscience, including a discussion of higher neural processes like learning, memory, and neuroendocrinology. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: Sp.

NEUBEH 510 Seminar in Neurobiology and Behavior (0.5)
Biweekly seminar on current topics. Required for students in the Graduate Program in Neurobiology and Behavior and for students supported on Graduate Neuroscience Program Training Grant. Credit/no credit only. Offered: AWSp.

NEUBEH 526 Introduction to Laboratory Research in Neurobiology (4)
Students become familiar with, and assist in, the performance of research on ongoing projects in designated laboratories. Emphasis on

employed methodology and techniques. Credit/no credit only. Prerequisite: first year graduate students in neurobiology. Offered: AWPSP.

NEUBEH 527 Current Topics in Neurobiology and Behavior (1) Presentation and discussion of current research provides exposure to diverse areas of neurobiology and behavior research. Credit/no credit only. Prerequisite: graduate student in neurobiology and behavior program or permission of instructor. Offered: AWPSP.

NEUBEH 541 Neuroendocrinology (3) *Steiner* Emphasizes the cellular and molecular aspects of several topics in neuroendocrinology, including neuropeptide genes, reproduction, steroid hormone regulation of gene expression, mechanisms of hormone action, endocrine rhythms, and neural oscillations. Prerequisite: either BIOL 201, BIOL 202, and BIOL 203, or BIOL 180, BIOL 200, and BIOL 220; BIOC 440, BIOC 441, BIOC 442 or permission of instructor. Offered: jointly with P BIO 509; W.

NEUBEH 600 Independent Study or Research (*, max. 10) Credit/no credit only. Offered: AWPSP.

NEUBEH 700 Master's Thesis (*, max. 10) Offered: AWPSP.

NEUBEH 800 Doctoral Dissertation (*, max. 10) Offered: AWPSP.

Nutritional Sciences



General Catalog Web page:
www.washington.edu/students/gencat/academic/Nutritional_Sci.html



Program Web page:
depts.washington.edu/nutr/

Graduate Program Coordinator
305 Raitt, Box 353410
206-543-1730
nutr@u.washington.edu

The Interdisciplinary Graduate Program in Nutritional Sciences offers programs of study leading to Master of Science (M.S.), Doctor of Philosophy (Ph.D.), and Master of Public Health Nutrition (M.P.H.) degrees. The graduate program best serves the needs of students with a strong science background who wish to pursue (1) advanced training in nutritional science or clinical research, (2) advanced training in nutritional epidemiology and diet-disease interactions, or (3) training in public health nutrition with a community focus. Additional training in clinical and community nutrition is provided to those students who wish to satisfy the didactic and internship requirements of the American Dietetic Association, prior to obtaining Registered Dietitian (R.D.) status.

The principal areas of study are biochemical and molecular nutrition, clinical nutrition, and community or public health nutrition. Members of the core faculty represent the School of Public Health and Community Medicine, the Fred Hutchinson Cancer Research Center, and the University of Washington Medical Center. The program also draws on a larger group of interdisciplinary faculty from the College of Arts and Sciences, Schools of Medicine and Nursing, other units on campus, and from affiliated institutions in the Seattle area.

Each program of study is designed by the student in consultation with, and with the approval of, a supervisory committee. Ideally, M.S. and Ph.D. students begin working on a research project under the supervision of an appropriate faculty member in the early stages of their graduate experience. Public health field placements are an integral part of the M.P.H. curriculum and generally follow required coursework.

Students pursuing courses in clinical nutrition work closely with the coordinator of clinical activities and are supervised by teaching assistants.

The University of Washington has an extensive research environment. Research facilities in Raitt Hall include modern laboratories, computer facilities, and a vivarium. Students also have access to faculty mentors and research facilities through the Medical Center, the Fred Hutchinson CRC, the Clinical Research Center, and the Clinical Nutrition Research Unit. Additional clinical facilities include Harborview Medical Center, Northwest Kidney Center, Children's Hospital and Medical Center, Pacific Medical Center, and the Center for Human Development and Disabilities. Among facilities for M.P.H. placements are Seattle King County Health Department.

Students may enter the graduate degree program after completing a bachelor's or a master's degree in biological sciences. Background in chemistry, biochemistry, and human physiology is especially desirable. Students who wish to supplement their degree program with ADA-approved training leading to R.D. status must complete all didactic requirements before being admitted to the supervised dietetic internship.

The internship specialty areas are clinical and community nutrition. Applicants should contact Program Director for detailed admission requirements.

Faculty

Director

Adam Drewnowski

Professors

Beresford, Shirley A. * 1987; PhD, 1981, University of London (UK); nutritional epidemiology, folic acid, fruit and vegetables.

Chait, Alan * 1977; MBChB, 1967, MD, 1974, University of Capetown (South Africa); clinical nutrition with special emphasis on lipid metabolism.

Drewnowski, Adam * 1998; PhD, 1977, Rockefeller University; taste and psychology of food choice in disease prevention.

Kristal, Alan R. * 1987; DPH, 1983, Columbia University; nutritional epidemiology, dietary behavior, nutrition intervention, and cancer control.

Leboeuf, Renee C. * 1987, (Adjunct); PhD, 1985, Harvard University, MD, 1987, University of Massachusetts; genetic and nutritional regulation of proteins involved in lipid transport.

Monsen, Elaine R. * 1969; MS, 1959, PhD, 1961, University of California (Berkeley); nutrition, dietetics.

Rosenfeld, Michael E. * 1992; PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.

Associate Professors

Patterson, Ruth E. * 1994; PhD, 1992, University of North Carolina; dietary assessment in adult populations, dietary change, vitamin supplements in cancer prevention.

Assistant Professors

Cheney, Carrie L. * 1990; PhD, 1989, University of Washington; nutrition in autism spectrum disorder; role of nutrition in cancer prognosis, secondary prevention.

Johnson, Donna 1990; MS, 1979, Syracuse University, PhD, 1995, University of Washington; pub-

lic health nutrition practice: obesity, maternal and child nutrition.

Lampe, Johanna W. * 1998, (Research); MS, 1982, PhD, 1990, University of Minnesota; gene-diet interactions and cancer susceptibility: phytochemicals, biotransformation enzymes, colon.

Lecturers

Rees, Jane * 1973, (Adjunct); MS, 1972, University of Washington; nutritional support of adolescent health, especially during pregnancy; eating disorders.

Trahms, Cristine M. * 1973; MS, 1972, University of Washington; growth and development of young children: metabolic disorders, special health care needs.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

NUTR 300 Nutrition for Today (3) NW *Bruemmer* Science of nutrition as it relates to individual food choices, health behaviors, public health. Health topics include wellness, obesity, eating disorders, sports nutrition, prevention of chronic disease. Nutrients and nutritional needs across the lifespan. Issues facing society including food safety, biotechnology, use of supplements and botanicals. Offered: W.

NUTR 301 Nutrition and Nursing (3) NW *Dong* Basic principles of nutrition and their relationship to health problems. 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. Recommended: CHEM 220; ZOOL 118. Offered: A.

NUTR 441 Chemistry of Foods (3) Bruemmer Principles of food science integrated with laboratory sessions that observe the effects of various parameters of food composition, and applied sensory evaluation. Explores current trends in the culinary sciences to promote pleasurable eating. Recommended: general and organic chemistry. Offered: odd years; S.

NUTR 445 Food Policy and Food Safety (3-5) Bruemmer Presentation of emerging issues in food safety, food policy, including food and nutrition regulatory and legal issues, labeling; sanitation; biotechnology; and consumer perception of nutritional risk. Lab element examines objectives of management in the delivery of safe food; receiving systems; inventory control, menu planning, and cost control. Recommended: microbiology. Offered: even years; S.

NUTR 462 Medical Nutrition Therapy I (2) Bruemmer Intervention strategies, counseling skills, and diet modifications that pertain to chronic disease prevention and management. Co-requisite: NUTR 562.

NUTR 463 Medical Nutrition Therapy II (2) Bruemmer Didactic training in nutrition support theories and skill development for interpretation of laboratory values. Management of fluids and electrolytes, and nutrition interventions in acute care. Prerequisite: NUTR 462; co-requisite: NUTR 563. Offered: Sp.

NUTR 465 Nutritional Anthropology (3) I&S/NW *Shell-Duncan* Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related

biobehavioral influences on human growth, development, and disease resistance. Prerequisite: BIO A 201. Offered: jointly with BIO A 465.

NUTR 499 Undergraduate Research (1-5, max. 10) *Drewnowski, Rosenfeld* Independent study and research supervised by a faculty member with appropriate academic interest. Offered: AWSpS.

Courses for Graduate Students Only

NUTR 500 Graduate Seminar: Current Issues in Nutrition (1, max. 4) A review of current topics in nutritional science and public health nutrition. Provides a forum for student and faculty presentation, and review of current research efforts. Prerequisite: graduate student in nutrition. Offered: AWSp.

NUTR 520 Protein and Carbohydrate Nutrition (4) *Kirk, Rosenfeld* Metabolic/physiologic concepts related to protein and carbohydrate nutrition. Areas addressed include composition of foods, requirements through the life cycle, quality of protein, vegetarianism, protein deficiency, carbohydrates of physiological importance, low carbohydrate diets, glycemic response to foods, carbohydrates and dental caries, inborn errors in carbohydrate and protein metabolism. Prerequisite: biochemistry. Offered: A.

NUTR 521 Lipid Nutrition (4) *Kirk, Rosenfeld* Normal lipid components of animal fluids and tissues, with review of their metabolism and physiological functions. Effect of diet and the normal development during the life span of these lipid metabolism. Changes of lipids with various types of disease states and means of nutritional modification of these changes. Prerequisite: biochemistry. Offered: W.

NUTR 522 Vitamin and Mineral Nutrition (4) *Kirk, Rosenfeld* Advanced study of biologically essential minerals and vitamins. To include absorption, transport, function, storage, excretion; imbalance, deficiency and toxicity; dietary sources; role of these nutrients in prevention diseases directly or indirectly (such as cancer, dental caries); role of modern food technology on availability of these nutrients in our food supply. Prerequisite: biochemistry. Offered: Sp.

NUTR 525 Evaluation of Nutritional Status (3) *Monsen* Dietary, clinical, and biochemical components in the assessment of nutritional status of individuals and groups. Interrelationships of nutrients and effects of varying levels of nutrient intake. Critical appraisal of nutritional status surveys. Experimental design and dietary methodology. Prerequisite: human nutrition and biochemistry. Offered: odd years; A.

NUTR 526 Maternal and Infant Nutrition (3) *Johnson* Influence of maternal and infant nutrition on the health of populations. Nutrition-related physiological, psychological, and social factors in pregnancy, lactation, and infancy. Application of evidence-based approaches to maternal and infant nutrition recommendations and interventions for populations and high-risk individuals. Prerequisite: human nutrition and human physiology. Offered: A.

NUTR 527 Nutrition: Childhood Through Adolescence (3) *Rees, Trahms* Interactions of nourishment with behavior, growth, and development of children, from infancy through adolescence. Critical evaluation of normative data and special problems, as well as strategies for individual and public health interventions. Prerequisite: graduate student in nutritional sciences or permission of instructor. Offered: even years; Sp.

NUTR 528 Nutrition in Aging (3) *Drewnowski, Monsen* Physiological, psychological, social, cultural, and economic factors affecting nutrition in the middle and later years. Prerequisite: human nutrition and human physiology. Offered: odd years; Sp.

NUTR 529 Nutrition Research Design (3) *Cheney* Critical review of selected nutrition literature. Evaluation of experimental design, research protocols, data analyses, and application in nutritional science. Prerequisite: BIOST 511. Offered: even years; AWSpS.

NUTR 530 Nutrition for Children with Special Health Care Needs (3) *Lucas* Principles of nutrition screening and assessment, clinical nutritional care, family-centered care, and health services as applied to meeting nutritional needs of children with special health care needs. Both population-based and individual care concepts are explored for children with a variety of chronic conditions. Offered: odd years; Sp.

NUTR 531 Community Nutrition (3) *Johnson* The functions of public health as applied to nutrition: nutrition monitoring and assessment, assuring access to food and a safe food supply, and national nutrition policy. The practice of public health nutrition: the nutrition environment, program planning, implementation, and evaluation. Offered: W.

NUTR 532 Fieldwork in Public Health Nutrition (1-12, max. 12) *Johnson* Experience and service learning in organizations that plan, deliver, and promote population-based nutrition education and nutrition services. Prerequisite: Nutritional Sciences graduate student and permission of instructor. Offered: AWSpS.

NUTR 536 Nutrition Education Principles and Practice (3) *Drewnowski* Integrated course designed to prepare students of the practical application of nutrition education theories and principles in diverse behavioral change settings for a variety of learner-population groups. Prerequisite: permission of instructor. Offered: even years; Sp.

NUTR 537 Laboratory Rotation (1-4, max. 6) *Drewnowski, Rosenfeld* Exposure to research being conducted in the laboratories of the graduate nutrition faculty. Provides hands-on experience in laboratory research. Introduces the student to on-going research for preparation of dissertation topics. Prerequisite: permission of instructor. Offered: AWSpS.

NUTR 538 Nutritional Epidemiology (3) *Beresford, Drewnowski* Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Prerequisite: EPI 511 or EPI 512 and BIOST 511 or permission of instructors. Offered: jointly with EPI 538; A.

NUTR 539 Seminar in Nutrition (1-3, max. 9) *Monsen* Library seminar and research on selected topics in recent developments in the field of nutrition. Prerequisite: advanced nutrition.

NUTR 551 Nutrition and Gene Expression (3) *Rosenfeld* Lectures, student presentations, and discussions of current research on nutrient:gene interactions. Focus on how dietary factors act both directly as transcriptional regulators or indirectly as inducers of signal transduction cascades leading to alterations in expression of proteins associated with cellular nutrient metabolism. Prerequisite: NUTR 520, NUTR 521, NUTR 522, or permission of instructor. Offered: odd years; W.

NUTR 561 Dietetics Internship (10, max. 30) *Leader* Focuses on the competencies for entry-level practice in dietetics. Autumn and winter quarters include core experiences in wellness, public health, food service, ambulatory care, home health, and clinical services. Spring quarter activities are devoted to either nutrition therapy or public health, depending on student's career goals. Prerequisite: clinical students only. Offered: AWSp.

NUTR 562 Nutrition and Chronic Disease (4-6) *Bruemmer, Drewnowski* Epidemiology/pathophysiology of chronic disease related to nutrition (e.g., obesity, cardiovascular disease, osteoporosis, hypertension, diabetes). Examines nutritional risk/protective factors in relation to public health, individual nutrition, and clinical intervention. Lab focuses on medical nutrition therapy/application of nutrition interventions related to chronic disease prevention/management. Prerequisite: physiology, biochemistry. Offered: W.

NUTR 563 Nutrition in Acute Care (4-6) *Bruemmer* Assessment of the nutritional demands and hypermetabolic response of trauma, surgery, organ failure, burns, AIDS, and neoplastic disease. Examines specialized nutritional support and substrate requirements in the acute care setting. Lab explores medical nutrition therapy and application of nutrition interventions related to acute care. Prerequisite: NUTR 562, or permission of instructor. Offered: Sp.

NUTR 564 Management of Nutrition Services (4) *Bruemmer, Monsen* Policy and administrative issues that impact delivery of nutrition services in health care environments. Topics include organization behavior, productivity, financial environments, clinical management, and human resources. Offered: S.

NUTR 600 Independent Study or Research (*) Offered: AWSpS.

NUTR 700 Master's Thesis (*) Offered: AWSpS.

NUTR 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of program adviser. Offered: AWSpS.

Quantitative Ecology and Resource Management

General Catalog Web page:
 www.washington.edu/students/genca/academic/Quant_Ecology.html

Program Web page:
 depts.washington.edu/qerm/

Graduate Program Coordinator
 304 Loew Hall, Box 352182
 206-616-9571
 qerm@u.washington.edu

The graduate program offered by the Quantitative Ecology and Resource Management (QERM) interdisciplinary group provides a unique opportunity for students to study the application of statistical, mathematical, and decision sciences to a broad array of terrestrial and marine ecology, natural resource management, and biometrical and mathematical biology problems. The QERM program of study leads to Master of Science and Doctor of Philosophy degrees, and is designed to attract mathematically trained students interested in working on contemporary ecological or resource-management problems from a quantitative perspective.

Faculty associated with this interdisciplinary program come from thirteen campus units, including Statistics, Applied Mathematics, Forest Resources, Aquatic and Fishery Sciences, Zoology, Biostatistics, and Marine Affairs. This pool of faculty talent is available to enrich the academic experience of all QERM students.

Degree Requirements

Students entering the QERM program are expected to have either a strong mathematical or biological (ecological) background. Master of Science coursework requirements include two courses in statistical

theory; one course in optimization; one applied statistical methods course; two courses in either applied quantitative ecology or quantitative resource management; a seminar in quantitative ecology; plus approved electives. All master's degree holders must pass a first-year qualifying statistical theory and ecological modeling examinations, prepare and defend a thesis, take a total of at least 18 graded quarter credits, and satisfy all Graduate School requirements.

Students passing the first-year qualifying examinations at the Ph.D. level are eligible to enter the doctoral program of study. Course requirements equivalent to the master's program also must be completed. Doctor of Philosophy degree requirements include a minimum of 18 credits of graded course work beyond the master's; a minimum of 27 credits of dissertation research; and satisfaction of all Graduate School requirements. The 18 credits of course work must be taken from an approved list of courses.

Admission Requirements

Students entering this graduate program are expected to perform well on the quantitative and analytical sections of the Graduate Record Examination. Background in a biological or ecological field is also highly desirable. To enter the Ph.D. program, students must pass the first-year qualifying examination at the Ph.D. level. In addition, all course requirements equivalent to the master's program must be completed. At least three letters of recommendation and a brief narrative statement of objectives must accompany each application for admission. Applications are accepted only for autumn quarter. The application deadline is February 1.

Financial Aid

Fellowships, teaching assistantships, and research assistantships are available each year. These come from either the Graduate School or one of the campus units contributing faculty to the QERM program. They generally cover the nine-month academic year, although provisions can be made for summer support. Tuition is normally included as part of the financial package. Funding decisions are made yearly, but attempts are made to continue support for students making satisfactory progress.

Faculty

Director

Loveday L. Conquest

Professors

Bare, B. Bruce * 1969; MS, 1965, University of Minnesota, PhD, 1969, Purdue University; forest land management and valuation, taxation, finance, management science.

Bassingthwaighte, James * 1975; MD, 1955, University of Toronto (Canada), PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Briggs, David G. * 1973; PhD, 1980, University of Washington; operations research in forest products industries.

Brown, Gardner * 1965, (Emeritus); PhD, 1964, University of California (Berkeley); resource economics.

Conquest, Loveday L. * 1976; PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.

Ford, E. David * 1985; PhD, 1968, University College, London (UK); quantitative science, ecosystem analysis, forest productivity.

Francis, Robert C. * 1983; PhD, 1970, University of Washington; fisheries management, marine ecosystem dynamics, fisheries oceanography and global climate change.

Gallucci, Vincent * 1976; PhD, 1971, North Carolina State University; stock assessment, fisheries management.

Greulich, Francis E. * 1977; MS, 1967, PhD, 1976, University of California (Berkeley); forest engineering, statistics, operations research.

Guttorp, Peter * 1980; PhD, 1980, University of California (Berkeley); point processes, stochastic models, applications to hydrology, environmental and atmospheric science.

Hilborn, Ray * 1987; PhD, 1974, University of British Columbia (Canada); stock assessment, population dynamics, fisheries policy.

Johnson, Jay A. * 1983; MS, 1970, State University of New York (Syracuse), PhD, 1973, University of Washington; mechanical and physical properties of wood and wood composite materials, wood quality.

Sampson, Paul D. * 1981; PhD, 1979, University of Michigan; spatial statistics, environmental metrics; morphometrics, multivariate analysis; statistical consulting.

Schreuder, Gerard Fritz * 1971; MS, 1967, University of North Carolina, PhD, 1968, Yale University; statistical analysis in resource economics, international forestry, trade, aerial photos.

Skalski, John R. * 1987; PhD, 1985, Cornell University; population estimation, environmental statistics and sampling, effects assessment.

Swartzman, Gordon Leni * 1973, (Research); PhD, 1969, University of Michigan; ecological modeling, quantitative natural resources management.

Zeh, Judith * 1982; PhD, 1979, University of Washington; estimation of population size and dynamics; robust methods, computing in infectious disease research.

Associate Professors

Anderson, James J. * 1981; PhD, 1977, University of Washington; biomathematics, ecology, fisheries oceanography, toxicology, fish protection at power plants.

Cullen, Alison * 1995; DSc, 1992, Harvard University; environmental policy, environmental health risk assessment, decision analysis, information and uncertainty analysis.

Kot, Mark * 1989; PhD, 1987, University of Arizona; mathematical ecology, nonlinear dynamics, and population biology.

Leschine, Thomas M. * 1983; PhD, 1975, University of Pittsburgh; marine pollution management, ocean policy studies.

Punt, Andre * 2001, (Research); PhD, 1991, University of Cape Town (South Africa); methods for assessing and managing marine renewable resource populations, Bayesian assessment.

Assistant Professors

Horne, John K. * 2000, (Research); PhD, 1995, Memorial University of Newfoundland (Canada); spatial ecology, predator-prey interactions, fisheries acoustics.

Turnblom, Eric * 1994; MSc, 1986, University of British Columbia (Canada), PhD, 1994, University of Minnesota; forest growth modeling, quantitative stand dynamics, biometrics and natural resources inventory.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

QERM 502 Statistical Consulting for the Life Sciences (1-4) *Conquest* Consulting experience in data analysis, applied statistics, experimental design, parameter estimation, and sampling. Student provides consultation services to students and faculty. Students spend one classroom hour per week under faculty supervision discussing problems encountered. Prerequisite: QERM 482, QERM 483, STAT 421, STAT 423, or BIOST 514, BIOST 515, or equivalents, and permission of instructor. Offered: W.

QERM 514 Analysis of Ecological and Environmental Data I (4) *Conquest* Factors affecting optimal growth of individuals in their habitat. Estimation of growth and mortality parameters. Response of organisms to changes in environment (bioassay, environmental monitoring). Stochastic viewpoint emphasized. Research design issues for ecological or environmental studies. Analysis of unwieldy data sets. Prerequisite: calculus and either STAT 341, STAT 342 or STAT 512. Offered: Sp.

QERM 521 Scientific Method in Resource Management (4) *Ford* Describes process of scientific discovery and strategies used for problems in ecology and natural resources management. Relationships between growth and use of objective knowledge in natural resources management is explored through case studies.

QERM 550 Applied Ecological Modeling (5) *Ford* Methods of applied ecological modeling at individual community and ecosystem levels. Analysis of ecological problems suitable for modeling and assessment of models. Students construct a model of their own. Offered: W.

QERM 551 Modeling Organism Dynamics (3) *Anderson* Application of techniques of stochastic differential equations, time series analysis, and simulating dynamic processes to plant and animal growth.

QERM 552 Spatial Processes in Ecology (3) *Ford* Spatial distribution of organisms, the mechanisms that produce different distributions, and how they may be described mathematically and modeled. Spatial distribution of communities, how this arises, and what its consequences are. Prerequisite: QERM 482, QERM 483, QERM 550.

QERM 597 Seminar in Quantitative Ecology (2) Current topics in quantitative ecology and resource management. Fisheries, forestry, and marine resources. Offered: ASp.

QERM 598 Special Topics in Quantitative Resource Management (1-3, max. 12) Population and community ecology, systems ecology, and physical processes in ecosystems. Prerequisite: permission of instructor.

QERM 599 Research in Quantitative Resource Management and Ecology (*, max. 12) Topics can be theoretical in nature or combined theory and experiment. Research might be a prelude to thesis or dissertation research. Credit/no credit only.

QERM 600 Independent Study or Research (*)

QERM 700 Master's Thesis (*)

QERM 800 Doctoral Dissertation (*)

Quaternary Research Center

19 Johnson



General Catalog Web page:
www.washington.edu/students/genocat/academic/Quaternary.html



Program Web page:
depts.washington.edu/qrc/

Quaternary studies focus on the processes that presently shape the natural environment and have operated over approximately the past two and a half million years (Quaternary period). A knowledge of Quaternary events facilitates an understanding of earth history in relation to the modern environment and has predictive value with regard to present-day and future environmental changes.

Quaternary research is typically interdisciplinary, and thus it commonly involves related interests of two or more academic units. The Quaternary Research Center was established in 1967 to foster such interdisciplinary studies on a cooperative basis.

The center has the following goals:

1. To understand environments and climate changes of the past two and a half million years in the context of modern surface processes, which include historical changes, prehistoric postglacial environments, and Ice Age events.
2. To serve as an effective catalyst in fostering interdisciplinary studies in the fields of atmospheric sciences, archaeology/anthropology, botany, engineering, fisheries, forestry, geology, geophysics, oceanography, pedology, and zoology.
3. To provide a scientific perspective on the scale of modern and man-made environmental changes, including climate changes, in the context of recent earth history.
4. To conduct a curriculum jointly with other disciplines in the training of graduate students in Quaternary-oriented studies.
5. To seek applications of Quaternary studies to modern environmental problems that will help predict consequences of policy decisions.

Graduate Program

Students associated with the center obtain their degrees through cooperating departments. Students interested in graduate work at the center should apply to the department of their choice but plan to do their research in a Quaternary-related subject.

Research Facilities

The research laboratories of the center provide an array of modern facilities for investigation of Quaternary problems.

Periglacial Laboratory. The laboratory contains cold rooms equipped for manipulating and studying the freezing and thawing of soils, rocks, and building materials. A large, unique tilt table permits the study of soils under controlled conditions of slope, temperature, and moisture. Research stress is placed on frost action in arctic and alpine environments.

Quaternary Palynology and Paleocology Laboratories. These facilities foster studies of the biotic environment through time and of the uses of plant and animal fossils in Quaternary environmental and ecological reconstruction. Studies of vegetational changes are supported by an extensive modern

pollen and plant reference collection from Asia and western North America.

QRC Library. This specialized collection, dealing with a wide range of Quaternary topics, is among the most extensive in North America. It includes books, monographs, theses, journals, and maps, and houses a large, diverse reprint collection. Searches for library material can be conducted via the QRC Web page (depts.washington.edu/qrc/).

Faculty

Director

Bernard Hallet

Professors

Atwater, Brian F. * 1986, (Affiliate); MS, 1974, Stanford University, PhD, 1980, University of Delaware; Quaternary geology, earthquake hazards.

Brubaker, Linda B. * 1973, (Adjunct); MS, 1967, PhD, 1973, University of Michigan; dendrochronology, forest ecology, quaternary paleocology.

Close, Angela E. * 1995, (Adjunct); MA, 1974, PhD, 1976, Cambridge University (UK); archaeology; lithic analysis; prehistory of North Africa; human origins.

Gillespie, Alan R. * 1985; MS, 1977, PhD, 1982, California Institute of Technology; Quaternary geology, glacial geomorphology, remote sensing.

Grayson, Donald K. * 1975, (Adjunct); PhD, 1973, University of Oregon; North American prehistory, paleoecology, vertebrate faunal analysis, history of archaeology.

Hallet, Bernard * 1980; PhD, 1975, University of California (Los Angeles); glacial and periglacial geomorphology (alpine and Arctic).

Hartmann, Dennis L. * 1977, (Adjunct); PhD, 1975, Princeton University; climate change, dynamic meteorology, radiation and remote sensing.

Heath, G. Ross * 1984, (Adjunct); PhD, 1968, University of California (San Diego); geochemistry and mineralogy of deep-sea sediments.

Montgomery, David R. * 1991, (Adjunct); PhD, 1991, University of California (Berkeley); geomorphology (fluvial and hillslope).

Nittrouer, Charles * 1998, (Adjunct); PhD, 1978, University of Washington; geological oceanography, continental-margin sedimentation.

Porter, Stephen C. * 1962, (Adjunct); MS, 1958, PhD, 1962, Yale University; Quaternary stratigraphy, geochronology, paleoclimatology.

Quay, Paul D. * 1977; PhD, 1977, Columbia University; chemical oceanography, stable isotope geochemistry, ocean tracers and mixing.

Raymond, Charles F. * 1969, (Adjunct); PhD, 1969, California Institute of Technology; glaciology, ice sheet dynamics.

Richey, Jeffrey E. * 1973, (Adjunct); PhD, 1973, University of California (Davis); quantitative problems of aquatic ecosystems, primary Amazon River, limnology.

Shreve, Ronald L. 2000, (Research Adjunct); PhD, 1959, California Institute of Technology; geology, geomorphology, glaciology, geological physics, and geophysics.

Stein, Julie K. * 1980, (Adjunct); MA, 1976, PhD, 1980, University of Minnesota; New World archaeology,

Northwest coast archaeology, geoarchaeology, shell middens.

Waddington, Edwin D. * 1984, (Adjunct); MS, 1973, University of Alberta (Canada), PhD, 1981, University of British Columbia (Canada); glacier and ice sheet dynamics, paleoclimatology.

Warren, Stephen G. * 1981, (Adjunct); MA, 1969, PhD, 1973, Harvard University; atmospheric radiation, radiative properties of clouds, snow and sea ice, Antarctic climate.

Associate Professors

Anderson, Patricia M. * 1982; MA, 1976, PhD, 1982, Brown University; paleoecology, paleoclimatology, Quaternary environments (Arctic).

Bourgeois, Joanne * 1980, (Adjunct); PhD, 1980, University of Wisconsin; stratigraphy, sedimentology, Quaternary paleoseismology.

Eck, Gerald G. * 1974, (Adjunct); PhD, 1977, University of California (Berkeley); primate paleontology, especially African Pliocene-Pleistocene monkeys and hominids.

Assistant Professors

Brown, Tom 1999, (Affiliate); MSc, 1985, Simon Fraser University (Canada), PhD, 1994, University of Washington.

Fitzhugh, J. Ben * 1997, (Adjunct); PhD, 1996, University of Michigan; archaeology, anthropology, evolutionary ecology, complex hunter-gatherers, social evolution, settlement.

Putkonen, Jaakko K. 2001, (Adjunct Research); MS, 1990, Helsinki University (Finland), PhD, 1997, University of Washington; Quaternary geology, frozen ground research, cosmogenic isotope dating.

Sletten, Ronald S. * 1997, (Research Adjunct); MS, 1987, PhD, 1995, University of Washington; soils, environmental chemistry.

Steig, Eric J. * 1998; MS, 1992, PhD, 1996, University of Washington; stable and cosmogenic isotope geochemistry, glaciology.

Stone, John O. H. * 1998; PhD, 1986, Cambridge University (UK); cosmogenic isotope geochemistry.

Senior Lecturer

Swanson, Terry W. 1988, (Adjunct); MA, 1989, University of California (Davis), PhD, 1994, University of Washington; Quaternary geology, geochronology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

QUAT 417 Environmental Change in the Glacial Ages (3) NW Porter Physical, biological evidence of climatic change during Quaternary Period; emphasizing stratigraphy, chronology. Impact of alternating glacial/interglacial cycles on earth's terrestrial, marine environments. Theories on causes of climatic variation. Offered: jointly with ESS 433.

Courses for Graduate Students Only

QUAT 501 Seminar/Conference in Quaternary Environments (1, max. 6) Interdisciplinary seminar or conference in the changing natural environments

of the Quaternary Period, with emphasis on climatic changes and their effects. Speakers from the University and elsewhere present lectures on their specialties, followed by discussion. Credit/no credit only.

QUAT 502 Interdisciplinary Quaternary Investigations (2, max. 6) Research course for interdisciplinary investigation of Quaternary problems. Student attends sessions of QUAT 501 and pursues a problem-oriented case study concurrently under faculty direction. Required paper on case study. Credit/no credit only. Prerequisite: graduate standing.

QUAT 504 Special Topics in Quaternary Sciences (1-3, max. 3) Environments and climate changes of past two million years (Quaternary Period) in context of modern surface processes, including historical changes, prehistorical environments of postglacial period, and Ice Age events. Provides scientific perspective on scale of modern and man-made environmental changes, including those of climate, in context of recent earth history. Credit/no credit only. Prerequisite: background courses in earth sciences and ecology.

Urban Design and Planning



General Catalog Web page:
www.washington.edu/students/genocat/academic/Urban_Design.html



Program Web page:
www.grad.washington.edu/inter/urbdpindex.htm

Graduate Program Coordinator
34A Communications Building, Box 353770
206-543-6398

The Interdisciplinary Group for Urban Design and Planning offers the Doctor of Philosophy degree. The program seeks to prepare scholars who can advance the state of research, practice, and education related to the built environment and its relationship to society and nature in metropolitan regions throughout the world. The program provides a strong interdisciplinary educational experience that draws on the resources of the entire university, and the laboratory provided by the Seattle metropolitan region and the Pacific Northwest. The program emphasizes the educational values of interdisciplinarity, intellectual leadership and integrity, and the social values of equity, democracy and sustainability. It seeks to promote deeper understanding of the ways in which public decisions shape and are shaped by the urban physical, social, economic, and natural environment. The program envisions its graduates becoming leaders in the international community of researchers, practitioners and educators who focus on improving the quality of life and environment in metropolitan regions.

The intellectual focus of the Ph.D. program is unique in bringing together interdisciplinary perspectives from the social and natural sciences, humanities, and design and planning disciplines, and applying them to the formation and evaluation of urban and environmental plans and policies. It seeks to explore interactions among built urban form; urban markets for real estate, labor, public services and infrastructure; urban social and political institutions and processes; and urban ecological patterns and processes. Study of these interactions draws on the disciplines of economics, geography, history, sociology, political science, and ecology, among others. The program of study is divided into three phases.

Phase one—the core curriculum—defines the intellectual foundation of the program. While the program retains considerable flexibility in defining a research agenda within the broad umbrella of urban and environmental planning and policy, it provides a common foundation for all students to build upon. The core curriculum consists of required classes and a qualifying examination.

Upon passing the qualifying examination, the student forms a supervisory committee to oversee progress through the rest of the academic program. The committee must consist of at least three faculty members in the interdisciplinary group representing at least two academic departments. Students develop with their supervisory committee a description of their proposed areas of study. These define an area of scholarship that must demonstrate an interdisciplinary research approach to an application within urban and environmental planning and policy.

Phase three focuses on original work which is presented as a dissertation.

Admission Criteria

Admission to the Ph.D. program is based on evidence of promise of high scholarly achievement and research orientation. The applicant's statement of purpose, Graduate Record Examination (GRE) test results, letters of recommendation, and examples of past work constitute the basis for the admissions evaluation. Further, to ensure the highest level of faculty support and proper level of faculty guidance, the program accepts those students whose research interests match areas of specialized faculty competence. Students are encouraged to identify faculty whose interests coincide with theirs in their statement of purpose.

Applicants typically have a master's degree in fields ranging from planning and public affairs to natural and social sciences. In some cases, students can be admitted to the program on the condition that certain master's-level core courses are completed during the first year of study. Students interested in a professional degree in urban design and planning should apply to the master's program in Urban Design and Planning (www.caup.washington.edu/html/URBDP/ or jcbrooks@u.washington.edu). The application deadline is February 1, for entry into the program autumn quarter.

Financial Aid

The Interdisciplinary Ph.D. Program in Urban Design and Planning attempts to provide funding for doctoral program applicants in a way that makes the program attractive to the strongest potential applicants, ensures their effective mentoring while in the program, and actively engages and energizes faculty to improve the program and to bring research funding to support students.

Faculty

Director

Paul Waddell

Professors

Beyers, William B. * 1962; PhD, 1967, University of Washington; regional science, economic geography, location theory, regional analysis.

Borning, Alan H. * 1980; MS, 1974, PhD, 1979, Stanford University; human-computer interaction; constraint-based languages and systems.

Bradley, Gordon A. * 1972; MLA, 1972, University of California (Berkeley), PhD, 1986, University of

Michigan; forest land use planning, Conservation area planning and design.

Chrisman, Nicholas R. * 1987; PhD, 1982, University of Bristol (UK); geographic information systems, science and technology studies, geography of geographic information.

Ellis, John Mark 1999; PhD, 1988, Indiana University; race, ethnicity, immigration and local labor markets.

Findlay, John M. * 1987; PhD, 1982, University of California (Berkeley); history of the American West.

Guest, Avery * 1972; MS, 1964, Columbia University, MA, 1967, PhD, 1970, University of Wisconsin; demography, ecology, stratification.

Handcock, Mark S. * 2000; PhD, 1989, University of Chicago; methodology for the social sciences; spatial, environmental modeling; distributional comparison.

Harrington, James W. * 1997; PhD, 1983, University of Washington; roles of industrial change and labor processes in sub-national, regional economic development.

Hershman, Marc * 1976; JD, 1967, Temple University, LLM, 1970, University of Miami (Florida); coastal zone management law.

Lee, Robert G. * 1978; MS, 1969, Yale University, PhD, 1973, University of California (Berkeley); natural resource sociology, multiresource management, development/change of forestry institutions.

May, Peter J. * 1979; PhD, 1979, University of California (Berkeley); policy processes; policy design and implementation; environmental regulation.

Miller, Donald H. * 1970; PhD, 1972, University of California (Berkeley); urbanization processes, urban spatial structure, planning theory and evaluation, public service plan.

Miller, Marc * 1979; PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology and social/cultural change.

Morrill, Richard L. * 1955, (Emeritus); PhD, 1959, University of Washington; social and economic geography, theory and quantitative methods, spatial organization, migration.

Mugerauer, Robert 2000; PhD, 1973, University of Texas (Austin); built and natural environments.

Nyerges, Timothy L. * 1985; PhD, 1980, Ohio State University; GIS, spatial decision support, urban, transportation, environment, groupware.

Ochsner, Jeffrey K. * 1987; MArch, 1976, Rice University; design, history, preservation design, urban design.

Rutherford, G. Scott * 1981; PhD, 1974, Northwestern University; transportation planning and engineering, transit planning, demand forecasting.

Streatfield, David C. * 1974; MLA, 1965, University of Pennsylvania; regional landscape planning, environmental history, landscape studies.

Vernez Moudon, Anne * 1980; DSc, 1987, Ecole Polytechnique Federale de Lausanne; urban design, city form and neighborhood studies, design research.

Zerbe, Richard O. * 1975; PhD, 1969, Duke University; law and economics, cost-benefit analysis, economic history, environmental regulation.

Associate Professors

Alberti, Marina * 1996; PhD, 1992, Massachusetts Institute of Technology; environmental planning, urban ecology, impact assessment, geographic information systems.

Blanco, Hilda J. * 1996; MRP, 1984, PhD, 1989, University of California (Berkeley); factors influencing urban sprawl; the implications of cognitive science and evolutionary theory.

Chang, Kuei-Sheng * 1966, (Emeritus); PhD, 1955, University of Michigan; economic geography of China, historical geography of exploration, Third World development.

Dubrow, Gail Lee * 1989; MA, 1979, University of Oregon, PhD, 1991, University of California (Los Angeles); the social history of the built environment; historic preservation; issues of race, class and gender.

Gross, Mark D. * 1999; PhD, 1986, Massachusetts Institute of Technology; design and planning methods, architecture, computational models, human computer interaction.

Hill, Kristina * 1997; MLA, 1990, PhD, 1997, Harvard University; human dimensions of landscape change; urban ecology; urban design; urban hydrology.

Marzluff, John M. * 1997; MS, 1983, PhD, 1987, Northern Arizona University; behavior, ecology, and conservation of birds and mammals.

Prakash, Vikramaditya * 1996; MA, 1989, PhD, 1994, Cornell University; Non-western, Asian, Indian Architecture; cultural and postcolonial studies; LeCorbusier; modernism.

Waddell, Paul A. * 1997; PhD, 1989, University of Texas (Dallas); urban policy, regional planning, growth management, land use, transportation, GIS.

Assistant Professors

Bae, Christine * 1996; MRP, 1986, State University of New York (Albany), PhD, 1994, University of Southern California; transportation; environmental planning; land use; planning methodologies.

Do, Yi-Luen Ellen * 1999; MDes, 1991, Harvard University, PhD, 1998, Georgia Institute of

Technology; diagramming and freehand sketching, creativity, computer-aided design, cognitive studies.

Kleit, Rachel G. 1999; PhD, 1999, University of North Carolina; urban politics, public housing, urban planning.

Layton, David F. 2001; PhD, 1995, University of Washington; environmental and natural resource policy.

Ryan, Clare * 1997; PhD, 1996, University of Michigan; natural resource policy and administration, environmental conflict management, water policy.

Shankar, Venkataraman * 1999; PhD, 1997, University of Washington; modeling of transportation infrastructure and civil engineering systems.

Withers, Suzanne D. * 1997; PhD, 1992, University of California (Los Angeles); urban housing, residential mobility and migration, longitudinal methods, life-course dynamics.



Interschool or Intercolleage Programs

Bioengineering

309 Harris Hydraulics Laboratory



General Catalog Web page:
www.washington.edu/students/gencat/academic/Bioengineering.html



Department Web page:
depts.washington.edu/bioe/

Bioengineering encompasses a wide range of activities in which the disciplines of engineering and biological or medical science intersect. Such multidisciplinary endeavors are yielding new discoveries and major advances that are revolutionizing the health care system. The Department of Bioengineering, housed jointly in the School of Medicine and the College of Engineering, provides a comprehensive, multidisciplinary program of education and research and is recognized as one of the finest bioengineering programs in the world. Major areas of research and education include distributed diagnosis and home healthcare (d2h2), molecular bioengineering and nanotechnology, engineered biomaterials and tissue engineering, medical imaging and image-guided therapy, and computational bioengineering.

The Department is home to the University of Washington Engineered Biomaterials ERC funded by NSF, the Center for Nanotechnology, the National Simulation Resource, the Resource Facility for Population Kinetics, the Cell Systems Initiative, the Image Computing Systems Laboratory, and the National ESCA and Surface Analysis Center for Biomedical Problems (NESAC/BIO).

Graduate Program

Graduate Program Coordinator
Box 357962
206-685-2000
bioeng@u.washington.edu

The Department of Bioengineering offers programs of study which lead to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

Master of Science

The Master of Science degree program provides breadth of knowledge of engineering, biology, and medicine, and depth of knowledge in a particular research area. The degree will prepare students for careers in academic, industrial, or hospital environments. A thesis is required.

Doctor of Philosophy

The objective of the Ph.D. program is to train individuals for careers in bioengineering research and teaching. The program has three major objectives: (1) breadth of knowledge about engineering, biology, medicine, and the interdisciplinary interface between these different fields; (2) depth of knowledge and expertise in a particular scientific specialty; (3) demonstrated independence as a bioengineering researcher. These objectives are fulfilled through a

combination of educational and research experiences. The program is rigorous but maintains flexibility to accommodate qualified students from diverse backgrounds. Entrance to the Ph.D. program does not require prior completion of the M.S. degree and may be made directly after the B.S.

Medical Scientist Program

A Medical Scientist Training Program exists for the support of individuals interested in coordinated graduate school/medical school study leading to both the M.D. and Ph.D. degrees. Students entering this highly competitive program are given an opportunity to pursue a flexible, combined course of study and research. Early inquiry is essential for this option. Contact the MSTP office at 206-685-0762.

Research Facilities

Offices and laboratories are located in the College of Engineering and the School of Medicine. Students have access to the University of Washington Medical Center, Vivarium, Primate Center, Computer Center, and libraries, as well as to all engineering and health-sciences departments and facilities. A wide range of technologies and virtually all aspects of biomedical science are available.

Admission Requirements

Applicants for the M.S. or Ph.D. should have a baccalaureate degree in engineering, biological science, or a related field. Preparation for both programs must include ordinary differential equations, linear algebra, instrumentation, signal processing, engineering systems analysis, thermodynamics or physical chemistry, and cellular and molecular biology. Strong students who are missing some of these background courses can be admitted but will be expected to take the appropriate courses as part of their graduate program. Admission to graduate study in bioengineering is highly selective. Successful applicants have strong academic credentials, research experience, and demonstrated potential for advanced study. The application form and further information can be found on the department's Web page.

Financial Aid

Financial aid is available to qualified graduate students in the form of traineeships, fellowships, and teaching and research assistantships. Funding is derived from federal research and training programs, the Graduate School Fund for Excellence and Innovation, and programs sponsored by private agencies. Questions regarding financial support may be directed to the Academic Counselor.

Faculty

Chair

Yongmin Kim

Professors

Afromowitz, Martin * 1975, (Adjunct); MS, 1966, PhD, 1969, Columbia University; microtechnology, solid-state and fiber-optics sensors, biomedical instrumentation.

Auth, David C. * 1969, (Affiliate); PhD, 1969, Georgetown University; lasers and electro-optical system design, electrophysics, medical instrumentation.

Baneyx, Francois * 1992, (Adjunct); PhD, 1991, University of Texas (Austin); biotechnology, protein technology, biochemical engineering.

Bashein, Gerard * 1974, (Adjunct); PhD, 1969, Carnegie Mellon University, MD, 1974, University of

New Mexico; automation techniques in anesthesia, transesophageal ultrasonic cardiac assessment.

Bassingthwaite, James * 1975; MD, 1955, University of Toronto (Canada), PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Beach, Kirk Watson * 1976, (Adjunct Research); MSChE, 1968, PhD, 1971, University of California (Berkeley), MD, 1976, University of Washington; arterial disease in diabetes, blood flow studies with ultrasonic Doppler.

Burke, James V. * 1985, (Adjunct); PhD, 1983, University of Illinois; optimization, nonsmooth analysis.

Caldwell, James H. 1983, (Adjunct); MD, 1970, University of Missouri; positron emission tomography imaging of myocardial oxygenation, metabolism and sympathetic function.

Callis, James B. * 1973, (Adjunct); PhD, 1970, University of Washington; instrumentation development, process analytical chemistry, non-invasive clinical chemistry.

Conley, Kevin E. * 1988, (Adjunct); PhD, 1983, University of Wisconsin; muscle metabolism and energetics in vivo.

Crum, Lawrence A. * 1992; PhD, 1967, Ohio University; physical acoustics, underwater acoustics, medical ultrasound, acoustic cavitation, sonoluminescence.

Dager, Stephen R. * 1979, (Adjunct); MD, 1978, University of Nebraska; application of functional brain imaging techniques to investigate neuropsychiatric disorders.

Feijen, Jan 1990, (Affiliate); PhD, 1970, University of Groningen (Netherlands).

Foster, David M. * 1980, (Research Emeritus); PhD, 1969, University of British Columbia (Canada).

Guy, Arthur W. * 1955, (Emeritus); PhD, 1966, University of Washington; biological effects and medical applications of electromagnetic fields.

Hannaford, Blake * 1989, (Adjunct); MS, 1982, PhD, 1985, University of California (Berkeley); haptic interfaces, robotics, biomechanics, bioengineering, controls, human-machine interaction.

Haynor, David R. * 1979, (Adjunct); PhD, 1971, University of California (Berkeley), MD, 1979, Harvard University; medical image processing and segmentation; image deformation; functional MRI; expression arrays.

Hlastala, Michael P. * 1972, (Adjunct); PhD, 1969, State University of New York (Buffalo); respiratory physiology, inert gas analysis of respiratory function.

Hoffman, Allan S. * 1970; DSc, 1957, Massachusetts Institute of Technology; synthesis, characterization, and biological interaction of biomaterials, mechanics of natural tissue.

Hol, Wilhelmus G. J. * 1992, (Adjunct); PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Hood, Leroy E. * 1992, (Affiliate); PhD, 1968, California Institute of Technology; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution.

Horbett, Thomas A. * 1973; PhD, 1970, University of Washington; interfacial proteins, cell interactions, foreign body reaction, nonfouling surfaces.

Huntsman, Lee L. * 1968; PhD, 1968, University of Pennsylvania; mechanics of heart and heart muscle, cardiovascular system assessment, new measurement techniques.

Kim, Yongmin * 1982; MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, imaging systems, medical imaging, computer graphics, multimedia.

Lai, Henry C. 1981, (Research); PhD, 1978, University of Washington; cellular effects of electromagnetic fields.

Lidstrom, Mary E. * 1995, (Adjunct); MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.

Matsen, Frederick A., III * 1973, (Adjunct); MD, 1968, Baylor University; orthopaedics, bone and joint research, robotics.

Meldrum, Deirdre R. * 1992, (Adjunct); MS, 1985, Rensselaer Polytechnic Institute, PhD, 1993, Stanford University; laboratory automation systems, genome analysis, modeling and control of dynamic systems, robots.

Pollack, Gerald H. * 1968; PhD, 1968, University of Pennsylvania; muscular contraction.

Ratner, Buddy D. * 1972; PhD, 1972, Polytechnic Institute of Brooklyn; synthesis and characterization of polymeric biomaterials.

Richards, Todd L. * 1985, (Adjunct); PhD, 1984, University of California (Berkeley); nuclear magnetic resonance imaging, spectroscopy of the brain in demyelinating diseases.

Schurr, J. Michael * 1966, (Adjunct); PhD, 1965, University of California (Berkeley); physical chemistry of DNA and other biopolymers, photon correlation techniques.

Schwartz, Stephen Mark * 1974, (Adjunct); MD, 1967, Boston University, PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.

Soma, Mani * 1982, (Adjunct); MS, 1977, PhD, 1980, Stanford University; computer-aided design, device modeling, I.C. technology and design, bioengineering.

Spelman, Francis A. * 1961, (Emeritus); PhD, 1975, University of Washington; biophysics of implanted cochlea, bioinstrumentation for primate research.

Stayton, Patrick S. * 1992; PhD, 1989, University of Illinois; engineering proteins for biotechnology, biomaterials, and biomedical therapies/diagnostics.

Stewart, Brent K. * 1993, (Adjunct); PhD, 1988, University of California (Los Angeles); biomedical physics, biomedical image processing, medical imaging, medical information systems.

Trask, Barbara J. * 1992, (Adjunct); PhD, 1985, University of Leiden (Netherlands); in situ hybridization, analytical cytogenetics, analysis of large-scale DNA polymorphism.

Verdugo, Pedro * 1974; MD, 1965, State University of Chile; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology.

Viney, Christopher * 1987, (Affiliate); PhD, 1983, Cambridge University (UK); phase transformations and microstructure/property relationships in polymers and liquid crystals.

Yager, Paul * 1987; PhD, 1980, University of Oregon; physical chemistry, biophysics of biomembranes, biosensors, microfluidics.

Yuan, Chun 1991, (Adjunct); PhD, 1988, University of Utah; magnetic resonance imaging in medical application.

Associate Professors

Baker, David * 1993, (Adjunct); PhD, 1989, University of California (Berkeley); protein folding, genomics.

Barrett, P. Hugh R. * 1988, (Affiliate); PhD, 1989, University of Adelaide (Australia); biomathematics and modeling methodology, simulation analyses, lipid and lipoprotein metabolism.

Bonadio, Jeffrey 2000; MD, 1979, Medical College of Wisconsin.

Burns, David H. 1984, (Affiliate); PhD, 1984, University of Washington.

Castner, David G. * 1986, (Research); PhD, 1979, University of California (Berkeley); polymer surfaces, metal-organic interfaces, catalytic materials.

Ching, Randal Preston * 1992, (Adjunct); PhD, 1992, University of Washington; orthopaedic biomechanisms related to injury prevention, injury mechanisms and injury repair.

Giachelli, Cecilia * 1982; PhD, 1987, University of Washington; adhesion molecules and vascular biology processes.

Gross, Ted S. 2000, (Adjunct); PhD, 1993, State University of New York (Stony Brook); biomechanics.

Kalet, Ira J. * 1980, (Adjunct); PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Kunzelman, Karyn S. * 1991, (Affiliate); PhD, 1991, University of Texas (Dallas); biomedical engineering - cardiac; anatomy and physiology.

Linker, David T. 1993, (Adjunct); MD, 1976, Stanford University; diagnostic ultrasound in cardiology and cardiovascular pathophysiology.

Martyn, Donald A. * 1978; PhD, 1975, University of Southern California; basic mechanisms of contractile regulation in skeletal and cardiac muscle.

Murry, Charles E. * 1989, (Adjunct); PhD, 1989, MD, 1989, Duke University; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation.

Nelson, Alan C. * 1986, (Affiliate); PhD, 1980, University of California (Berkeley); biomedical imaging using image analysis for tissue and tumor studies.

Nickerson, Deborah A. * 1992, (Adjunct); PhD, 1978, University of Tennessee; automating the analysis of single nucleotide polymorphisms, human genetics, DNA diagnostics.

Sanders, Joan Elizabeth * 1985; PhD, 1991, University of Washington; soft tissue biomechanics and tissue adaptation to mechanical stress.

Vogel, Viola * 1990; Doct, 1987, Johann Wolfgang Goethe University (Germany); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, nonlinear optics, microscopy.

Assistant Professors

Beyer, Richard P. 1989, (Affiliate); PhD, 1989, University of Washington.

Folch, Albert 2000; PhD, 1994, University of Barcelona (Spain); cell-based microfabricated devices, microscale engineering, high-throughput biological measurements.

Kaiser, Robert J. * 1992; PhD, 1984, California Institute of Technology.

Li, Xingde 2001; PhD, 1998, University of Pennsylvania.

Qian, Hong 1997, (Adjunct); PhD, 1989, Washington University; mathematical, physical chemistry and biology, statistical physics, stochastic mathematics.

Regnier, Michael * 1995, (Research); PhD, 1991, University of Southern California; mechanics, kinetics and computational modeling of cardiac/skeletal muscle contraction.

Schenkman, Kenneth A. 1990, (Adjunct); MD, 1986, Indiana University; pediatric anesthesia.

Singh, Narendra Pal 1993, (Research); MBBS, 1972, King George's Medical College (India).

Vaezy, Shahram * 1983, (Research); PhD, 1991, University of Washington; therapeutic ultrasound, image-guided therapy, three dimensional visualization and computation.

Vicini, Paolo 1996; PhD, 1996, Polytechnic of Milan (Italy).

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat/.

BIOEN 420 Medical Imaging (4) *Kim, Yuan* Various medical imaging modalities (x-rays, CT, MRI, ultrasound, PET, SPECT, etc.) and their applications in medicine and biology. Extends basic concepts of signal processing (BIOEN 303) to the two and three dimensions relevant to imaging physics, image reconstruction, image processing, and visualization. Prerequisite: BIOEN 303; MATH 308; CSE 143. Offered: A.

BIOEN 436 Medical Instrumentation (4) Introduction to the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. For juniors, seniors, and first-year graduate students who are preparing for careers in bioengineering, both research and industrial. Offered: jointly with E E 436; Sp.

BIOEN 440 Introduction to Biomechanics (4) *Sanders* Presents the mechanical behavior of tissues in the body and the application to design of prostheses. Tissues studies include bone, skin, fascia, ligaments, tendons, heart valves, and blood vessels. Discussion of the structure of these tissues and their mechanical response to different loading configurations. An important part of the class is a final project. Offered: jointly with M E 445; Sp.

BIOEN 455 BioMEMS (4) *Folch* Introduction to BioMEMS. State-of-the-art techniques in patterning biomolecules, machining three-dimensional microstructures and building microfluidic devices. Various biomedical problems that can be addressed with microfabrication technology and the engineering challenges associated with it. Biweekly labs. Prerequisite: BIOEN 303. Offered: Sp.

BIOEN 457 Advanced Molecular Bioengineering (4) *Stayton* Fundamentals of molecular recognition: thermodynamics, forces, kinetics. Manipulation of recognition processes for current molecular bioengi-

312 INTERSCHOOL OR INTERCOLLEGE PROGRAMS / BIOENGINEERING

neering research and development. Fundamental physical chemistry of molecular recognition in the context of biomedicine. Therapeutics based on cells. Prerequisite: BIOEN 357; BIOC 405. Offered: Sp.

BIOEN 467 Biochemical Engineering (3) *Baneyx* Application of basic chemical engineering principles to biochemical and biological process industries such as fermentation, enzyme technology, and biological waste treatment. Rapid overview of relevant microbiology, biochemistry, and molecular genetics. Design and analysis of biological reactors and product recovery operations. Prerequisite: either CHEM 223 with CHEM E 340 or either CHEM 237 or CHEM 335; recommended: CHEM E 465. Offered: jointly with CHEM E 467; W.

BIOEN 470 Systems Engineering and Electronic Medicine (4) *Kim* Provides students with understanding and hands-on experience in systems engineering, healthcare information systems, and core technologies for electronic medicine; including how large-scale engineering systems are defined, architected, built, and tested. Focus is on current and future medical systems. Prerequisite: BIOEN 303; MATH 308. Offered: W.

BIOEN 480 Bioengineering Research/Capstone Design (2-6, max. 12) Students formulate a problem, develop a detailed experimental or design plan, and report results of their work in written and oral form. Prerequisite: BIOEN303; BIOEN 305; BIOEN 357. Offered: A/WSpS.

BIOEN 485 Computational Bioengineering (4) *Vicini* Introduction to computational, mathematical and statistical approaches to the analysis of biological systems, including systems and control theory, molecular models and bioinformatics. Lectures and laboratory sessions emphasize practical problems in kinetics, metabolism and genomics. Prerequisite: CSE 143; BIOEN 305; MATH 308. Offered: W.

BIOEN 490 Engineering Materials for Biomedical Applications (3) *Bonadio, Horbett* Combined application of principles of physical chemistry and biochemistry, materials engineering, to biomedical problems and products. Applications include implants and medical devices, drug delivery systems, cell culture processes, diagnostics, and bioseparations. Offered: jointly with CHEM E 490; Sp.

BIOEN 491 Controlled-Release Systems: Principles and Applications (3) *Hoffman* Mechanisms for controlled release of active agents and the development of useful drug delivery systems for this purpose. Release mechanisms considered include diffusive, convective, and erosive driving forces. Delivery routes include topical, oral and in vivo. Some special case studies covered in detail. Offered: jointly with CHEM E 491; even years; W.

BIOEN 492 Surface Analysis (3) *Ratner* Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials, science wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger): ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with CHEM E 458; W.

BIOEN 499 Special Projects (2-6, max. 6) Individual undergraduate bioengineering projects under the supervision of an instructor. In addition, classes on selected topics of current interests as announced. Offered: A/WSpS.

Courses for Graduates Only

BIOEN 510- Bioengineering Seminars (3) Topics of current bioengineering interests presented by resident and visiting faculty members and students. Graduate students actively involved in bioengineer-

ing research are eligible to enroll for credit and can be expected to attend regularly, participate in discussions, and make presentations. Offered: A.

BIOEN 511 Biomaterials Seminar (1) *Hoffman, Horbett, Ratner* Presentation of student research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with CHEM E 511; A/WSp.

BIOEN 520 Orthopedic Biomechanics (4) *Ching* Mechanical engineering applied to musculoskeletal system with emphasis on techniques in orthopedic surgery. Measurement of mechanical properties of tissues, mechanics of bone, soft tissue, and muscle, mechanics of upper extremity, spine, and lower extremity. Engineering in surgery, gait analysis, joint replacement, fracture fixation. Prerequisite: M E 556 and M E 557 or permission of instructor. Offered: odd years; W.

BIOEN 540 Biosystem Identification (4) *Vicini* Fundamentals of mathematical modeling in medicine and biology, Introduction to compartmental models: a priori, a priori identifiability. Data measurement error, parameter estimation. Maximum likelihood, least squares. Introduction to tracer-tracee models, pharmacokinetics, pharmacodynamics. Models to test hypotheses. Hands-on computer experience. Prerequisite: ordinary differential equations, introductory statistics, or permission of instructor. Offered: even years; A.

BIOEN 542 Computer Simulation in Biology (3) *Bassingthwaighte, Graham* Introduction to mathematical modeling of biological phenomena. Tutorial text explains how to derive equations for simple models and apply them to generate simulation data. Application topics include kinetics of biomolecular reactions and enzyme saturation, membrane transport, organismal predation, competition and growth, compartmental and spatially distributed models, physiological control systems, probabilistic models. Prerequisite: P BIO 405 and P BIO 406 or equivalent or permission of instructor. Offered: even years; A.

BIOEN 545 Fractals in Biology and Medicine (3) *Bassingthwaighte* Introduction to fractal and chaos. Conceptual approaches to using fractals for characterizing structures and growth processes, describing heterogeneities, and evaluating properties of tissues. The behavior of non-linear systems, often chaotic, describes physiological homeodynamics, regulation without set points in feedback control.

BIOEN 550 Mass Transport and Exchange in Biological Systems (3) *Bassingthwaighte* Review of basic mechanisms of transport; transport through vascular system and blood-tissue exchange processes in organs; integrated system analysis of closed systems and applications to physiological regulation, medical imaging, and pharmacokinetics. Prerequisite: calculus, introduction to differential equations; cardiovascular physiology; E E network analysis or systems analysis, chemical engineering transport. Offered: Sp.

BIOEN 555 Introduction to Biomechanics (3) *Pollack* Mechanical properties of biological tissues, with emphasis on the underlying histological bases. Bones, joints, cartilage, blood vessels, connective tissue, muscle, heart. Many laboratory sessions. Offered: odd years; W.

BIOEN 560 Ultrasound in Bioengineering (4) *Vaezy* Fundamentals of ultrasonic generation, formation, reception, and treatment of absorption, scattering, and transmission. Conventional and new methodology. (A, B, T-M mode, imaging, Doppler, tissue characterization, and nonlinear effects.) Prerequisite: E E/M E 525 for nonbioengineering students or permission of instructor. Offered: odd years; Sp.

BIOEN 561 Biomedical Optics (4) Advanced theories of optical and spectroscopic measurement with

emphasis on biomedical laser applications. Laser principles, instrumentation, and current practice in various biomedical uses, covering such areas as medicine, surgery, and biology. Prerequisite: BIOEN 302 or equivalent, or permission of instructor. Offered: even years; Sp.

BIOEN 565 Nuclear Magnetic Resonance in Biomedicine (2) Basic physics of nuclear magnetic resonance (NMR) imaging and spectroscopy are presented. Research applications of NMR in physiology and biochemistry are reviewed with emphasis on the brain. Grade based on written tests and small research paper. Prerequisite: permission of instructor. Offered: jointly with RADGY 550; odd years; W.

BIOEN 568 Image-Processing Computer Systems (4) *Kim* Components of digital processing computer systems. Two-dimensional filtering and optimal filter design as well as basic image-processing operations. Selected advanced image-processing topics introduced. Individual student project. Prerequisite: permission of instructor. Offered: jointly with E E 568; Sp.

BIOEN 571 Polymeric Materials (3) *Ratner* Relationships between configuration, conformation, molecular order, microstructure, properties of polymeric materials. Concepts relevant to tailoring polymer molecules and microstructures for specific applications. Interactions between polymers and their in-service environment. Characterization and processing techniques relevant to polymeric materials. Prerequisite: one semester or two quarters of organic chemistry. Offered: jointly with MSE 571.

BIOEN 573 Biosensors and Biomedical Sensing (3) *Yager* In-depth overview of the principal types of biosensors. Topics include: how biological molecules are used in sensing, how the sensors operate, how different sensors compare, under what circumstances sensors can be useful, and the applicability of sensors to biomedical sensing. Prerequisite: BIOEN 436 or permission of instructor. Offered: odd years; A.

BIOEN 575 Molecular Modeling Methods (4) *Beard* Introduction to theory and practice of computer simulation studies of molecules with emphasis on applications to biological molecules and complexes. Discussion of background theory, implementation details, capabilities and practical limitations of these methods. Prerequisite: previous coursework in biochemistry and physical chemistry and/or permission of instructor. Offered: jointly with CHEM 575; A.

BIOEN 576 Laboratory Techniques in Protein Engineering (4) *Stayton* Practical introduction to fundamentals of recombinant DNA technology and protein engineering. Gene design, bacterial molecular biology, genetic engineering strategy. Laboratory project focused on making site-directed protein mutations. Techniques include the Polymerase Chain Reaction, DNA sequencing, DNA cutting/splicing, protein expression. Prerequisite: background in biochemistry or molecular biology or consent of instructor. Offered: W.

BIOEN 577 Cell and Protein Reaction with Foreign Materials (3) *Horbett* Study of ways in which cell and protein interactions with foreign materials affect the biocompatibility of biomaterials. Description of the phenomenology and mechanisms of protein adsorption, mammalian cell adhesion, and cell receptor biology and of methods used to study these phenomena. Surface properties of materials discussed in context of the course. Prerequisite: permission of instructor. Offered: even years; A.

BIOEN 578 Biomembranes (3) *Yager* Develops an understanding of the molecular principles that underlie the self-assembly of surfactants into natural and model membranes; in particular, on the relationship between the chemical structure of lipid molecules

and the three-dimensional aggregates that they form in water. Offered: A.

BIOEN 579 Host Response to Biomaterials (3) *Giachelli* Basic cell and molecular biology of the pathologies associated with biomaterial implantation that limit bioprosthetic use, including hemostasis, infection, acute and chronic inflammation, wound healing and fibrosis, and structural alterations. Major methods for histological analysis of retrieved implants. Prerequisite: general biology, BIOEN 490 (may be taken concurrently) or permission of instructor. Offered: odd years; W.

BIOEN 584 Computational and Integrative Bioengineering (4) *Vicini* Advanced computational, mathematical, and statistical approaches to the analysis of biological systems, including molecular models, time series, fractal systems, population kinetic analysis, and stochastic simulation. Lectures and laboratory sessions emphasize practical problems in kinetic analysis, metabolism, and genomics. Final project, written and oral reports. Prerequisite: BIOEN 485. Offered: odd years; Sp.

BIOEN 588 Bioengineering Principles of Physiology (4) *Bonadio, Kushmerick* Muscle exemplifies: protein-protein interactions; molecular recognition; proteins as machines; functional scaling; computing and signaling with metabolic machines; metabolic processes as chemical networks; membrane separation into functions; channels as communication machines; neural control and function. Prerequisite: BIOL 200 or equivalent or permission of instructor; recommended: BIOEN 304, P BIO 405. Offered: A.

BIOEN 589 Integrative Physiological Systems Analysis (4) *Bassingthwaighte* Physiological systems, emphasizing cardiovascular, pulmonary and to a lesser extent, renal, hepatic, and endocrine systems, described in quantitative terms, using model representation for examples and problems. Laboratories. Prerequisite: BIOEN 588, calculus and ordinary differential equations. Offered: W.

BIOEN 590 Advanced Topics in Biomaterials (3) *Bonadio* Major, controversial issues in application of synthetic materials to medical problems. Blood compatibility, bioadhesion, intraocular lenses, contact lenses, polyurethanes, biodegradation, protein adsorption, corrosion, bone fixation, new materials, artificial heart, medical device regulation. Prerequisite: BIOEN 490 or CHEM E 490. Offered: jointly with CHEM E 590; odd years; Sp.

BIOEN 592 Surface Analysis (3) *Ratner* Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with CHEM E 558; W.

BIOEN 599 Special Topics in Bioengineering (1-6, max. 15) Offered at a graduate level periodically by faculty members within the Department of Bioengineering; concerns areas of research activities with current and topical interest to bioengineers. Prerequisite: undergraduate or graduate courses (or equivalent) determined individually for each special topic. Offered: AWSpS.

BIOEN 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

BIOEN 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

BIOEN 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Program on the Environment

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat.

ENVIR 415 Sustainability and Design for Environment (3) *Cooper* Analysis and design of technology systems within the context of the environment, economy, and society. Applies the concepts of resource conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with CEE 495/M E 415; S.

ENVIR 439 Attaining a Sustainable Society (1/3, max. 3) *I&S/NW Karr* Discusses diverse environmental issues, the importance of all areas of scholarship to evaluating environmental challenges, and the connections between the past and the future, to reveal integrative approaches to protect the long-term interests of human society. Offered: jointly with FISH 439; A.

ENVIR 450 Special Topics in Environmental Studies (1-5, max. 15) Format may range from seminar/discussion to formal lectures to laboratory or modeling work.

ENVIR 451 Comparative Historical and Social Ecology of the Tropics (5) *I&S Sivaramakrishnan* Historical and social aspects of tropical environmental change. Comparative analysis of resource management, conservation, and environmental regulation issues in Asia, Africa, and Latin America from cultural and political economic perspectives. Special focus on issues of state policy, expert knowledge, social conflict, and international politics. Prerequisite: ANTH 210. Offered: jointly with ANTH 451.

ENVIR 459 Culture, Ecology and Politics (5) *I&S Pena* Critical studies of class, gender and race differences in environmental politics. The political-economic dimensions of ecological change. Contemporary environmental movements including the varieties of bioregionalism, deep ecology, ecofeminism, ecosocialism, environmental justice, and social ecology. Offered: jointly with ANTH 459.

ENVIR 460 Institutionalizing Sustainable Ecological Practices. (3) *I&S/NW Lee* The purpose of this course is to introduce how sustainable resource activities are put into practice. Case studies of successful institutional of sustainable resource practices are presented, including curb-side and biosolids recycling, ecological restoration, bioremediation, sustainable wood production, and material certification. Offered: jointly with ESC 460; W.

ENVIR 470 Communications and the Environment (5) *I&S* Examines the role of mass media in the resolution of environmental problems. Topics include strengths and weaknesses of media coverage, use of media by environmental groups and government agencies, media effects on public opinion, and mass communication and social movements. Offered: jointly with COM 418.

ENVIR 475 Environmental Impacts of Small Scale Societies (5) *I&S/NW Grayson, Smith* Examines the environmental impacts (positive and negative) among prehistoric and historic/ethnographic small-

scale (hunter-gatherer and horticultural) societies worldwide, and debates these impacts, within a theoretical framework provided by evolutionary ecology and biogeography. Offered: jointly with BIO A 475.

ENVIR 477 Marine Conservation (3) *NW Parrish* Terrestrially based concepts of conservation biology applied to marine systems: human activities affecting the marine environment including fishing and pollution, influence of legal and cultural frameworks, and ecosystem management. Offered: jointly with BIOL 477; W.

ENVIR 478 Topics in Sustainable Fisheries (3, max. 9) *Parrish* Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Pre-seminar discussion section focusing on select readings. Final paper. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with FISH 478/BIOL 478; odd years; W.

ENVIR 480 Marine Resource Conservation and Management (3) *I&S/NW Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with FISH 480/SMA 480.

ENVIR 490 Capstone Experience I (1) Preparation for ENVIR 491. Students attend presentations and critiques given by students who are taking or have completed 492 and will make arrangements for their own capstone experience (internship, group or individual project). Credit/no credit only. Recommended: 15 credits of ENVIR 201/202/203. Offered: AWSp.

ENVIR 491 Capstone Experience II (2-8, max. 8) Internship, group project, or individualized project in Environmental Studies. May be taken in a single quarter or distributed over two or three quarters of the student's final year. Recommended: ENVIR 490 and 15 credits ENVIR 201/202/203. Credit/no credit only. Offered: AWSpS.

ENVIR 492 Capstone Experience III (2) Critique and discussion of projects undertaken in 491. May be taken concurrently with the final quarter of 491. Credit/no credit only. Prerequisite: ENVIR 491. Offered: AWSp.

ENVIR 498 Independent Study (1-3, max. 5) Independent reading and/or research. Limited to majors and minors in Environmental Studies.

Courses for Graduates Only

ENVIR 500 Graduate Seminar in Environmental Studies (1-5, max. 15) Exploration of multidisciplinary themes in environmental studies. Topics vary.

ENVIR 535 Foresight in Science and Technology: Choices and Consequences (3) Examination of the foresight (or lack of it) with which we practice science and use technology. Contrasts potential risks of various choices with potential benefits. Credit/no credit only. Offered: jointly with PHYS 535/PHIL 501/ZOOL 523.

Quantitative Science

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Q SCI 456 Introduction to Quantitative Fishery Science (5) NW Conveys fundamental concepts of fish population dynamics and fishery management within context of real-world fisheries problems. Lectures discuss notation, terminology, mathematical models, fisheries principles, and case studies. Laboratory time devoted to practical applications, problems. Recommended: either MATH 125, MATH 135, or Q SCI 292; Q SCI 381. Offered: jointly with FISH 456; A.

Q SCI 457 Methods of Abundance Estimation (4) NW Methods of estimating fish abundance by direct sampling and indirectly from tagging, catch, and effort analysis. Confidence limits and bias adjustments. Design of marine fishery surveys using statistical sampling principles. Laboratory work with real fishery data and data collected during trawl sampling survey. Recommended: Q SCI 292; Q SCI 381; Q SCI 456 or FISH 456. Offered: jointly with FISH 457.

Q SCI 458 Fisheries Stock Assessment (4) NW Francis Emphasizes quantitative analysis of fisheries data to determine how the fishery would respond to alternative management actions. Major topics include production models, stocks and recruitment, catch at age analysis, and formulation of harvest strategies. Recommended: either Q SCI 456 or FISH 456. Offered: jointly with FISH 458 Sp.

Q SCI 477 Quantitative Wildlife Assessment (5) NW Skalski Focuses on wildlife sampling techniques for estimating animal abundance, home range, and survival rates in terrestrial populations. The design of wildlife investigations for the purposes of impact assessment, research, and resource management is integrated with estimation schemes and demographic models in a quantitative framework. Prerequisite: Q SCI 292; Q SCI 482.

Q SCI 480 Sampling Theory for Biologists (3) NW Gallucci, Rustagi Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling, sample size determinations, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with STAT 480; even years.

Q SCI 482 Statistical Inference in Applied Research (5) NW Analysis of variance and covariance; chi square tests; nonparametric procedures multiple and curvilinear regression; experimental design and power of tests. Application to biological problems. Use of computer programs in standard statistical problems. Prerequisite: either STAT 311 or Q SCI 381. Offered: AWS.

Q SCI 483 Statistical Inference in Applied Research (5) NW Analysis of variance and covariance; chi square tests; nonparametric procedures multiple and curvilinear regression; experimental design and power of tests. Application to biological problems. Use of computer programs in standard sta-

tistical problems. Prerequisite: either Q SCI 381 or Q SCI 482. Offered: WSp.

Q SCI 486 Experimental Design (3) NW Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency, power, sample size, pseudoreplication, factor structure. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with STAT 486.

Q SCI 499 Undergraduate Research (1-5, max. 5) Special studies in quantitative ecology and resource management for which there is not sufficient demand to warrant the organization of regular courses. Credit/no credit only.

University Conjoint Courses

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Each of the following courses is administered by two or more schools or colleges within the University. No degree program is offered.

UNCONJ 411 Psychology of Aging (3) Kiyak Focuses on developing the skills necessary for critically evaluating current psychological theories of aging, research findings in this area, and the implications of findings on the aging person. Special consideration given to the effects of socioeconomic, sex, and ethnic differences in the psychology of aging. Open to upper-division undergraduates and beginning graduate students interested in the field of gerontology.

UNCONJ 420 Biological Safety Practices (1) Kenny General introduction to appropriate laboratory procedures used for handling potentially hazardous biological agents. Particular focus on laboratory safety and appropriate protocols that should be employed by those engaged in infectious disease and recombinant DNA research. Credit/no credit only.

UNCONJ 422 Sexually Transmitted Diseases: An Overview (2) Gardner Clinically oriented course designed to provide a knowledge base for upper division health science students to participate effectively in community outreach programs for the prevention of sexually-transmitted diseases. Offered cooperatively by the departments of Pharmacy and Medicine.

UNCONJ 440 Biological Aspects of Aging (3) Introductory course on aspects of the biology of human aging and of functional changes associated with normal aging and with those illnesses that may be present in the elderly. Focus on the relationship between changes in physical function, environment, and quality of life. Includes theoretical perspective on aging as well as the aging process in specific physiological systems. Designed for upper-level undergraduate students with an interest in aging.

UNCONJ 442 Social and Cultural Aspects of Aging (3) Involves faculty members from the various social science fields examining the range and variation of relationships among age-linked attitudes and cultural values related to aging; the social and economic factors that influence the elderly in contemporary society; the effects of ethnic and sex differences in socio-cultural aging. Open to upper-division undergraduates and beginning graduate students interested in gerontology.

UNCONJ 443 Interdisciplinary Seminar on Aging (1-6, max. 15) Borgatta Interdisciplinary examination of the contemporary theoretical literature on gerontology and long-term care. For upper-level undergraduate and graduate students with an interest in aging. Quarterly offerings available from the Institute on Aging.

UNCONJ 444 Interdisciplinary Collaborative Teams in Health Care (1-5, max. 10) Course open to students in UW Health Sciences schools. Students function as an interdisciplinary learning group within a problem based learning framework. The primary goal of the course is to promote the development of interdisciplinary practice in the care of urban and rural underserved patient populations. Credit/no credit only.

UNCONJ 490 Social Sensitivity in Health Care (3) I&S Multidisciplinary course for health professions students. Health professionals' roles in dealing with social, cultural, and physical barriers to health care of low-income groups and ethnic people of color. Personal involvement through field experiences and faculty drawn from affected communities as well as health sciences, social work schools. Credit/no credit only.

Courses for Graduates Only

UNCONJ 500- Seminar in Interprofessional Collaboration ([1-3]-, max. 7) Interdisciplinary teams composed of students and community members placed in diverse urban settings to address an identified community need by developing and implementing collaborative, community-based projects. Seminars emphasize interprofessional collaborative practice, intrapersonal understanding, interpersonal group process skills, organizational savvy, community awareness, and sociocultural sensitivity. Graduate School of Public Affairs. Offered: AWSp.

UNCONJ 501 International Health (1) Hunt Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements.

UNCONJ 502 International Health (1) Hunt Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements.

UNCONJ 503 International Health (1) Hunt Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements.

UNCONJ 510 Integrating Arts in the Classroom (4) Prepares prospective elementary education teachers to understand and acquire arts literacy through a comprehensive approach to learning and teaching in and through the arts. Course is school and arts-site based, inclusive of multiple art forms. Based on comprehensive art principles, and project oriented. Credit/no credit only. Offered: Sp.

UNCONJ 513 Dynamics of Patient Management: Diabetes Mellitus (2) Analysis of advanced knowledge related to interdisciplinary management of diabetes. Commonalities and differences in provider approaches, recent research and its effect on management practices, collaborative communication, knowledge application. Brief interactive presentations, decision-making opportunities, discussion. Credit/no credit only. Prerequisite: graduate standing

in pharmacy, dietetics, nursing; third- or fourth-year medical student; or permission of instructor.

UCONJ 520 Molecular Biophysics Research Seminar (1) *Parson* A series of research seminars for faculty and students involved with the molecular biophysics program. Credit/no credit only.

UCONJ 524 Developmental Neurobiology (3) *Raible, Reh, Roelink, Rubel* Survey of contemporary issues in developmental neurobiology, including neurogenesis and differentiation; electrophysiological, morphological, and neurochemical regulation of cellular phenotype; neuronal pathways and synaptic contacts; cellular and synaptic plasticity; and behavior. Examination of molecular biological, morphologi-

cal, electrophysiological, and behavioral approaches. Prerequisite: background in neurophysiology, neuroanatomy, molecular neurobiology. Offered: Sp.

UCONJ 530 Issues in Indian Health (3) Survey of historical and contemporary issues in Indian Health. Covers Indian contributions to health, traditional Indian Medicine, current disease epidemiology, development of Federal Indian Health policy, the Indian Health Service, tribal health programs, and consequences of major legislation on Indian Health. Prerequisite: current health science student or permission of instructor.

UCONJ 555 Principles of STD/HIV Research (3) Provides MD and PhD fellows and graduate students

with a comprehensive overview of the current state of knowledge in specific areas of STD/HIV research, including study design, laboratory methods, production of instruments for data collection, and methods for data analysis. Credit/no credit only.

UCONJ 584 Plant Tumors (1, max. 9) *Gordon* Discussion of the literature of plant tumors and current research work being carried on in this area at the University. Offered cooperatively by the departments of Biochemistry, Botany, and Microbiology and Immunology. Credit/no credit only. Prerequisite: offered only to persons actively pursuing work in this area.



School of Law

Dean

Roland L. Hjorth
326 Condon

Associate Dean

Richard O. Kummert
306 Condon

Assistant Deans

Michael Kingan
412 Condon

Paula Littlewood
414 Condon

Sandra E. Madrid
338 Condon



General Catalog Web page:
www.washington.edu/students/genocat/academic/School_Law.html



School Web page:
www.law.washington.edu

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. Additional information about the School is contained in the current *School of Law* catalog.

Facilities and Services

The School of Law is housed in Condon Hall, adjacent to the University's main campus. It is equipped with classroom, library, lounge, and office facilities.

The Marian Gould Gallagher Law Library is one of the finest law libraries in the country. Its collection, among the largest university law collections on the West Coast, currently contains more than 450,000 bound volumes and volume equivalents of microform. In addition to the extensive main collection, it houses important materials that support the Asian, marine, sustainable international development, and tax law graduate programs and serves as a federal depository for selected United States government documents. An experienced audiovisual staff directs the use of video equipment in the trial advocacy and moot court programs. The library is equipped with the latest in microreaders and printers in order to make full use of the growing microform collection. The library is a subscriber to LEXIS, WESTLAW, the Western Library Network, and other research databases.

Juris Doctor Program

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 with most law schools in 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 deal with contracts, torts, property,

civil procedure, criminal law, constitutional law, and basic legal skills.

Except for a required course in professional responsibility, the public service requirement, and an advanced writing project requirement, courses in the second and third years are elective. Therefore, a student may choose a program designed to suit his or her interests and needs. J.D. candidates are required to perform 60 hours of public-service legal work during the second or third year.

Admission

New students may enter the School of Law only in autumn quarter. Instruction begins for first-year students a few days earlier than the time set for upper-class students. Beginning students must have received a baccalaureate degree from an accredited college or university prior to commencing the study of law.

All applicants are required to take the Law School Admission Test (LSAT) and to register for the Law School Data Assembly Service (LSDAS). Registration packets and test information are available at most law schools and from Law School Admission Council, Box 2000, 661 Penn Street, Newtown, PA 18940-0998. Email: lsacinfo@lasac.org.

No specific prelaw course is required or recommended, and the School of Law subscribes to the remarks set forth on prelaw preparation in *The Official Guide to U.S. Law Schools (2000 Edition)*. Applications for admission to the next entering class must be postmarked no later than January 15. To be assured of consideration for admission, an applicant must have complete credentials, including the LSDAS report, filed in the School of Law by February 1. An application fee (at this writing, \$50) also is required.

Transfer Applicants

Students who have completed at least one year at a member school of the Association of American Law Schools may apply to this school for admission with advanced standing with credit for no more than one year of such work. A student who has completed or expects to complete at least two years of work at a member school of the Association of American Law Schools and who expects to graduate from that member school may apply to this school for admission as a non-degree candidate.

Applicants should request application forms and instructions from the admissions office in time to permit filing of all application materials by July 7.

Applications are considered only if vacancies exist. Selection of the applicants is based on evidence either (1) that the candidate can produce above-average work at this law school, or (2) that the candidate will contribute to the diversity of the student body.

Students working on law degrees to be conferred by the University have priority over non-degree candidates in the selection of courses. This policy is in accordance with the general University policy on the registration of nonmatriculated students.

Financial Aid

Students in need of financial assistance may receive University aid, School of Law aid, federal loans, or aid from all of these sources. To be considered for aid, applicants must submit the Free Application for Federal Student Aid (FAFSA) by February 28. FAFSAs are available in December at most college financial aid offices, or may be obtained by writing or calling the Office of Student Financial Aid, 105 Schmitz Hall, Box 355880, University of Washington, Seattle, WA 98195, 206-543-6101, offa@u.washington.edu. Applicants for

admission should not wait until they have been admitted before applying for financial aid.

School of Law grants are awarded primarily on the basis of financial need, although scholarship, or other factors may be considered with regard to certain awards. Inquiries concerning School of Law aid should be addressed to Financial Aid Coordinator, School of Law, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195-4600; uwlawaid@u.washington.edu.

Inquiries

A more detailed statement on admission policy and application procedure is available in the School of Law. Requests for application materials and the University law school bulletin should be addressed to Law School Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195-4617; admissions@law.washington.edu; 206-543-4078.

Graduate Program

Graduate Program Coordinator
712 Condon, Box 354600
206-543-4937
gradlaw@u.washington.edu

In addition to the professional law program leading to the Juris Doctor degree, the law faculty offers graduate programs leading to the Master of Laws (LL.M.) in law and marine affairs, Asian and comparative law, the law of sustainable international development, and taxation. The School of Law offers the Doctor of Philosophy (Ph.D.) degree in Asian and comparative law only. The requirements for each program are as follows:

Asian Law Program

The Master of Laws degree program in Asian and comparative law is designed for students with career and research interests in one or more of the legal systems of East Asia, with particular emphasis on that of Japan, as well as for lawyers from East Asia seeking advanced comparative study of American law. The Asian law program is structured around extensive course offerings involving comparative study of basic areas of United States and East Asian law and tutorials in areas of special interest to each student.

Admission to the LL.M. degree program in Asian and comparative law is limited to language-qualified applicants who have received the first degree in law and who have a record of superior academic achievement. Graduates of American law schools must have a degree from an ABA-accredited institution. The applicant must be competent in an East Asian language (or, in the case of foreign students, in English). Students without the required competence may be admitted to the program, but must successfully complete an approved program of intensive study of an East Asian language before beginning their studies. The program contemplates one year in residence, at least 36 credits, and an acceptable major research undertaking.

Admission to the Ph.D. program in law is limited to exceptional scholar-lawyers who are fluent in English and in either Japanese, Chinese, or Korean. Prospective Ph.D. students must normally complete the LL.M. program before being accepted as Ph.D. students. The core of the program is a major creative research project using Asian-language sources as well as English-language sources. At least two, and usually three, years in residence are necessary in order to accomplish the work that must be done in order to pass the General Examination that precedes candidacy for the doctoral degree. An acceptable dissertation must thereafter be submitted to complete the requirements for the degree. 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 conferred.

Law and Marine Affairs Emphasis

Students who have acquired a first degree in law can become prospective candidates for the LL.M. degree in law and marine affairs. Graduates of American law schools must have a degree from an ABA-accredited school. Particular emphasis is placed on interdisciplinary aspects of marine affairs and coastal zone management. Attainment of the LL.M. degree with specialization in law and marine affairs requires satisfactory completion of 40 credits of course and research work, at least 15 of which must be in the School of Law. In the School of Law, courses include U.S. Coastal and Ocean Law, International Law of the Sea, Marine Law and Policy, and Admiralty and Maritime Law. Pertinent courses are also offered in the Schools of Aquatic and Fishery Sciences, Marine Affairs, and Oceanography, the Graduate School of Public Affairs, the College of Engineering, and the Departments of Economics and Geography.

Law of Sustainable International Development Emphasis

Students may earn an LL.M. degree in the law of sustainable international development. This LL.M. degree option is open to students with a first degree in law. Graduates of American law schools must have a degree from an ABA-accredited school. Emphasis is placed on the interdisciplinary study of sustainable international development, and students may earn more than half their credits in courses outside the School of Law, including courses offered by the Schools of International Studies and Public Health, and the Departments of Economics, Political Science, and Sociology. In the School of Law, courses offered include Legal Problems of Economic Development (required); International Environmental Law (required); Public Land Law; International Commercial Law; and Land, American Culture, and the Law. Attainment of the LL.M. degree with specialization in the law of sustainable international development requires satisfactory completion of 40 credits of course and research work, at least 15 of which must be in the School of Law, and the taking of courses in at least three other departments other than law. As part of their work, students must write one substantial paper.

Taxation

Students may earn an LL.M. degree in taxation. This LL.M. degree option is open to students with a first degree in law. Graduates of American law schools must have a degree from an ABA-accredited school. International students must have a first degree in law or equivalent and may be admitted by the permission of the director. A candidate for the LL.M. degree must successfully complete 36 quarter hours of course work. Students who qualify may be enrolled either on a full-time or a part-time basis. Full-time students can complete the course of study within one nine-month academic year, while those participating on a part-time basis are allowed six academic years to complete the degree. Generally all courses must be taken from the Graduate Tax curriculum, although candidates for the LL.M. may, with the permission of the director, take up to 6 credits of course work in the Law School's J.D. curriculum. Certain core courses are required: Federal Tax Controversies and Procedure, Taxation of Corporations and Shareholders, Tax Accounting, Property Dispositions and Transactions, and Taxation of Partners and Partnerships. The remainder of the curriculum is elective.

Financial Aid

Scholarship funds for graduate students in law are quite limited. Inquiries should be made to Law School Graduate Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195, U.S.A.; gradlaw@u.washington.edu; 206-543-4937.

Inquiries

Requests for applications and program brochures for all School of Law LL.M. programs except the LL.M. in taxation, as well as information regarding application procedures, should be addressed to Law School Graduate Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195, U.S.A.; gradlaw@u.washington.edu.

Requests for applications and program brochures for the LL.M. in taxation should be addressed to Gloria Strickland, Law School Graduate Tax Admissions, Condon Hall, Box 354600, University of Washington, Seattle, WA 98195; gradlaw@u.washington.edu.

Faculty

Professors

Allen, Craig H. 1994; JD, 1989, University of Washington; marine affairs, evidence, environmental regulation.

Andersen, William * 1964; LLB, 1956, University of Colorado (Denver), LL.M., 1958, Yale University; administrative law, regulated industries, urban government.

Andrews, Thomas R. * 1985; MA, 1973, Northwestern University, JD, 1979, University of Pennsylvania; professional responsibility in legal practice, community property, decedents' estates, torts, proper.

Aronson, Robert H. * 1975; JD, 1973, University of Pennsylvania; evidence, criminal law, professional responsibility, law and literature.

Clarke, Donald C. * 1988; JD, 1987, Harvard University; China, modern Chinese law, corporations and business associations, international trade law.

Emory, Meade 1995; LLB, 1958, George Washington University, LL.M., 1962, Boston University; federal taxation.

Fitzpatrick, Joan M. * 1983; JD, 1975, Harvard University; international human rights and civil rights, federal courts, contracts.

Fletcher, Robert L. * 1956, (Emeritus); LLB, 1947, Stanford University; property.

Hardisty, James * 1970; LLB, 1966, Harvard University; criminal law, psychiatry and law, juvenile courts, torts.

Hazelton, Penny A. * 1985; JD, 1975, Lewis and Clark College, MLL, 1976, University of Washington; law librarianship, legal bibliography, computer-assisted legal research, law, Indian law.

Hershman, Marc * 1976, (Adjunct); JD, 1967, Temple University, LL.M., 1970, University of Miami (Florida); coastal zone management law.

Hicks, Gregory A. 1984; JD, 1978, University of Texas (Austin); property, environmental law, water law, public lands.

Hjorth, Roland L. * 1964; LLB, 1961, New York University; transnational tax, Common Market, federal taxation.

Hume, Linda S. * 1972; JD, 1970, University of California (Los Angeles); commercial transactions, property, equal rights.

Huston, John * 1967, (Emeritus); JD, 1952, University of Washington, LL.M., 1955, New York University; federal taxation.

Jay, Stewart M. * 1980; JD, 1976, Harvard University; constitutional law, legal history, legal philosophy, federal courts.

Jecker, Nancy A. S. * 1982, (Adjunct); MA, 1982, Stanford University, MA, 1984, PhD, 1986, University of Washington; philosophical and ethical aspects of health care delivery and policy.

Junker, John M. * 1964; JD, 1962, University of Chicago; criminal law and procedure.

Knight, W. H., Jr. 2001; JD, 1979, Columbia University.

Kummert, Richard O. * 1964; MBA, 1955, Northwestern University, LLB, 1961, Stanford University; business planning, corporations, federal tax.

Kuszler, Patricia Carol * 1994; MD, 1978, Mayo Medical School/graduate school, JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.

Loftus, Elizabeth F. * 1973, (Adjunct); PhD, 1970, Stanford University; cognition, memory, eye-witness testimony, psychology and law.

McCann, Michael W. * 1982, (Adjunct); MA, 1976, PhD, 1983, University of California (Berkeley); American government and politics, public law, political theory.

Morris, Arval * 1955, (Emeritus); JD, 1955, University of Colorado (Boulder), LL.M., 1958, Yale University, LL.D., 1972, Colorado College; constitutional law, jurisprudence.

Olswang, Steven G. * 1975, (Adjunct); JD, 1971, University of Illinois, PhD, 1977, University of Washington; law and education.

Peck, Cornelius J. * 1954, (Emeritus); LLB, 1949, Harvard University; administrative law, labor law, torts.

Prosterman, Roy L. * 1965; LLB, 1958, Harvard University; international law.

Rieke, Luvern V. * 1949, (Emeritus); LLB, 1949, University of Washington, LL.M., 1953, University of Chicago, LL.D., 1959, Pacific Lutheran University; contracts, domestic relations.

Rodgers, William H. * 1979; LLB, 1965, Columbia University; legislation, environmental law, resource management, property.

Rombauer, Marjorie D. * 1960, (Emeritus); LLB, 1960, University of Washington; creditor and debtor, personal property.

Schnapper, Eric 1995; MA, 1963, Johns Hopkins University, LLB, 1968, Yale University; constitutional law, civil procedure, civil rights, employment discrimination.

Smith, Charles Z. * 1973, (Emeritus); JD, 1955, University of Washington; evidence, judicial administration.

Stoebuck, William B. * 1967, (Emeritus); MA, 1953, Indiana University, JD, 1959, University of Washington, SJD, 1973, Harvard University; property, land use, legal history.

Taylor, Veronica 2001; LL.M., 1992, University of Washington.

Vaughn, Lea B. * 1984; JD, 1978, University of Michigan; labor law, alternate dispute resolution, civil procedure.

Wolcher, Louis E. * 1986; JD, 1973, Harvard University; contracts, critical legal studies, torts, remedies, philosophy of law.

Zerbe, Richard O. * 1975, (Adjunct); PhD, 1969, Duke University; law and economics, cost-benefit analysis, economic history, environmental regulation.

Associate Professors

Boxx, Karen E. 1996; JD, 1983, University of Washington; decedents' estates, community property.

Kirtley, Alan * 1984; JD, 1972, Indiana University; negotiation, mediation, alternative dispute resolution generally, and clinical legal education.

Maranville, Deborah 1989; JD, 1975, Harvard University; civil clinic, unemployment law, feminist legal theory.

O'Neill, Kathleen M. 1993; JD, 1980, Columbia University; legal research, writing, and analysis.

Takenaka, Toshiko * 1992; LLM, 1990, PhD, 1992, University of Washington; U.S. patent and intellectual property law; international and comparative intellectual property law.

Townsend, Michael E. *; MA, 1978, PhD, 1982, University of Michigan, JD, 1989, Yale University; law and science; intellectual property; use of quantitative methods.

Wiehl, Lis W. * 1993; MA, 1985, University of Queensland (Australia), JD, 1987, Harvard University; criminal law, especially federal prosecution; legal ethics; evidence; trial advocacy.

Assistant Professors

Anderson, Robert T. 2000; JD, 1983, University of Minnesota.

Calandrillo, Steve P. 2000; JD, 1998, Harvard University.

Donaldson, Samuel A. 1995; JD, 1993, University of Arizona, LLM, 1994, University of Florida; taxation.

Mastroianni, Anna C. * 1996; JD, 1986, University of Pennsylvania, MPH, 1997, University of Washington; law, ethics and policy genetics, reproduction, human subjects research.

Nicolas, Peter 2000; MPP, 1992, University of Michigan, JD, 1999, Harvard University.

Ramasastri, Anita G. 1996; MA, 1989, University of Sydney (Australia), JD, 1992, Harvard University; commercial law, legal history, contracts, non-profit organizations.

Walsh, Walter J. 1996; LLM, 1989, Yale University; torts, legal history, European community, constitutional law.

Senior Lecturers

Anderson, Helen A. 1994; JD, 1984, University of Washington; legal research, writing, and analysis.

Gold, Julia Ann 1995; JD, 1983, University of South Carolina; alternative dispute resolution, mediation.

Hotchkiss, Mary A. 1995; JD, 1983, LLM, 1985, George Washington University; legal research, writing, and analysis.

McGinnis, Kathleen M. 1994; JD, 1984, University of California (Berkeley); legal research, writing and analysis.

McMurtrie, Jacqueline 1989; JD, 1983, University of Michigan; criminal law and practice.

Lecturers

Berry, Melissa M. 2000; JD, 1993, Northwestern University; legal research, writing and analysis, administrative law.

Schumacher, Scott A. 2000; JD, 1990, Seattle University; LLM, 1991, New York University; low income tax clinic.

Victoria, Maria de Lourdes 1999; JD, 1992, University of Washington.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For current course descriptions, visit the online course catalog at www.washington.edu/students/crscat/.

LAW 300 Introduction to Law (3-6, max. 5) I&S Understanding the legal system, its functions in the social-economic order, legal reasoning, and the world of legal education and the legal profession. Open to nonlaw students only.

LAW 410 Problems in Professional Responsibility (4) I&S

LAW 415 Criminal Justice (3) I&S Examines pre-trial rights of persons suspected or accused of crime, primarily those rights covered by the Fourth, Fifth, Sixth, and Fourteenth Amendments of the U.S. Constitution.

LAW 422 Copyright (3) I&S

LAW 429 Public Land Law (3) I&S

LAW 440 Legal Issues of Internet Law (3) I&S Introduces the basic legal issues raised by networked digital technologies, such as the Internet. Covers jurisdiction, speech, privacy/access, propriety rights (copyrights, domain names), emerging law, leading policy debates, as well as fundamental Internet technical skills. Offered: S.

LAW 476 International Economic Relations and Trade Policy (3) I&S Consideration of international control of national trade policies and permissible transnational reach of national trade or other regulation. The General Agreement on Tariffs and Trade (GATT) and the international monetary system examined from legal and economic perspective. Examination and comparison of prescriptive jurisdiction to public international law.

LAW 477 Law Literature and Film (2-4, max. 4) I&S/VLPA An examination of literary and cinematic portrayals of and issues important to law, lawyers, and the legal system. Considers both portrayals purporting to depict the legal system as well as works envisioning lawyers and the legal system in a "better world."

First-Year Courses

The courses below are intended for law students; other students are admitted only rarely with special permission of the dean. Only the course titles are given. For complete course descriptions, see the School of Law Bulletin.

LAW A 501- Contracts ([2-8]-, max. 8)

LAW A 502- Civil Procedure I ([2-6]-, max. 6)

LAW A 503- Property I ([2-8]-, max. 8)

LAW A 504- Torts ([2-8]-, max. 8)

LAW A 505- Criminal Law ([2-5]-, max. 5)

LAW A 506- Basic Legal Skills ([1-6]-, max. 6)

LAW A 507 Constitutional Law I: Constitutional Structures of Government (4)

Second- and Third-Year Courses

LAW A 508 Payment Systems (3)

LAW A 509 Administrative Law (3-4, max. 4)

LAW A 510 Sales: A Comparative Perspective (3)

LAW A 511 Transmission of Wealth (5)

LAW A 512 Secured Transactions III (3)

LAW A 513- Creditor-Debtor Law ([2-3]-)

LAW A 514 Corporations (3/4)

LAW A 515 Business Organizations (5)

LAW A 517 Securities Regulations (4)

LAW A 518 Restitution (3)

LAW A 520- Property II ([2-8]-, max. 8)

LAW A 521 Community Property (2/3)

LAW A 522 Copyright (3)

LAW A 523 Real Property Security (3/4)

LAW A 524 Private Land Development (3)

LAW A 525 Water Law (4)

LAW A 526 Copyrights and Trademarks (5)

LAW A 527 Environmental Law: Pollution Control (4)

LAW A 529 Public Land Law (3)

LAW A 530- Basic Income Tax ([2-6]-, max. 6)

LAW A 531 Death and Gift Taxation (2-5, max. 5)

LAW A 532 Taxation of Business Entities (5)

LAW A 534- The Beginning and End of Life: Rights and Choices ([1-4]-)

LAW A 538 Estate Planning Workshop (3-4)

LAW A 539- Medical Ethics and Jurisprudence (3-)

LAW A 540 Land Use Planning (3)

LAW A 543 Business Reorganization Under the Bankruptcy Code (4)

LAW A 545 International Environmental Law (4)

LAW A 546- Patents ([2-4]-, max. 4)

LAW A 547- Critical Perspectives in Law (3-)

LAW A 548- Civil Rights ([2-6]-, max. 6)

LAW A 549 Advanced Legal Research (4)

LAW A 551 Constitution and American Public Education (3-6)

LAW A 552- Antitrust Law and Policy ([2-5]-, max. 5)

LAW A 553 Sex, Gender, Sexuality: Law and Theory (4)

LAW A 554- Labor Relations and the Law ([1-5]-, max. 5)

- LAW A 556- Employment Discrimination ([2-4]-, max. 4)**
- LAW A 557 Foreign Affairs and the Constitution (3)**
- LAW A 558- Jurisprudence and Legal Philosophy ([2-4]-, max. 4)**
- LAW A 561 Law and Economics (4)** Offered: jointly with PB AF 519.
- LAW A 562 Employment Law (3/4)**
- LAW A 563 Urban Government (3)**
- LAW A 564 Legal History (1-4, max. 4)**
- LAW A 565 American Indian Law (4)**
- LAW A 566- Theories of Justice ([2-4]-, max. 4)**
- LAW A 567 Disability Law (3)**
- LAW A 574 The International Legal Process (2-4)**
- LAW A 576 International Economic Relations and Comparative Trade Policy (3/4)**
- LAW A 577 Immigration Law (4)**
- LAW A 578- International Commercial Law ([1-4]-, max. 4)**
- LAW A 579 Child Advocacy (4)**
- LAW A 580 Family Law (4-5)**
- LAW A 581- Washington Constitutional Law Seminar ([1-4]-, max. 4)**
- LAW A 583 Insurance Law (4)**
- LAW A 584 American Public School Law (3)**
- LAW A 585 Admiralty (4)**
- LAW A 586 Secured Transactions IV (4)**
- LAW A 590 Constitutional Law: Equal Protection, Fundamental Rights, and Due Process of Law (4)**
- LAW A 591 Constitutional Law: Freedom of Expression (4)**
- LAW A 592- Constitutional Law II: The Fourteenth and First Amendments—Equal Protection, Fundamental Rights, Due Process of Law, Freedom of Expression and Religion ([2-8]-, max. 8)**
- LAW A 594 International and Comparative Intellectual Property Law (2)**
- LAW A 596- Law, Medicine, and Health Care Delivery ([1-4]-, max. 4)**
- LAW A 597 Fundamentals of Health Law (4)**
- LAW A 598 Legal Research I (3)** Offered: jointly with LIS 591.
- LAW A 599 Legal Research II (4)** Offered: jointly with LIS 592.
- LAW B 500 Civil Procedure II (3)**
- LAW B 503- Evidence ([2-6]-, max. 6)**
- LAW B 504 Law, Medicine, and Ethics in the Context of Pain Management (2)**
- LAW B 505 Medical Malpractice (3)**
- LAW B 506- Conflicts of Laws ([2-6]-, max. 6)**
- LAW B 507 Federal Courts and the Federal System (3/4)**
- LAW B 510- Problems of Professional Responsibility (2-4, max. 4)**
- LAW B 511- Seminar on Problems in International Environmental Law ([1-4]-, max. 4)**
- LAW B 513 Evidence IV (4)**
- LAW B 514 Street Law ([1-8]-, max. 8)**
- LAW B 515 Criminal Procedure (5)**
- LAW B 516- International Contracting: Negotiations and Drafting ([2-4]-, max. 4)** Credit/no credit only.
- LAW B 517- Juvenile Justice Seminar ([1-6]-, max. 6)**
- LAW B 519 Pre-Trial Practice (3)**
- LAW B 520- Trial Advocacy ([2-6]-, max. 6)** Credit/no credit only.
- LAW B 521- Appellate Advocacy ([1-3]-, max. 3)** Credit/no credit only.
- LAW B 522 Mediation of Disputes (3)** Credit/no credit only.
- LAW B 523 Negotiation (4)** Credit/no credit only.
- LAW B 525 Alternative Dispute Resolution (3)** Credit/no credit only.
- LAW B 526 Mediation Clinic (1-7, max. 7)** Credit/no credit only.
- LAW B 527 Criminal Law Clinic (8)** Credit/no credit only.
- LAW B 528 Unemployment Clinic (2-8, max. 8)** Credit/no credit only.
- LAW B 529 Advanced Environmental Law and Practice (1-4, max. 4)**
- LAW B 530 Judicial Externship (1-15, max. 15)**
- LAW B 531- Immigration Law Clinic ([1-8]-, max. 8)** Credit/no credit only.
- LAW B 532- Supervised Analytic Writing ([1-3]-, max. 3)**
- LAW B 533 Interviewing and Counseling for Lawyers (2/3)** Credit/no credit only.
- LAW B 534- Affordable Housing Development Clinic ([1-12]-, max. 12)**
- LAW B 535 Legislative Externship (1-15, max. 15)** Credit/no credit only.
- LAW B 536 Drafting Basic Business Documents (1-3, max. 3)-**
- LAW B 537- Refugee Advocacy Clinic ([1-12]-, max. 12)** Credit/no credit only.
- LAW B 538 Agency Externships (1-15, max. 15)** Credit/no credit only.
- LAW B 539 Public Interest Law Externship ([1-15]-, max. 15)** Credit/no credit only.
- LAW B 545 Survey of American Law and Practice (6)** Credit/no credit only.
- LAW B 560 Criminal Justice Externship (1-15, max. 15)** Credit/no credit only.
- LAW B 593 Natural Resources Commons Property (3)**
- LAW E 500 Advanced Writing Project (1-3, max. 3)**
- LAW E 502 White Collar Crime (4)**
- LAW E 503 Analytic Writing (3)**
- LAW E 504 Emerging Issues in Urban Government Seminar (6)**
- LAW E 505 Frontiers of Tort Law (3)**
- LAW E 506 Asian Contract Law and Practice (3)**
- LAW E 507 Access to Justice Seminar (2)** Credit/no credit only.
- LAW E 509 European Union Law (3)**
- LAW E 512 Law, Globalization, and Multinational Corporations (3)** Offered: jointly with SIS 562.
- LAW E 514 The Law of Nonprofit Organizations (4)**
- LAW E 515 Criminal Justice (3)**
- LAW E 516- Advanced Criminal Procedure (5)**
- LAW E 517- Foreign Trade and Investment Law of the People's Republic of China (1-4, max. 4)** Offered: jointly with SISEA 517.
- LAW E 519 Philosophy of Law (4)**
- LAW E 521 Advanced Trial Advocacy (3)**
- LAW E 523 Intellectual Property Law Clinic (3)**
- LAW E 524- Child Advocacy Clinic ([6-12]-, max. 12)** Credit/no credit only.
- LAW E 525 Poverty Law (4)**
- LAW E 527 Driving While License Suspended Impoundment Clinic (3)**
- LAW E 528- Appellate Advocacy Clinic (2-, max. 4)**
- LAW E 531 Basic Income Tax Concepts (3)**
- LAW E 536 Practical and Professional Responsibility Issues in the Small or Solo Law Practice (2)** Credit/no credit only.
- LAW E 537 Refugee Law (2)**
- LAW E 540 Legal Issues of Internet Law (3)**
- LAW E 541 Internet Law and Commerce (3)**
- LAW E 547 Legal Protection for Computer Software (3)**
- LAW E 548 Litigation Strategies in Technology Protection (3)**
- LAW E 550 Patent Prosecution (4)**
- LAW E 551 Representing Start-ups (2)**
- LAW E 552 Strategic Technology Licensing (3)**
- LAW E 558 Law of Democracy: Voting Rights and Election Law (3)**
- LAW E 560 Advanced Health Law (3)**
- LAW E 562 Legal, Ethical, and Social Issues in Public Health Genetics (3)** *Kuszler, Mastroianni* Offered: jointly with PHG 512/MHE 514.
- LAW E 563 Mental Health and the Law (3)**
- LAW E 564 Genetics and the Law (2)** *Kuszler* Offered: jointly with PHG 523.
- LAW E 565 Health and Human Rights (2)**
- LAW E 568- Indian Law Clinic (4, max. 12)**
- LAW E 570 Biotechnology and the Law (3)**
- LAW E 575 Telecommunications Law and Policy (2)**
- LAW E 577 Drafting Technology Contracts (3)**

LAW E 579 International and Foreign Law Research (2)

LAW E 582 Information Policy: Domestic and Global (5)

Asian and Comparative Law

LAW B 540 Law in East Asia: Japan (4) Offered: jointly with SISEA 540.

LAW B 541 Law in East Asia: China (3) Offered: jointly with SISEA 543.

LAW B 542 Law in East Asia: Korea and Southeast Asia (3)

LAW B 543 Intellectual Property Law in East Asia (3)

LAW B 544- Transnational Litigation: United States-Japan ([2-4]-, max. 4)

LAW B 546- United States-Japanese Corporate Relations ([2-4]-, max. 4)

LAW B 550- Legal Analysis and Research for Students Not Trained in the Common-Law System ([1-4]-, max. 4)

LAW B 551- Comparative Law Seminar ([2-6]-, max. 6)

LAW B 552- Tutorial in Comparative Law ([1-4]-, max. 4)

LAW B 555 Roman Law (3)

LAW B 556 Islamic Law (3) Offered: jointly with NEAR E 524.

LAW B 559 Comparative Law: Europe, Latin America, and East Asia (4)

Law and Marine Affairs

LAW B 561 International Law of the Sea (4) Offered: jointly with SMA 506.

LAW B 562 Quantitative Methods (4)

LAW B 563- Ocean Policy and Resources Seminar (3-)

LAW B 565 U.S. Coastal and Ocean Law (4) *Allen* Offered: jointly with SMA 515.

Seminars

LAW B 567 General Externship Perspectives Seminar (2) Credit/no credit only.

LAW B 577- Law, Literature and Film ([2-4]-, max. 4)

LAW B 578- Seminar on Legal Problems of Economic Development ([1-6]-, max. 6)

LAW B 580 Externship Tutorial (2) Credit/no credit only.

LAW B 584- Indian Law Seminar ([2-6]-, max. 6)

LAW B 589- Intellectual Property Law Seminar ([1-4]-, max. 4)

LAW B 590 The United States Constitution: Past, Present, and Future (2)

LAW B 596- International Protection of Human Rights Seminar (2-, max. 4)

LAW B 597- History of the Formation of the United States Constitution Seminar ([2-6]-, max. 6)

LAW B 598- Advanced Research and Writing in Property Seminar ([1-4]-, max. 4)

LAW B 599 Special Topics (1-12, max. 12)

LAW 600 Independent Study or Research (*)

LAW 800 Doctoral Dissertation (*)



School of Medicine



General Catalog Web page:
www.washington.edu/students/genocat/academic/School_Medicine.html



School Web page:
www.washington.edu/medical/som/

Dean

Paul G. Ramsey
 C314 Health Sciences

Associate Deans

Scott Barnhart
 Albert J. Berger
 John B. Coombs
 Robert J. Gust
 D. Daniel Hunt
 Eric B. Larson
 Richard A. Molteni
 Thomas E. Norris
 Gordon A. Starkebaum
 Andrew A. Ziskind

Assistant Deans

Carol F. MacLaren
 Susan G. Marshall
 Werner E. Samson

WWAMI Coordinators/Assistant Deans

Raymond P. Bailey, University of Alaska (interim)
 James R. Blackman, Boise, Idaho
 Philip D. Cleveland, Spokane, Washington
 Michael B. Laskowski, University of Idaho and Washington State University
 Sylvia J. Moore, University of Wyoming
 Dwight E. Phillips, Montana State University (interim)

Established in 1946, the School of Medicine is the only medical school directly serving the states of Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI). Located in the Warren G. Magnuson Health Sciences Center, the School operates a decentralized program of medical education (WWAMI) via a regional network of teaching affiliates.

The School's basic-science departments provide educational opportunities for students from all schools and colleges within the University. Clinical teaching programs are conducted at the University of Washington Medical Center, Harborview Medical Center, Children's Hospital and Regional Medical Center, and the Veterans Affairs Puget Sound Health Care System, as well as at other clinical affiliates in Seattle and throughout the WWAMI states.

The School admits 178 medical students to its first-year class and has a total enrollment of about 750 students pursuing the Doctor of Medicine degree. The full-time faculty numbers approximately 1,700 members. The affiliated University residency-training network enrolls approximately 900 house officers. Enrollment in the graduate programs in the basic sciences exceeds 500 students, and approximately 800 postdoctoral fellows are enrolled in various advanced training programs. The School has baccalaureate and graduate programs in occupational therapy, physical therapy, prosthetics and orthotics, and medical technology. The School participates in training a broad spectrum of other allied health professionals.

The School is also home for the Physician Assistant Training Program known as MEDEX.

Academic Programs

Doctor of Medicine

Upon completion of the curriculum of the School of Medicine, the M.D. degree is awarded to those candidates who (1) have given evidence of good moral character, (2) have satisfactorily completed the requirements of the curriculum, (3) have fulfilled all special requirements, and (4) have discharged all indebtedness to the University.

MEDEX Northwest Certificate Program

MEDEX Northwest is a program designed to train physician assistants. It provides primary-care, midlevel practitioners by training medical personnel with prior clinical experience. The program is accredited by ARC-PA, the Accreditation Review Commission on Education for the Physician Assistant. MEDEX Northwest places 70 to 75 students annually in a variety of sites in Alaska, Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. Successful completion of the program culminates in the award of a Bachelor of Clinical Health Services degree (see description in the undergraduate program volume) and in a certificate.

MEDEX Northwest is an eight-quarter program. The first four quarters consist of intense clinical and didactic instruction at one of three training locations: Seattle, Spokane, or Yakima. The final four quarters are spent in clinical experiences throughout the WWAMI region. The first five months are spent in a variety of inpatient and outpatient clinical rotations and the last five months are spent in a family-practice preceptorship. The preceptorship is an on-the-job experience tailored to the practice of individual primary-care physicians and emphasizes diagnosis and treatment. At the completion of the program, students are eligible to sit for the national certifying examination for physician assistants.

Special Requirements

Applicants must have a minimum of two years of recent, full-time, hands-on experience in the direct delivery of medical care to patients, or current professional credentials and at least two years of recent experience in an allied health field. Applicants must have completed two college-level English courses (at least one must be in composition), human anatomy and physiology course work totaling at least 10 quarter-credit hours, and at least one science course in a discipline relevant to medicine, such as biology or chemistry. English prerequisite courses must have been taken in a college or university in the United States, Canada, the United Kingdom, Australia, New Zealand, or Ireland. All academic prerequisites must have been awarded with college-level credit with grades of 2.7 (B-) or better.

For additional information, contact MEDEX Northwest Physician Assistant Program, Box 354725; 206-598-2600. Web site: www.washington.edu/medical/som/depts/medex/. Email: medex@u.washington.edu.

Master of Occupational Therapy

The Department of Rehabilitation Medicine offers graduate degrees in occupational therapy. The curriculum provides professional training in the health sciences and in the theory and practice of occupational therapy as it impacts *occupational performance* across the life span and in the various arenas of practice. Occupational therapy addresses daily living skills including self-care, work, and leisure/play.

Information concerning admission to the occupational therapy program appears under Rehabilitation Medicine in this catalog.

Master of Physical Therapy

The Department of Rehabilitation Medicine offers graduate degrees in physical therapy. The curriculum provides professional education in the basic sciences and in the clinical use of physical therapy evaluation and management strategies in the treatment or prevention of neuromusculoskeletal dysfunction. Information concerning admission to the physical therapy program appears under Rehabilitation Medicine in this catalog.

Master of Science and Doctor of Philosophy

Work leading to master's and doctoral degrees is offered, in accordance with the requirements of the Graduate School, in the departments of Biochemistry, Bioengineering, Biological Structure, Immunology, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Laboratory Medicine, Medical History and Ethics, and Rehabilitation Medicine. Students may work toward these degrees concurrently with the M.D. degree, taking additional years beyond the typical four-year medical curriculum.

Concurrent degrees are possible in many other departments and colleges of the University. Recent graduates have pursued concurrent degrees in the basic sciences of medicine and the School of Public Health and Community Medicine. A student who intends to work toward a graduate degree should confer with the chairperson of the department in which graduate study is to be pursued and with the Associate Dean for Academic Affairs of the School of Medicine. Specific requirements for admission to work for advanced degrees appear in the Graduate School section of this catalog. Permission to pursue advanced degrees is granted to medical students only if they are progressing normally in the medical curriculum and show evidence of being able to take on this additional work load.

Doctor of Medicine

Admissions

(These procedures and policies described are subject to change. Information regarding changes is available from the School of Medicine Admissions Office.)

Selection Factors

Candidates for admission to the University of Washington School of Medicine are considered comparatively on the basis of academic performance, motivation, maturity, personal integrity, and demonstrated humanitarian qualities. A knowledge of and exposure to the needs of individuals and society and an awareness of health-care delivery systems are desired. Extenuating circumstances in an applicant's background are evaluated as they relate to these selection factors.

Applicants must submit scores from the Medical College Admission Test (MCAT). This exam must be taken no later than autumn of the year before matriculation and cannot be more than three years old at the time of matriculation. MCAT registration blanks are available through premedical advisers or through the Office of Admissions. Under exceptional circumstances, to be determined by the Admissions Committee, the GRE may be considered during the admissions process; however, if accepted, the appli-

cant will be required to take the MCAT prior to matriculation.

The following science course requirements must be completed before matriculation but preferably should be completed by the time of application: A total of 32 semester hours or 48 quarter hours of undergraduate courses divided into (a) *Chemistry*, 12 semester/18 quarter hours, which can be satisfied by taking any combination of inorganic, organic, biochemistry, or molecular biology courses; (b) *Physics*, 4 semester/6 quarter hours; (c) *Biology*, 8 semester/12 quarter hours; and (d) *Other ("open") science subjects*, 8 semester/12 quarter hours, which can be met by taking other courses in any of the three categories above.

Under exceptional circumstances certain course requirements may be waived for individuals who present unusual achievements and academic promise. All candidates must demonstrate substantial academic ability in their major field as well as in the required courses. Candidates should be proficient in the use of the English language and basic mathematics and are expected to have a basic understanding of personal computing and information technologies. In the field of biochemistry/molecular biology, applicants should know the chemical nature of DNA, RNA, genes, and in general how genes are organized in chromosomes; understand the nature of eukaryotic DNA replication; be familiar with transcription of genes and intron splicing; have an overview of the mechanism of protein synthesis; understand principles of recombinant DNA technology (e.g., restriction endonucleases, PCR, southern blots, transformation); understand pH, pKa, and buffers; understand how proteins fold and how ligand binding and enzymatic activity depend upon three-dimensional folding; understand principles of enzyme kinetics (Km, Vmax, competitive inhibition, allostery, and regulation by phosphorylation); understand principles of energetics (e.g., free energy change, equilibrium constants, concentration gradients, and redox potentials); understand glycolysis, the TCA cycle, and how ATP is produced by oxidative phosphorylation; be familiar with how fatty acids are oxidized and synthesized; be familiar with patterns of amino acid catabolism and the urea cycle; understand the nature of phospholipids, lipid bilayers, and membranes; and have an overview of nucleotide biosynthesis. All of this is generally covered in a beginning biochemistry course.

Those students who entered in the fall of 2001 had a mean GPA of 3.64 and the following mean MCAT scores: Verbal, 10.0; Physical Science, 10.5; Biological Science, 10.7; and a median Writing Sample of Q.

Completion of three years of course work at an accredited college or university is the minimum required before possible matriculation; however, all entrants in recent years have earned bachelor's degrees. No specific major is advised. A broad background in the humanities and liberal arts is encouraged, indeed expected.

Application Procedure

The University of Washington participates in the American Medical College Application Service (AMCAS). The deadline for submitting an application to AMCAS is November 1. After receiving the application from AMCAS, the School of Medicine will ask qualified individuals to submit a \$35 application fee and supplemental application materials. Every attempt will be made to notify applicants of the final action by the end of March of the year of matriculation.

Residents of the states of Washington, Wyoming, Alaska, Montana, or Idaho are eligible to apply. Individuals with a demonstrated interest in research may apply for the M.D./Ph.D. program (MSTP)

regardless of residency. Applicants from outside this five-state region who come from disadvantaged backgrounds or who have demonstrated a commitment to serving underserved populations will be considered. Foreign applicants, in addition to the above requirements, must also have a permanent-resident visa. Applications will not be considered from persons who have failed to meet minimum standards in another medical or dental school.

The deadline for submitting the additional application materials is January 15. These supplemental materials include:

1. A supplemental application form. This will be sent to qualified applicants after the School of Medicine has received the AMCAS application.
2. A 300-word autobiographical statement in which the candidate describes the origin and development of his or her motivation to be a physician and any other issues of importance to the candidate. The applicant may request that the Personal Comments section of the AMCAS application be used to fulfill this requirement.
3. A concise statement, not exceeding 200 words, as to why the candidate wants to attend the University of Washington School of Medicine.
4. A premedical-committee letter of recommendation or three letters from instructors from whom the candidate has taken courses. These letters should be critical evaluations of the candidate's academic ability, strengths and weaknesses, the difficulty of course work undertaken, motivation for medicine, personal maturity, and special attributes and assets.
5. A \$35 fee. This will automatically be waived for those who have qualified for AMCAS fee waivers. Others seeking a waiver of this fee should submit their requests directly to the School of Medicine Admissions Office.
6. Acknowledgment of having read, understood, and of being able to meet, with or without reasonable accommodation, the Essential Requirements of Medical Education at the University of Washington School of Medicine: Admission, Retention and Graduation Standards to be sent with the supplemental application form.
7. Conviction/Criminal History Information Form. Washington state law requires that all individuals who have access to children under 16 years of age, developmentally disabled people, and other vulnerable persons, disclose background information concerning crimes and offenses against these populations.

Candidates from Wyoming, Alaska, Montana, and Idaho will be required to submit residency certifications from their respective state certifying officers. Proof of legal residence for Washington residents also may be requested. Determination of state of legal residence is not made by the School of Medicine; specific instructions regarding this requirement are furnished at the time of application. Those who enter as residents of Wyoming, Alaska, Montana, and Idaho are expected to spend their first year at the university site in their particular state. Twenty Washington students begin their medical education by spending the first year at Washington State University. Offers of acceptance, therefore, are conditional upon agreement to participate in the WWAMI Program.

Inquiries, address changes, or other information regarding the application should be transmitted in writing and directed to the Committee on Admissions, Office of Admissions, Box 356340, School of Medicine, University of Washington, Seattle, Washington 98195-6340; or email askuwsom@u.washington.edu.

Office of Multicultural Affairs

The Office of Multicultural Affairs assists students from minority or disadvantaged backgrounds who are pursuing M.D. or M.D.-Ph.D. degrees. The program nurtures interests in medical careers by providing a variety of support services and enrichment activities in the areas of recruitment, education, admission, retention, and professional development. The School actively recruits applicants from disadvantaged backgrounds or those who have a demonstrated commitment to work with underserved populations. Students should contact the Office of Multicultural Affairs for assistance during the application process. The program offers counseling and advocacy, referrals to University and community resources, tutoring, financial-aid information, and numerous opportunities to interact with other minority health-care professionals within the community. Various student organizations also provide minority medical students a means to interact socially and pursue shared interests, to offer peer support, and to assist with community-outreach activities.

U-DOC is a high-school summer-enrichment program offered by the Office of Multicultural Affairs. It is a six-week program for students who have completed their junior year in high school. U-DOC's goal is to foster, affirm, and encourage high school students' interest in the medical profession by allowing them to further explore medical careers and to obtain a valuable introduction to college life. U-DOC is offered in each of the five WWAMI states.

The Western Consortium Minority Medical Education Program (MMEP) offers undergraduate and some qualified postbaccalaureate students a six-week summer academic-enrichment program that includes biology, chemistry, physics, communications, study skills, and MCAT preparation. Structured clinical and research activities are also offered. Housing, stipends, and travel assistance are available.

A Prematriculation Program for entering minority or disadvantaged medical students is offered for six weeks during the summer. The program is designed to facilitate students' entry into medical school by providing instruction in histology as well as enrichment activities in areas such as study skills, stress management, test-taking skills, research, clinical practice, and community health. Stipends and travel assistance are available to students who qualify.

During the regular school year, the Office of Multicultural Affairs serves as a support network for both the academic and nonacademic needs of students, and facilitates students' access to the multiple resources in the School of Medicine, the WWAMI region, and the community.

The Native American Center of Excellence was established in 1992 as part of the Office of Multicultural Affairs to encourage Native American students to pursue medicine as a career, to promote research on Native American health issues, and to foster the preparation of Native American students for faculty roles in academic medicine. The Center of Excellence provides educational experiences that integrate western medicine with the Native American way of life, offers a variety of support services to promote the academic development of students, and sponsors a variety of educational opportunities within the Native American community.

Inquiries and requests for additional information may be obtained from the Office of Multicultural Affairs, Box 357430, School of Medicine, University of Washington, Seattle, Washington 98195-7430; 206-685-2489.

Medical Scientist Training (M.D.-Ph.D.) Program

A limited number of highly qualified candidates who wish to pursue both the M.D. and Ph.D. degrees are considered annually. M.D./Ph.D. students are permitted a wide choice of research specializations from among numerous disciplines and interdisciplinary areas of biomedical sciences. The program emphasizes continuity of both clinical and basic sciences exposure. Among participating graduate departments and interdepartmental disciplines are biochemistry, bioengineering, chemistry, environmental health, epidemiology, genetics, immunology, microbiology, molecular biotechnology, pathology, pharmacology, physiology and biophysics, and zoology. The participating interdepartmental and affiliate programs are neurobiology and behavior, molecular and cellular biology. Students can also conduct their research at the Fred Hutchinson Cancer Research Center.

Applicants who wish to be considered for the M.D./Ph.D. program must submit the Medical Scientist Training Program application as soon as possible. Both the application and any supplemental material requested must be completed by January 15. Serious consideration is rarely given to applicants with minimal research experience and/or a cumulative GPA of less than 3.50 or MCAT scores of less than 10 in each category.

Applicants should correspond directly with the administrator of the Medical Scientist Training Program:

MSTP
University of Washington
Health Sciences Building, Room I264
Box 357470
Seattle WA 98195-7470
206-685-0762
mstp@pathology.washington.edu
www.pathology.washington.edu/mstp/

Financial Information

Fees and Other Charges

All fees and extra service charges are payable in U.S. dollars and due at the time specified for such fees and charges. The University reserves the right to change any of its fees and charges without notice. Resident tuition for 2001-2002 is \$3,381 per quarter; nonresident tuition is \$8,556 per quarter.

Financial Assistance

Financial aid awards are based on the demonstrated need of the students. All applicants for aid must submit data for an analysis of need using the Free Application for Federal Student Aid (FAFSA). This requires disclosure of financial information from the student and the student's parents. The Federal Direct Stafford Loan (subsidized and unsubsidized), Perkins Loan, and the Primary Care Loan are the primary sources of aid. Loans are also available from the School of Medicine provided students meet the need requirement that is based on both the student's and parents' financial information. Limited amounts of grant funds are available to Washington state residents who meet specific funding criteria.

Scholarships are available through the School of Medicine scholarship fund. These awards vary in amount and require financial information from the student and the student's parents. There is a separate application for the School of Medicine scholarship, which has a May 30 due date.

Financial aid information is distributed to all accepted applicants. The FAFSA form may be obtained at www.fafsa.ed.gov or from the UW Office of Student Financial Aid or the School of Medicine Financial Aid

Office. The deadline for receipt of the financial-aid application by the processor is February 28. Applicants must meet this deadline to be considered for all available aid sources regardless of the status of their admission file. Late applicants are awarded only Stafford and Unsubsidized Stafford loans.

Outside employment is discouraged while the student is enrolled in medical-school course work.

Medical Curriculum

Basic Science Curriculum (124 Credits)

The first two years of the medical-student curriculum is identified as the Basic Science Curriculum. It consists of three phases, or groups, of courses in the human biology series: courses in the sciences basic to medicine, organ systems courses taught by basic and clinical disciplines, and introduction to clinical medicine. The first phase is designed to provide the background in basic disciplines required for the organ-system courses. In the second phase, the student is concerned with learning the normal and pathophysiologic properties of several human organ systems. Emphasis is placed upon correlating these properties with clinical methods of data collection and problem formulation. Students pursue the Introduction to Clinical Medicine course throughout the first two years, learning to interview patients, obtain a medical history, and perform physical examinations.

Students pursue the Basic Science Curriculum during their first two years in the School of Medicine. The academic demands of the Basic Science Curriculum are scaled so that most students also will be able to take elective courses that will broaden the student's background.

First Year

Microscopic Anatomy (Histology)
Gross Anatomy and Embryology
Mechanisms in Cell Physiology
Biochemistry
Systems of Human Behavior I
Cell and Tissue Response to Injury
Microbiology and Infectious Disease
Introduction to Immunology
Head, Neck, Ear, Nose, and Throat
Nervous System
Critical Reading and Evaluation of Medical Literature
Introduction to Clinical Medicine

Second Year

Cardiovascular System
Respiratory System
Principles of Pharmacology I
Endocrine System
Systemic Pathology
Genetics
Skin System
Gastrointestinal System
Epidemiology
Hematology
Musculoskeletal System
Medicine, Health, and Society
Urinary System
Systems of Human Behavior II
Principles of Pharmacology II
Reproduction
Nutrition for Physicians
Introduction to Clinical Medicine

Clinical Curriculum (148 Credits)

The clinical curriculum is pursued in the third and fourth years of medical school. It includes prescribed clerkships to be completed by all students (84 credits or 42 weeks) in family medicine, internal medicine,

obstetrics and gynecology, pediatrics, psychiatry, and surgery, plus clinical selectives (32 credits or 16 weeks) in four clinical areas including clerkships in rehabilitation medicine/chronic care, emergency care/trauma, neurology, and surgery electives. Additional clinical or non-clinical selectives (a minimum of 32 credits or 16 weeks) are also required.

Education in the clinical curriculum utilizes the case-study method. Students gain clinical knowledge and gradually increase their clinical problem-solving abilities while working as junior members of the medical-care team. Each team is headed by a faculty clinician working in one of the medical school-affiliated hospitals or practice units.

Independent Investigative Inquiry

In addition to the basic and clinical curricula, each student must complete 8 credits in independent study and investigation in one or more of the biological, behavioral, sociocultural, or epidemiological sciences basic to medicine, culminating in a written paper. The purpose of this requirement is for the student to gain an understanding of the philosophy and methods of science.

WWAMI Program

The WWAMI Program was initiated in 1971 as an effort to decentralize medical education to provide a broader range of educational opportunities for students, and to address the need for primary-care physicians oriented toward rural practice. It is an integral part of the undergraduate medical curriculum and is a fully accredited program of the School of Medicine. The WWAMI Program is named for the five states (Washington, Wyoming, Alaska, Montana, and Idaho) that share resources and responsibilities in the regional educational program. Funds appropriated to the WWAMI Program by the Wyoming, Alaska, Montana, and Idaho legislatures assure each state of positions for its students in the entering medical class each year.

First-Year Training

In the first year of the WWAMI Program, approximately 40 percent of the students admitted to the University's School of Medicine receive the first year of medical school training at Washington State University, the University of Wyoming, the University of Alaska, Montana State University, or the University of Idaho. Washington State University positions not filled by volunteers are assigned by lottery. Every Washington-resident applicant should recognize the possibility of assignment to Washington State University during the first year. Students from Wyoming, Alaska, Montana, and Idaho attend their home-state institutions. While at one of these institutions, they enroll in prescribed one-year medical school basic-science courses taught by the science faculty and are provided supplemental resources from the University of Washington's School of Medicine faculty. These students join their classmates at the University of Washington's campus in Seattle for the second year of medical studies.

Third- and Fourth-Year Training

At the conclusion of the second year, students enter the portion of the curriculum that is predominantly clinical. Required and selective clerkships are described above. As part of the clinical training, students complete clerkships at the University of Washington, at its affiliated hospitals, or at community clinical units located in the five-state region. During the third and fourth year clerkships, School of Medicine full-time and clinical faculty members provide supervised clinical training in required as well as elective clerkships throughout the WWAMI region.

Enrichment Opportunities

Students may enhance their medical education through a variety of sponsored activities that offer students an opportunity to explore areas of special interest, such as working in rural or urban clinics that serve medically underserved communities, undertaking medical research projects, or participating in an international exchange program with a developing country. Brief descriptions of three of the more formally structured programs follow.

Rural/Underserved Opportunities Program (RUOP)

This program exposes students to rural medicine and utilizes clinical training sites in all five states. For one month during the summer between the first and second years, students work with physicians in small communities, offering a chance to better understand the challenges and opportunities in these settings. Students receive a stipend supported by the Family Health Foundation, the Academy of Family Physicians, Area Health Education Centers, and the School of Medicine.

Medical Student Research Training Program

Research opportunities are offered to UW medical students interested in gaining valuable experience from training in medical research. The purpose of the program is to encourage students to participate in a research project as part of their medical education. This research is planned and carried out under the supervision of a faculty sponsor and is undertaken during the summer between the first and second years. Student trainees in the program receive a stipend supported largely by a special fund from the School of Medicine. The project is twelve weeks, full-time, on a working schedule of forty hours per week, and the student may not be enrolled in courses for credit during this time.

Student Evaluation and Promotion

The awarding of the Doctor of Medicine degree is contingent upon satisfactory completion of academic and noncognitive requirements. The latter includes the acquisition of behavioral patterns and attitudes consistent with the oath that all students take at the time of graduation. As such, student evaluation is based upon the faculty's observation of the student's behavior and conduct as well as papers and examinations. Every student is required to pass Steps 1 and 2 of the United States Medical Licensing Examination, all University of Washington examinations, and complete an approved Independent Investigative Inquiry project before receiving the Doctor of Medicine degree. Periodic reviews of student performance are conducted by the School's Student Progress Committee. Students are informed of their deficiencies and the remedial requirements, if any, for these deficiencies. Dismissal from the School may occur if the student fails to maintain an acceptable academic record, fails to follow academic directives provided by the School's committees, or fails to develop attitudes and behavioral patterns appropriate to a career in medicine.

The Faculty Council on Academic Affairs reviews the Student Progress Committee's actions, and the Dean of the School of Medicine has final approval of the committee's and council's recommendations. A review mechanism is available within this process. Once dismissal or withdrawal from the School has occurred, the student may petition for reinstatement through the Faculty Council on Academic Affairs. Reinstatement will not be considered without substantial evidence that the problems causing the dismissal or withdrawal have been resolved. Only one reinstatement petition through the Faculty Council on

Academic Affairs is allowed. If more than one year elapses after the withdrawal or dismissal, the individual may be required to apply for readmission through the admissions process. If a reinstatement petition is denied by the Faculty Council, the decision is final with no further avenue for review. Subsequent requests for admission must be directed through the standard admissions procedures.

Grading System

The grades awarded in each course in the M.D. curriculum are Honors, Pass, or Fail in the basic-science curriculum, and Honors, High Pass, Pass, or Fail in the clinical curriculum. The School's goal is to provide a curriculum that defines the competencies to be achieved by the student at each level. However, a pattern of documented evaluator concerns about a student's performance may indicate unsatisfactory performance when the record is viewed as a whole, even though passing grades have been assigned. Honors may be awarded in a course on predetermined criteria that may involve additional work in the subject as selected by the student. The grading system precludes the ranking of students in class standing by a grade-point average.

The School of Medicine reserves the right to revise or modify the curriculum, system of evaluation, or graduation requirements.

Honors

A charter as Alpha of Washington was granted to the School of Medicine in 1950 by Alpha Omega Alpha, the honorary medical society. Members are elected by the membership of Alpha Omega Alpha on the basis of high scholarship and good moral character.

Graduation with Honors

A degree of Doctor of Medicine with Honors may be awarded to students with high achievement who, in addition, have demonstrated initiative and success in clinical and scholarly pursuits related to medicine. Candidates for graduation with honors are nominated by the departments each year and are selected on the basis of a review of their academic records by the Honors and Awards Committee.

Graduate Medical Education and Postdoctoral Training

The University of Washington School of Medicine offers a broad array of residency and fellowship programs. Training occurs at the University of Washington Medical Center, Harborview Medical Center, Veterans Affairs Puget Sound Health Care System, Children's Hospital and Regional Medical Center, and other affiliated training sites in Seattle and throughout the WWAMI region. Postdoctoral research fellowship opportunities in the basic sciences are also offered.

Continuing Medical Education

The Office of Continuing Medical Education, School of Medicine, offers a wide variety of courses for physicians and health-care professionals in the Pacific Northwest and throughout the nation.

Offerings include short courses of one to three days, one- to two-week board-review courses, visiting professorships, preceptorships, and mini-residencies. Other offerings include lecture series at hospitals, video-tape presentations, self-directed instructional materials, and other specific courses requested by members of the medical community throughout the

WWAMI region. Information on offerings is available from its Web site at www.uwcme.org.

All physicians also are invited to participate in continuing medical education programs offered by clinical departments, such as grand rounds and regular conference series.

The University of Washington School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. All programs sponsored by the Office of Continuing Medical Education are applicable to physician relicensure requirements of the Washington Board of Medical Examiners and for Category I credit of the Physician's Recognition Award of the American Medical Association. Prescribed credit for the American Academy of Family Physicians and other types of credit are included in the program offerings when appropriate.

Brochures and calendars for courses are available for more detailed information. For information concerning Continuing Medical Education programs, contact:

University of Washington School of Medicine
Office of Continuing Medical Education
Box 358220
1325 4th Avenue, Suite 2000
Seattle, Washington 98101-8220
Telephone: 206-543-1050 or 1-800-869-2633
Email: cme@u.washington.edu
Web site: www.uwcme.org

Anesthesiology

BB1459 Health Sciences

 *General Catalog Web page:*
www.washington.edu/students/gencat/academic/Anesthesiology.html

 *Department Web page:*
depts.washington.edu/anesth/

The Department of Anesthesiology maintains an active program of teaching and research for both the specialist and nonspecialist. Medical students are introduced to the principles of anesthetic management and the effects of anesthetic agents on circulatory and respiratory physiology. The clinical-clerkship program provides basic training in airway management and care of the unconscious patient. A three-year residency program is available for physicians who desire specialty training in anesthesiology. In addition, advanced clinical and research training is offered in several major subspecialty areas (cardiac anesthesia, neuroanesthesia, pediatric anesthesia, obstetrical anesthesia, pain management, and regional anesthesia). Opportunities for collaborative research are available to undergraduate and graduate students. The department conducts a regular series of clinical conferences, didactic lectures, and research seminars. Questions regarding medical student clerkships may be directed to Dr. John Bramhall at 206-231-2847 or bramhall@u.washington.edu. Other training questions may be directed to the Residency Coordinator at 206-543-2773 or lfg@u.washington.edu.

Faculty

Chair

Frederick W. Cheney

Professors

Anderson, Corrie 2001; MD, 1982, Stanford University.

Artru, Alan A. 1980; MD, 1975, Medical College of Wisconsin.

Bashein, Gerard * 1974; PhD, 1969, Carnegie Mellon University, MD, 1974, University of New Mexico; automation techniques in anesthesia, trans-esophageal ultrasonic cardiac assessment.

Bernards, Christopher M. 1988; MD, 1984, Oregon Health Sciences University.

Bishop, Michael J. 1979; MD, 1974, University of California (San Diego).

Bowdle, T. Andrew 1981; MD, 1980, PhD, 1983, University of Washington.

Byers, Margaret R. * 1972, (Research); PhD, 1969, Harvard University; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions.

Cheney, Frederick W. 1967; MD, 1960, Tufts University.

Cullen, Bruce F. 1984; MD, 1966, University of California (Los Angeles).

Domino, Karen B. 1986; MA, 1974, University of New Mexico, MD, 1978, University of Michigan; neuroanesthesia.

Freund, Felix G. 1963, (Emeritus); MD, 1948, University of Buenos Aires (Argentina).

Freund, Peter 1980; MA, 1971, Brown University, MD, 1975, Columbia University; temperature regulation, vasomotor control, physiology/biophysics.

Hornbein, Thomas F. * 1963; MD, 1956, Washington University; physiology, biophysics.

Kharasch, Evan D. * 1984; PhD, 1983, MD, 1984, Northwestern University; clinical pharmacology of anesthetic agents, drug metabolism, and drug interactions.

Lam, Arthur M. 1986; MD, 1974, Western Ontario University (Canada); neuroanesthesia.

Lecky, John H. 1988; MD, 1965, University of Pennsylvania.

Loeser, John D. 1969; MD, 1961, New York University; pain, neurophysiology.

Lynn, Anne 1981; MD, 1975, Stanford University; pediatric anesthesiology.

Mackie, Kenneth P. * 1987; MD, 1984, Yale University; molecular and cell biological studies of cannabinoid receptor signaling.

Martin, Roy W. * 1971, (Research); PhD, 1975, University of Washington; bioinstrumentation, ultrasonic Doppler, echo, tissue characterization, signal processing.

Otto, Catherine M. 1982, (Adjunct); MD, 1979, University of Washington; cardiology.

Pavlin, Edward G. 1973; MD, 1968, University of Manitoba (Canada).

Pearlman, Alan S. 1978, (Adjunct); MD, 1970, Harvard University; cardiology.

Rooke, G. Alec 1982; MD, 1980, University of Washington.

Schwid, Howard A. 1986; MD, 1982, University of Wisconsin.

Su, Judy Y. 1976; PhD, 1968, University of Washington; cardiovascular pharmacology.

Turk, Dennis C. 1996; PhD, 1978, University of Waterloo (Canada); pain control/psychology.

Ward, Richard J. 1963, (Emeritus); MD, 1949, St Louis University.

Zimmerman, Jerry J. 1998; PhD, 1975, MD, 1979, University of Wisconsin; critical-care medicine.

Associate Professors

Buckley, F. Peter 1977; MBBS, 1968, St Bartholomew's Hospital Medicine School (UK).

Chabal, Charles 1985; MD, 1982, University of Pittsburgh.

Chadwick, Heathcliff S. 1980; MD, 1976, University of Oregon.

Chudler, Eric H. 1991; PhD, 1986, University of Washington; nervous system behavior.

Colley, Peter S. 1973; MD, 1967, University of Vermont.

Deem, Steven A. 1992; MD, 1984, Southern Illinois University; critical care.

Edwards, William T. 1990; PhD, 1968, Massachusetts Institute of Technology, MD, 1975, University of Massachusetts; pain management.

Everett, Lucinda 1998; MD, 1982, University of Connecticut; pediatric anesthesiology.

Gavrin, Jonathan R. 1991; MD, 1978, Dartmouth College.

Geiduschek, Jeremy M. 1983; MD, 1983, Vanderbilt University; pediatric anesthesiology.

Jacobson, Louis 1985; MBChB, 1973, University of Capetown (South Africa).

Jardine, David 1987; MD, 1980, Johns Hopkins University; pediatric anesthesiology.

Jonmarker, Christer S. R. 1989; MD, 1975, University of Lund (Sweden).

Karl, Helen W. 1990; MD, 1976, University of Virginia; pediatric anesthesiology.

Martin, Lynn D. 1994; MD, 1982, University of Washington; pediatric anesthesiology.

Orr, Rosemary J. 1975; MBChB, 1967, Queen's University of Belfast (Ireland); pediatric anesthesiology.

Oxorn, Donald C. 1998; MD, 1978, McGill University (Canada).

Pavlin, D. Janet 1975; MD, 1969, University of Manitoba (Canada).

Posner, Karen L. 1990, (Research); PhD, 1990; PhD, 1990, University of Washington; health systems research.

Ross, Brian K. 1983; MS, 1973, Idaho State University, PhD, 1975, University of North Dakota, MD, 1983, University of Washington.

Sharar, Samuel R. 1983; MD, 1983, University of Washington.

Souter, Michael J. 2001; MBChB, 1984, University of Edinburgh (UK).

Terman, Gregory W. * 1987; MA, 1981, PhD, 1985, University of California (Los Angeles), MD, 1987, University of Miami (Florida).

Assistant Professors

Boddu, Krishna 2001; MBBS, 1983, University of Waltair (India).

Bramhall, John S. 1995; PhD, 1976, Aston University (England), MD, 1991, University of California (San Diego).

Dunbar, Peter J. 1991; MBChB, 1978, University of Aberdeen (UK).

Fitzgibbon, Dermot R. 1992; MBChB, 1983, Cork Regional Hospital; pain management.

Lee, Lorri A. 1995; MD, 1989, West Virginia University.

Martay, Kenneth 1999; MD, 1987, University of Freiburg (Germany).

Schenkman, Kenneth A. 1990; MD, 1986, Indiana University; pediatric anesthesia.

Souders, Jennifer E. 1992; MD, 1988, University of Chicago.

Vater, Youri L. 1999; MD, 1977, Riga High Medical School (Latvia).

Vavilala, Monica S. 1994; MD, 1991, University of Texas (Houston).

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

ANEST 498 Undergraduate Thesis (*) *Geiduschek* By special arrangement. Time and credit to be arranged. Offered: AWSpS.

ANEST 499 Undergraduate Research (*) *Geiduschek* Introduction to specific research problems relating to pulmonary, cardiovascular, renal, obstetric, and central nervous system functions, and their alteration by anesthetic techniques and agents. (Six weeks, full-time. Limit: two students.) Offered: AWSpS.

ANEST 501 P-Preceptorship in Anesthesiology (1) *Geiduschek* An opportunity for first- and second-year medical students to gain experience with medical practice situations by observing clinical faculty members in their offices. Prerequisite: permission of instructor. Offered: AWSpS.

ANEST 680 P-Basic Anesthesia Clerkship (4) *Geiduschek* Introduction to the principles of airway management, ventilatory support, use of local anesthetics, techniques of patient monitoring and fluid therapy. Skills taught include airway management, venipuncture, lumbar puncture and endotracheal intubation. Prerequisite: third- or fourth-year student. (Two weeks, full-time. Limit: three to five students each two-week period.) Affiliated hospitals. Offered: AWSpS.

ANEST 681 P-Advanced Clerkship in Anesthesiology (8) *Geiduschek* Clerkship for students desiring greater exposure to anesthesiology as a specialty. Individual programs can be arranged in

the following areas: surgical anesthesia, obstetrical anesthesia, and pain clinic. Prerequisite: Third- or fourth-year student. (Four weeks, full-time. Limit: two students per period.) Affiliated hospitals. Offered: AWSpS.

ANEST 697 P-Anesthesiology Special Electives (*, max. 24) *Geiduschek* Special clerkships, externships, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain a special assignment form from the Dean's office at least one month before advance registration. Prerequisite: permission of instructor. (Four to twelve weeks, full-time.) Offered: AWSpS.

Biochemistry

J405 Health Sciences



General Catalog Web page:
www.washington.edu/students/genocat/academic/Biochemistry.html



Department Web page:
depts.washington.edu/biowww/

Graduate Program Coordinator
J405 Health Sciences, Box 357350
206-543-1660
biocgrad@u.washington.edu

Modern biochemistry involves the study of biological processes at a molecular level. Specific research projects may entail study in such diverse fields as molecular biology, molecular biophysics, genetics, microbiology, immunology, developmental biology, organic chemistry, pharmacology, and physiology. Graduate students enrolled in the Department of Biochemistry engage in studies and research that prepare them for the challenging opportunities open to the professional biochemist/molecular biologist in colleges and universities, research institutes, medical schools and hospitals, government laboratories, and the laboratories of chemical, biotechnology, and pharmaceutical industries.

The course of advanced study is designed to give each student a firm foundation upon which to base further professional progress. In the first year of academic work, students attend courses in biochemistry and molecular biology, and in related fields such as chemistry, biophysics, genetics, cell biology, and microbiology. In the second and succeeding years, an increasing amount of time is devoted to research and independent study. For the Ph.D. degree, each student is required to gain teaching experience, usually during the second year of the graduate program.

An accredited major in biology, chemistry, or biochemistry fulfills admission prerequisites. Students with other majors are required to have completed the following undergraduate courses: two years of chemistry, mathematics through calculus, one year of physics, and at least one year of biology. Experience in a research laboratory during or following baccalaureate study is highly desirable. Applicants must also meet the general admission requirements of the Graduate School.

Normally, all graduate students admitted to the Department of Biochemistry are provided with financial assistance.

Research facilities for the department are housed in the Biochemistry-Genetics Building, which provides approximately 52,000 square feet of excellent research space, conference rooms, and a departmental library. In the immediate vicinity are the departments of Immunology, Genome Sciences, Microbiology, and Pharmacology, as well as pro-

grams in biomolecular structure, molecular medicine, neurobiology, and molecular and cellular biology, with whom the department has common research interests. The laboratories are equipped with modern research equipment and are supported by external, centralized research facilities, which include a modern computer center, the Marine Biology Laboratory at Friday Harbor, and the Health Sciences Library. An emphasis on biomedical research is facilitated by the location of the department within the School of Medicine.

Faculty

Chair

Alan Weiner

Professors

Bornstein, Paul * 1967; MD, 1958, New York University; structure and function of connective tissue macromolecules, wound healing.

Cooper, Jonathan A. * 1987, (Affiliate); PhD, 1976, University of Warwick (UK); regulation of cellular metabolism and proliferation by protein phosphorylation.

Dale-Crunk, Beverly A. * 1972, (Adjunct); PhD, 1968, University of Michigan; keratin biochemistry, epithelial differentiation, antimicrobial peptides.

Davie, Earl Warren * 1962; PhD, 1954, University of Washington; protein synthesis, mechanism of blood clotting, cloning of plasma proteins.

Davis, Trisha Nell * 1987; PhD, 1983, Yale University; control of the cell cycle, chromosome segregation, proteomics.

Eisenman, Robert M. * 1982, (Affiliate); PhD, 1971, University of Chicago; viral oncology, oncogenes, retrovirus multiplication.

Eyre, David R. * 1985, (Adjunct); PhD, 1969, University of Leeds (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism.

Fischer, Edmond H. * 1953, (Emeritus); PhD, 1947, University of Geneva (Switzerland); relationship of protein structure to enzyme activity, hormonal regulation of metabolic processes.

Gelb, Michael H. * 1985, (Adjunct); PhD, 1982, Yale University; mechanistic enzymology, bioorganic and medicinal chemistry.

Glomset, John A. * 1977; MD, 1960, University of Uppsala (Sweden); membrane structure and function.

Gordon, Milton * 1959; PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants.

Hauschka, Stephen D. * 1967; PhD, 1966, Johns Hopkins University; regulation of skeletal muscle differentiation, growth factor-receptor signaling mechanisms.

Hol, Wilhelmus G. J. * 1992; PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Hurley, James Bryant * 1985; PhD, 1979, University of Illinois; molecular basis of vision.

Jensen, Lyle H. * 1949, (Emeritus); PhD, 1943, University of Washington; molecular structure, x-ray diffraction.

Kimelman, David * 1989; PhD, 1985, Harvard University; molecular biology of early development in the frog, *Xenopus laevis*, and the fish, *Danio rerio*.

Klevit, Rachel E. * 1983; DPhil, 1981, Oxford University (UK); protein structure and function; molecular recognition; protein NMR.

Krebs, Edwin G. * 1977, (Emeritus); MD, 1943, Washington University; intracellular signaling mechanisms involving protein phosphorylation.

Loeb, Lawrence A. * 1978; MD, 1961, New York University, PhD, 1967, University of California (Berkeley); DNA replication, cancer and AIDS.

Maizels, Nancy * 2000; PhD, 1974, Harvard University; recombination and repair in mammalian cells, especially activated B cells.

Morris, David R. * 1966; PhD, 1964, University of Illinois; regulation of growth in eukaryotes and prokaryotes, translational control.

Neurath, Hans * 1982, (Emeritus); PhD, 1933, University of Vienna (Austria); structure and functions of proteolytic enzymes, zymogen activation, evolution of proteins.

Palmiter, Richard D. * 1974; PhD, 1968, Stanford University; regulation of gene expression in transgenic mice.

Parson, William W. * 1967; PhD, 1965, Case Western Reserve University; bioenergetics, with particular emphasis on photosynthesis, picosecond spectroscopy.

Reid, Brian R. * 1980; PhD, 1965, University of California (Berkeley); biophysical chemistry, NMR of DNA and tRNA.

Roberts, James Michael * 1989, (Affiliate); PhD, 1984, MD, 1984, Columbia University; regulation of DNA replication by cyclin-kinase complexes.

Saari, John C. * 1974; PhD, 1970, University of Washington; retinal biochemistry.

Teller, David C. * 1965; PhD, 1965, University of California (Berkeley); physical chemistry of macromolecules, protein interactions, X-ray crystallography.

Varani, Gabriele * 2001; PhD, 1987, University of Milan (Italy); physical biophysical.

Walsh, Kenneth A. * 1958, (Emeritus); PhD, 1959, University of Toronto (Canada); structure and functions of proteins, zymogens, and proteases.

Weiner, Alan * 2000; PhD, 1973, Harvard University; genome structure, function of small nuclear and cytoplasmic RNA species, CCA-adding enzyme.

Young, Elton * 1969; PhD, 1967, California Institute of Technology; regulation of gene activity in the yeast *Saccharomyces cerevisiae*.

Associate Professors

Baker, David * 1993; PhD, 1989, University of California (Berkeley); protein folding, genomics.

Daggett, Valerie D. * 1993, (Adjunct); PhD, 1990, University of California (San Francisco); molecular modelling studies of peptides and proteins.

Hahn, Steven M. * 1994, (Affiliate); PhD, 1984, Brandeis University; transcription initiation in yeast.

Merritt, Ethan A. * 1989; PhD, 1980, University of Wisconsin; x-ray crystallography, structure-based drug design, and structural genomics.

Muller, Eric D. * 1988; PhD, 1981, Yale University; proteomics and cell biology in yeast.

Roth, Mark * 1994, (Affiliate); PhD, 1988, University of Colorado (Boulder); nuclear proteins involved in the regulation of gene expression.

Ruohola-Baker, Hannele * 1993; PhD, 1989, Helsinki University (Finland); oogenesis, developmental genetics.

Stenkamp, Ronald E. * 1978, (Adjunct); PhD, 1975, University of Washington; crystallography, metallo-proteins, protein engineering, blood clotting proteins.

Stoddard, Barry L. * 1994, (Affiliate); PhD, 1990, Massachusetts Institute of Technology; physical and structural studies of biological macromolecules.

Verlinde, Christophe L. M. J. * 1992; PhD, 1988, Catholic University of Leuven (Belgium); structure-based drug design and protein crystallography.

Assistant Professors

Beeson, Craig C. * 1996, (Adjunct); PhD, 1993, University of California (Irvine); the chemistry and biochemistry of the immune system, regulation of energy metabolism.

Ferre-D'Amare, Adrian Riu * 1999, (Affiliate); PhD, 1994, Rockefeller University; structural biology of RNA, X-ray crystallography, biological catalysis.

Kennedy, Brian K. * 2001; PhD, 1996, Massachusetts Institute of Technology; cancer and control of DNA replication.

Tsukiyama, Toshio * 1999, (Affiliate); PhD, 1991, University of Hiroshima (Japan).

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

BIOC 405 Introduction to Biochemistry (3) NW *Daum, Teller, Wiseman* Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of biologically important molecules. Suitable for pre-majors, for students interested in careers in medicine, dentistry, pharmacy, medical technology. Prerequisite: BIOL 200; either BIOL 201 or both BIOL 101 and GENET 371; either CHEM 223, CHEM 237, or CHEM 335. Offered: A.

BIOC 406 Introduction to Biochemistry (3) NW *Hurley, Petra* Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of biologically important molecules. Suitable for pre-majors, for students interested in careers in medicine, dentistry, pharmacy, medical technology. Prerequisite: BIOC 405. Offered: W.

BIOC 426 Basic Techniques in Biochemistry (4) NW *Chung, Petra* Introduction to basic biochemistry experiments. Acquaints students (largely Biochemistry majors) with basic biochemical laboratory techniques. Prerequisite: BIOC 440, which may be taken concurrently. Offered: ASp.

BIOC 440 Biochemistry (4) NW *Davis, Klevit* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: either 2.0 in BIOL 201 or both 2.0 in BIOL

180 and 2.0 in BIOL 200; either CHEM 224, CHEM 239, or CHEM 337. Offered: A.

BIOC 441 Biochemistry (4) NW *Gordon, Young* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: 1.7 in BIOC 440. Offered: W.

BIOC 442 Biochemistry (4) NW *Kimelman, Palmiter* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: either 1.7 in BIOC 406 or 1.7 in BIOC 441. Offered: Sp.

BIOC 496 Research Seminar for Undergraduates (1, max. 2) NW formal presentations of student research. One credit applies to research component of a relevant major. Credit/no credit only. Prerequisite: either BIOC 396 or CHEM 396. Offered: jointly with CHEM 496; Sp.

BIOC 498 Undergraduate Thesis (*) For senior medical students. Offered: AWSpS.

BIOC 499 Undergraduate Research (*) Investigative work on enzymes, proteins, lipids, molecular biology, developmental biology, intermediary metabolism, physical biochemistry, and related fields. Credit/no credit only. Offered: AWSpS.

BIOC 515-519 (For description, see listing for "Current Literature Conferences" at the end of this section.)

BIOC 520 Seminar (1) Seminar dealing with timely topics in the field of biochemistry. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

BIOC 525-529 (For description, see listing for "Current Literature Conferences" at the end of this section.)

BIOC 530 Advanced Biochemistry (3) Baker, Gelb, Hol, Klevit, Stenkamp, Stoddard Graduate-level discussion of the structure, function, and chemistry of proteins, control of enzymatic reactions. Prerequisite: a comprehensive course in biochemistry and permission. Offered: A.

BIOC 533 Topics In Biochemistry (1, max. 30) *Daum, Davie, Fischer* Provides in-depth examination of current topics in biochemistry, molecular biology, and structural biology. Designed to help participants in basic science departments become acquainted with latest ideas on selected topics. Emphasis on analysis of key concepts in the field with reference to classical papers and recent literature. Prerequisite: permission of instructor. Offered: AWSp.

BIOC 534 Topics In Molecular Biophysics (1.5) *Parson* Emphasis on methods used to study macromolecular structure and dynamics, including x-ray crystallography, NMR, optical spectroscopy, computer modeling, protein folding and ligand binding. Two topics covered each quarter; students may register for one or both. Prerequisite: permission of instructor. Offered: AWSp.

BIOC 535-539 (For description, see listing for "Current Literature Conferences" at the end of this section.)

BIOC 540 Literature Review (2) *Parson* Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: jointly with BMSD 540 A.

BIOC 541 Literature Review (2) *Palmiter* Emphasizes critical evaluation of original articles in

the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: W.

BIOC 542 Literature Review (2) *Morris* Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: Sp.

BIOC 546-548 (For description, see listing for "Current Literature Conferences" at the end of this section.)

BIOC 555-559 (For description, see listing for "Current Research Conferences" at the end of this section.)

BIOC 565-569 (For description, see listing for "Current Research Conferences" at the end of this section.)

BIOC 575-579 (For description, see listing for "Current Research Conferences" at the end of this section.)

BIOC 581 Introduction to Biochemical Research (4, max. 16) Student works with one of the research groups within the department for one quarter and then rotates to other laboratories for second and third quarters. Credit/no credit only. Prerequisite: graduate standing in biochemistry or permission of instructor. Offered: AWSpS.

BIOC 586-588 (For description, see listing for "Current Research Conferences" at the end of this section.)

BIOC 600 Independent Study or Research (*) Offered: AWSpS.

BIOC 700 Master's Thesis (*) Offered: AWSpS.

BIOC 800 Doctoral Dissertation (*) Offered: AWSpS.

Current Literature Conferences

BIOC 515-519, 525-529, 535-539, 546-548 Current Literature Conference in Biochemistry Weekly literature reviews of topics pertinent to ongoing research in biochemistry. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. (Only 25 credits may be counted toward degree.)

BIOC 515 Matrix Macromolecules in Morphogenesis and Development (1, max. 30) *Bornstein* Offered: AWSp.

BIOC 516 Molecular Mechanisms of Blood Clotting (1, max. 30) *Davie* Offered: AWSp.

BIOC 517 Protein Structure (1, max. 30) *Baker* Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 518 Signaling in Development (1, max. 30) *Ruohola-Baker* Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 525 Phytoremediation (1, max. 4) *Gordon* Literature survey of phytoremediation topics. Discussion of latest techniques for the use of plants to concentrate heavy metals in the soil and of plants and plant-bacteria combinations to detoxify various organic contaminants. Credit/no credit only. Offered: AWSpS.

BIOC 526 Control of Growth and Differentiation During Development (1, max. 30) *Hauschka* Credit/no credit only. Offered: AWSpS.

BIOC 528 Signal Transduction (1, max. 30) *Hurley* Credit/no credit only. Offered: AWSp.

BIOC 529 Molecular Biology of Early Development (1, max. 30) *Kimelman* Offered: AWSpS.

BIOC 535 Macromolecular Structure (1, max. 30)
Klevit Offered: AWSp.

BIOC 536 Control of Cell Growth (1, max. 30) *Morris*
Offered: AWSp.

BIOC 537 Regulation of Gene Expression (1, max. 30)
Palmiter Offered: AWSpS.

Current Research Conferences

BIOC 555-559, 565-569, 575-579, 586-588 Current Research Conferences in Biochemistry Weekly group conferences concerning ongoing graduate student and postdoctoral research in biochemistry. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. (Only 25 credits may be counted toward degree.)

BIOC 555 Cell and Molecular Biology of Connective Tissue Proteins (1, max. 30) *Bornstein*
Offered: AWSpS.

BIOC 556 Enzymatic and Genetic Aspects of Blood Clotting (1, max. 30) *Davie* Offered: AWSp.

BIOC 557 Growth Regulation by Calcium Binding Proteins (1, max. 30) *Davis* Offered: AWSpS.

BIOC 559 Membrane Biochemistry and Cell Growth (1, max. 30) *Glomset* Offered: AWSpS.

BIOC 560 Protein Folding (1, max. 30) *Baker*
Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 561 Origin of Polarity (1, max. 30) *Ruohola-Baker*
Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 565 Plant Molecular Genetics (1, max. 30)
Gordon Offered: AWSpS.

BIOC 566 Growth and Differentiation of Skeletal and Cardiac Muscle (1, max. 30) *Hauschka* Offered: AWSpS.

BIOC 568 Molecular and Genetic Aspects of G Protein Signal Transduction (1, max. 30) *Hurley*
Offered: AWSpS.

BIOC 569 Inductive Events in Early Development (1, max. 30) *Kimelman* Offered: AWSpS.

BIOC 575 NMR Analysis of Proteins and Nucleic Acids (1, max. 30) *Klevit* Offered: AWSp.

BIOC 576 Sequential Analysis of Growth Regulation (1, max. 30) *Morris* Offered: AWSpS.

BIOC 577 Gene Regulation in Transgenic Mice (1, max. 30) *Palmiter* Offered: AWSpS.

BIOC 578 Electron Transport in Photosynthesis (1, max. 30) *Parson* Offered: AWSp.

BIOC 588 Molecular Biology of Yeast Gene Regulation (1, max. 30) *Young* Offered: AWSpS.

major advances that are revolutionizing the health-care system. The Department of Bioengineering, housed jointly in the School of Medicine and the College of Engineering, provides a comprehensive, multidisciplinary program of education and research, and is recognized as one of the finest bioengineering programs in the world. Programs of study lead to the Bachelor of Science, Master of Science, and Doctor of Philosophy degrees. Major areas of research and education include distributed diagnosis and home healthcare (D2H2), molecular bioengineering and nanotechnology, engineered biomaterials and tissue engineering, medical imaging and image-guided therapy, and computational bioengineering. Detailed information on Bioengineering appears in the Interschool or Intercollege Programs section of this catalog.

Biological Structure



General Catalog Web page:
www.washington.edu/students/genecat/academic/Biological_Structure.html



Department Web page:
www.biostr.washington.edu/

Graduate Program Coordinator
G514 Health Sciences, Box 357420
206-543-5474

The Department of Biological Structure offers graduate programs of study leading to the Master of Science and Doctor of Philosophy degrees. The department promotes an understanding of biological processes through the study and analysis of structure-function relationships. The research problems that interest members of the faculty are diverse, including cellular differentiation and development explored in a variety of biological systems, neuroscience, molecular biophysics, biomolecular structure, and quantitative biology with an emphasis on computer-graphic representations of biological structures. This diversity creates a lively atmosphere in the department that provides a stimulating environment for the training of scientists with a variety of backgrounds.

The department's graduate program is directed toward the education of doctoral students who anticipate careers that will involve teaching or research in the biomedical sciences. Graduates from the program have a broad knowledge of biological structure at all levels, from the molecular to the human anatomical, with a major emphasis on the cellular level.

Graduate students select research and teaching options in their program. The research options are designed to provide training for a student in one or two of the following areas: cell and developmental biology, neurobiology, quantitative biology, cellular immunology, molecular biology, and macromolecular structure. Teaching options prepare the student to teach in one of the anatomical subdisciplines: human anatomy, neuroanatomy/neurobiology, histology, embryology/developmental biology, cell biology, and macromolecular structure.

Special Requirements

Applicants should have completed an undergraduate major in an appropriate field, such as anthropology, biochemistry, biology, chemistry, physics, psychology, or zoology.

The department is currently recruiting students into its labs and graduate program principally through the basic-science interdisciplinary programs. Students interested in working with particular departmental faculty members should apply for admission through one of the following programs: Molecular and Cellular

Biology, Neurobiology and Behavior, Biomolecular Structure and Design, or the Medical Scientist Training Program. Alternatively, some faculty sponsor students for application to the departmental program. For further information, contact the graduate program coordinator.

Financial Aid

The department offers financial support through training-grant positions and from research funds.

Faculty

Acting Chair

John I. Clark

Professors

Baskin, Denis G. * 1979; PhD, 1969, University of California (Berkeley); neuroendocrinology; obesity; CNS regulation of body weight; histochemistry; expression of receptors.

Brinkley, James F., III * 1988; MD, 1974, University of Washington, PhD, 1984, Stanford University; computer applications in medicine and biology; structural informatics.

Byers, Margaret R. * 1972, (Research); PhD, 1969, Harvard University; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions.

Clark, John I. * 1982; PhD, 1974, University of Washington; development and maintenance of lens transparency.

Dacey, Dennis M. * 1986; PhD, 1983, University of Chicago; the neural basis of vision and the organization of primate retina.

Farr, Andrew G. * 1982; PhD, 1975, University of Chicago; cell interactions governing lymphocyte production and function.

Gehrig, John D. * 1954, (Emeritus); DDS, 1946, MSD, 1951, University of Minnesota; oral and maxillofacial surgery, biological structure.

Graney, Daniel O. * 1966; PhD, 1965, University of California (San Francisco); gross anatomy, electron microscopy, intestinal absorption.

Hendrickson, Anita E. * 1969; PhD, 1964, University of Washington; neuroanatomy, morphology and development of primate visual system.

Herring, Susan W. * 1990, (Adjunct); PhD, 1971, University of Chicago; vertebrate functional morphology, relations between muscular function and skull growth.

Hol, Wilhelmus G. J. *; PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Jensen, Lyle H. * 1949, (Emeritus); PhD, 1943, University of Washington; molecular structure, x-ray diffraction.

Koehler, James K. * 1963, (Emeritus); PhD, 1961, University of California (Berkeley); electron microscope, cryobiology, reproductive biology.

Patton, Dorothy L. 1981, (Adjunct); PhD, 1981, University of Washington; infectious disease.

Press, Oliver W. * 1982, (Adjunct); PhD, 1977, MD, 1979, University of Washington; treatment of hematologic malignancies with monoclonal antibody immunoconjugates.

Bioengineering

309 Harris Hydraulics Laboratory



General Catalog Web page:
www.washington.edu/students/genecat/academic/Bioengineering.html



Department Web page:
depts.washington.edu/bioe/

Bioengineering encompasses a wide range of activities in which the disciplines of engineering and biological or medical science intersect. Such multidisciplinary endeavors are yielding new discoveries and

Reh, Thomas A. * 1989; PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.

Rosse, Cornelius * 1967, (Emeritus); MD, 1964, DSc, 1983, University of Bristol (UK); knowledge representation in anatomy.

Westrum, Lesnick E. * 1966; MD, 1963, University of Washington, PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

Wilson, Steven E. 1998, (Adjunct); MD, 1984, University of California (San Diego); wound healing, apoptosis, growth factors, receptors.

Yablonka-Reuveni, Zipora * 1982; MSc, 1975, Weizmann Institute for Science (Israel), PhD, 1979, University of Windsor (Canada); myogenesis during growth, aging, and regeneration of skeletal muscle.

Associate Professors

Cunningham, Michael L. * 1988, (Adjunct); MD, 1988, University of Vermont, PhD, 1996, University of Washington; molecular, development, craniofacial, malformation, human, mouse, craniosynostosis, birth defects.

Gaddum-Rosse, Penelope * 1969, (Emeritus); PhD, 1965, University of Liverpool (UK); reproductive biology.

Harris, Roger M. * 1982; PhD, 1975, University of Washington; neuro-anatomical recovery from spinal cord injury.

Kalet, Ira J. * 1980, (Adjunct); PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Landau, Barbara R. 1962, (Emeritus); MS, 1949, PhD, 1956, University of Wisconsin.

Merritt, Ethan A. * 1989; PhD, 1980, University of Wisconsin; x-ray crystallography, structure-based drug design, and structural genomics.

Nameroff, Mark A. * 1970, (Emeritus); MD, 1965, PhD, 1966, University of Pennsylvania; cell differentiation.

Raible, David W. * 1995; PhD, 1989, University of Pennsylvania; zebrafish neural development.

Robinson, Farrel R. * 1986; PhD, 1982, Brown University; study of the cerebellum via monkey eye movements.

Roelink, Henk * 1996; MSc, 1985, University of Groningen (Netherlands), PhD, 1991, University of Amsterdam (Netherlands); role of signaling molecules in mediating neural tissue differentiation during vertebrate development.

Sherk, Helen * 1982; PhD, 1978, Massachusetts Institute of Technology; neural mechanisms underlying vision, especially visual guidance during locomotion.

Stenkamp, Ronald E. * 1978; PhD, 1975, University of Washington; crystallography, metalloproteins, protein engineering, rhodopsin, G-protein coupled receptors.

Sundsten, John Wallin 1962, (Emeritus); PhD, 1961, University of California (Los Angeles); neuroanatomy.

Verlinde, Christophe L. M. J. * 1992; PhD, 1988, Catholic University of Leuven (Belgium); structure-based drug design and protein crystallography.

Assistant Professors

Broderson, Stevan H. * 1967; PhD, 1967, State University of New York (Buffalo); computer graphics.

Fan, Erkang * 1996, (Research); PhD, 1993, University of Pittsburgh; organic and combinatorial chemistry, structure-based drug design, molecular recognition.

Moens, Cecilia B. * 1998, (Affiliate); PhD, 1993, University of Toronto; development of segmentation and segment identity in the vertebrate hindbrain.

Xu, Wenqing * 1999; PhD, 1995, Massachusetts Institute of Technology; structural studies of proteins involved in cancer, immune dysfunction and neuronal diseases.

Senior Lecturer

Mulligan, Kathleen A. 1987; PhD, 1985, University of New South Wales(Australia); neurobiology, gross anatomy, teaching innovations, technical communication.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CONJ 401, 402, 403 Human Anatomy and Physiology (4, 4, 4) See Conjoint Courses.

B STR 431 Introduction to Neuroanatomy (4) NW *Broderson, Mulligan, Westrum* Survey of the anatomy and functional organization of the human central nervous system, with clinical applications. Prerequisite: admission to the School of Dentistry. Offered: W.

CONJ 480 Neuroscience and Rehabilitation Professionals (5) See Conjoint Courses.

B STR 498 Undergraduate Thesis (*) Individual research projects under the supervision of an instructor. For senior medical students. Offered: AWSpS.

B STR 499 Undergraduate Research (*) Individual research projects in cellular and developmental biology, experimental immunology, reproductive biology, neurobiology, molecular structure, morphometrics, computer modeling, and related fields under the supervision of an instructor. Offered: AWSpS.

B STR 501 Gross Anatomy (1-10, max. 10) *Clark* Lecture and laboratory dissection course in regional anatomy: thorax, abdomen, pelvis, perineum. Prerequisite: permission of instructor. Offered: A.

B STR 502 Gross Anatomy (1-5, max. 5) *Graney* Lecture and laboratory dissection course in regional anatomy: upper and lower extremities. Prerequisite: permission of instructor. Offered: W.

B STR 503 Gross Anatomy (1-5, max. 5) *Graney* Lecture and laboratory dissection course in regional human anatomy; head and neck. Prerequisite: permission of instructor. Offered: Sp.

B STR 510 Seminar in Anatomy (1) *Graney* Scientific and historical basis of selected studies in biological structure, anatomy, and human development. Original literature used as basis for textbook descriptions is reviewed. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

B STR 512 Human Microanatomy (4) Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultramicroscopic points of view. Prerequisite: permission of instructor. Offered: A.

B STR 515 Biological X-Ray Structure Analysis (3) *Stenkamp* Theory of x-ray diffraction, with emphasis on applications to biological systems. Prerequisite: permission of instructor. Offered: W.

B STR 519 Current Problems in Macromolecular Structure (2, max. 10) *Hol* A discussion of macromolecular structures related to specific areas of biological research. Emphasis on discussion of relevant research papers and use of computer graphics to visualize the molecular structures. Offered: AWSpS.

CONJ 520 Anatomy and Autopsy (1/2, max. 2) *Fligner* See Conjoint Courses.

B STR 520 Structure Based Design of Drugs and Vaccines (3) *Hol* Lecture and discussion on research papers illustrating protein structure based design of new drugs and vaccines. Review of methods of structure-based drug design and problem of drug resistance. Discussion on importance of adjuvants, protein engineering methods, and immune evasion methods in vaccine design. Offered: even years; W.

B STR 521 Advanced Biomacromolecular Crystallography (3) *Hol, Merritt, Stenkamp* Aspects of protein crystallography ranging from crystal growth, phase determination methods, density averaging to refinement, fiber diffraction of DNA and proteins. Offered: odd years; W.

CONJ 524 Structural Basis of Neural Transduction (1.5) See Conjoint Courses.

UCONJ 524 Developmental Neurobiology (3) *Raible, Reh, Roelink, Rubel* See University Conjoint Courses.

B STR 530 P-Gross Anatomy and Embryology for Dental Students (7) *Broderson, Clark* Normal anatomy of the thorax, abdomen, pelvis, and perineum are discussed and dissected employing cadavers. The development of the organ systems is presented and related to definitive adult structure. Developmental anomalies and diagnostic anatomy are also discussed. Prerequisite: admission to School of Dentistry. Offered: A.

B STR 540 Special Problems in Anatomy (1-6, max. 6) Special projects in anatomy under sponsorship of faculty member. Prerequisite: graduate, medical, or dental student standing and permission of instructor. Offered: AWSpS.

B STR 541 P-Microscopic Anatomy for Dental Students (4) Lecture and laboratory work in microscopic anatomy. For dental students taking HUBIO 510; others by permission of instructor. Offered: A.

CONJ 542 Development (1.5) See Conjoint Courses.

CONJ 545 Molecular Interactions and Medicine (1.5) See Conjoint Courses.

B STR 550 P-Head and Neck Anatomy for Dental Students (4) *Broderson, Clark, Graney* Normal anatomy of the head is discussed and dissected, employing human cadavers. The fundamentals of diagnostic anatomy are also discussed. Restricted to first-year dental students. Prerequisite: B STR 530. Offered: Sp.

B STR 555 Laboratory Rotation in Biological Structure (*, max. 5) Introduction to experimental design, research methods, and scientific thought in laboratories of faculty members. Provides hands-on experience, an entrance into the literature of the field, and opportunities for discussion with all members of the laboratory. first-year dental students only. Prerequisite: permission of instructor. Offered: AWSpS.

B STR 557 Biomolecular Structure Seminar (1) *Hol* Literature review of key research in Biomolecular Structure in the form of short presentations by partic-

ipants followed by discussion. Critical evaluation of methods and results regarding properties and protein structure determination. Credit/no credit only. Prerequisite: graduate standing in biological structure or biochemistry and permission of instructor. Offered: AWPp.

B STR 580 P-Anatomy Teaching Practicum (*, max. 8) *Dacey, Graney, Mulligan* Opportunity for medical student (or other professional student) to gain teaching experience in biological structure and human biology courses, including gross anatomy, histology, and neuroanatomy. May include lecture, laboratory, conference, depending on student interest, experience. Credit based on course credit in which student is assisting. Prerequisite: permission of course chairperson. Offered: AWPp.

B STR 584 Seminar in Neurogenesis (1) *Reh* Discussion of current research on process by which neurons are generated in the nervous system. Offered: AWPp.

CONJ 585 Surgical Anatomy (1-3, max. 12) *Graney* See Conjoint Courses.

B STR 591 X-Ray and NMR Analysis of Macromolecular Structure (1, max. 9) *Hol* Weekly discussion of current topics in research on molecular structure, usually emphasizing techniques of x-ray crystallography. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPp.

B STR 595 Skin Biology Seminar (1, max. 5) *Smith* Presentation, discussion of ongoing multidisciplinary research in basic and clinical problems of adult and fetal skin biology. Genetic diseases of epidermis and dermis, percutaneous absorption in adult and fetal skin, wound healing, cutaneous blood flow, development and prenatal diagnosis of inherited disorders, pigment cell biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPp.

B STR 597 Topics in Neurobiology (1, max. 5) *Harris* Presentations by participants of topics in neuroanatomy, neurophysiology, neurochemistry, and other areas relating to the nervous system. Problems of current research interest. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

B STR 598 Reading in Biological Structure (2) Critical evaluation of research in biological structure, including current problems, methods and future directions by reading and discussing research and review papers. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPp.

B STR 600 Independent Study or Research (*) Offered: AWPp.

B STR 700 Master's Thesis (*) Offered: AWPp.

B STR 800 Doctoral Dissertation (*) Offered: AWPp.

Comparative Medicine

T142 Health Sciences



General Catalog Web page:
www.washington.edu/students/genocat/academic/Comparative_Med.html



Department Web page:
www.washington.edu/medical/som/depts/compmed/overview.html

The Department of Comparative Medicine provides education and research opportunities in the use of animals in biomedical research, testing, and educa-

tion. In addition, training is provided for veterinarians in the diagnosis, treatment, and prevention of the diseases of laboratory animals. Current educational programs include scheduled courses in the principles and techniques of animal experimentation (C MED 407) for biomedical graduate students, zoonotic diseases, and training in laboratory-animal medicine for veterinary medical students and veterinarians, combined with a Master of Science degree program in comparative medicine. Areas of current research interests include enteric disease, lymphocyte biology, biology of aging, mouse genomics, generation and characterization of transgenic animal models, somatic cell gene transfer, and animal models of gene therapy.

Graduate Program Coordinator
T136 Health Sciences, Box 351790
206-685-3261

Postdoctoral Program

Postdoctoral training in the areas of laboratory animal medicine and comparative pathology is offered to persons with a D.V.M. or equivalent degree. Training consists of a combination of course work, clinical residency rotations, and research leading to a Master of Science degree in comparative medicine. The program also prepares participants for specialty certification by the American College of Laboratory Animal Medicine. Financial assistance is normally provided.

A detailed description of the postdoctoral program is available on the department's Web site at www.washington.edu/medical/som/depts/compmed/overview.html.

Master of Science

The Master of Science degree in comparative medicine provides advanced training in comparative medicine to veterinarians. Admission to the degree program requires acceptance into the department's Postdoctoral Training Program. The degree option involves additional elective courses, the completion of a more-involved research project, and a thesis.

Predocorial Program

This program is designed to acquaint veterinary medical students with laboratory-animal medicine as a veterinary specialty. Specific areas covered include control/treatment of the principal diseases of common laboratory animals and their role in biomedical research. Blocks of four to eight weeks are available for fourth-year students year-round. Stipend support is normally provided.

Faculty

Chair

Melvin B. Dennis

Professors

Dennis, Melvin B. * 1971; DVM, 1961, Washington State University; comparative medicine, including animal models and experimental surgery.

Di Giacomo, Ronald F. * 1974, (Emeritus); VMD, 1965, University of Pennsylvania, MPH, 1974, University of Washington; comparative epidemiology and zoonoses.

Johnsen, Dennis O. 1997, (Clinical); DVM, 1961, University of California (Davis), MS, 1965, Ohio State University; comparative medicine including nonhuman primate medicine, international health.

Ladiges, Warren C. * 1982; DVM, 1971, Washington State University; immunobiology of aging, transgenic

mouse models of aging, DNA repair genes and age-associated cancer.

Liggitt, H. Denny * 1989; DVM, 1972, PhD, 1979, Colorado State University; using in vivo models to evaluate novel approaches for gene delivery, transgenic models.

Morton, William R. * 1976; VMD, 1967, University of Pennsylvania; animal models for AIDS-related research on vaccine development and pathogenesis studies.

Rausch, Robert L. * 1978, (Emeritus); DVM, 1945, Ohio State University, PhD, 1949, University of Wisconsin; parasitology, helminthic zoonoses.

Van Hoosier, Gerald * 1975; DVM, 1957, Texas A&M University; laboratory animal medicine with emphasis on effects of intercurrent infection on mouse phenotypes.

Whitney, Robert A. 1997, (Affiliate); DVM, 1959, Oklahoma State University, MS, 1965, Ohio State University.

Wolf, Norman S. * 1968, (Adjunct); DVM, 1953, Kansas State University, PhD, 1960, Northwestern University; hematopoietic stem cell dynamics and transplantation in radiation biology.

Associate Professors

Grossmann, Angelika * 1985, (Affiliate); DVM, 1978, PhD, 1982, Freie University of Berlin (Germany); immunosenescence in humans and mice; immunotoxicology; transmembrane signaling in T-lymphocytes.

Hargis, Ann M. 1990, (Affiliate); VMD, 1973, MS, 1976, Colorado State University.

Price, Lillian M. * 1984; DVM, 1972, PhD, 1983, University of Pennsylvania; t-cell development in the thymus, immunotoxicology, thymus development, retinoic acid embryopathy.

Thouless, Margaret E. * 1980, (Adjunct); PhD, 1974, University of Birmingham (UK); retroviruses, herpes viruses, enteric viruses, immunodiagnosis, virus variability.

Waggie, Kimberly S. 1997, (Affiliate); DVM, 1980, Iowa State University, MS, 1984, University of Missouri.

Weigler, Benjamin J. * 1997; DVM, 1986, Colorado State University, MPH, 1988, University of California (Berkeley), PhD, 1991, University of California (Davis); infectious disease epidemiology in laboratory animal medicine and management.

Assistant Professors

Anderson, David 1996, (Clinical); DVM, 1989, Washington State University; development and application of nonhuman primate animal models.

Iritani, Brian M. 1992; DVM, 1988, Washington State University, PhD, 1997, University of Washington; developmental immunology, cell signaling, oncogene function.

Pekow, Cynthia A. 1989, (Clinical); DVM, 1984, University of Illinois; comparative medicine, instruction of research staff and technicians in animal care and use.

Ware, Carol B. 1995, (Research); PhD, 1986, University College (Ireland); multi-systemic LIF receptor function in developing and adult mice.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

C MED 407 Principles of Animal Experimentation (3) *Dennis, VanHoosier* Focus on biology and care of experimental animals, animal models of human disease, ethical use of animals in biomedical research and teaching; techniques of aseptic surgery. Includes lectures and animal-use laboratories. For graduate and advanced undergraduate students. Prerequisite: permission of instructor. Offered: A.

C MED 499 Undergraduate Laboratory Research (1-6, max. 6) *Van Hoosier* Specific problems in comparative medicine. Credit/no credit only. Offered: A/WSpS.

C MED 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) *Liggitt* Use of animals in experimental study of disease; techniques of animal necropsy, characterization, interpretation of gross and microscopic lesions, correlation of lesions with altered physiological processes, differentiation between naturally occurring and experimentally induced lesions. Prerequisite: PATH 444, PATH 445, or equivalent, and permission of instructor. Enrollment limited: two students per quarter. Offered: A/WSpS.

C MED 514 Comparative Pathology Conference (1, max. 6) *Liggitt* Focus on histopathology of naturally occurring and experimentally induced lesions of primates, laboratory and domestic animals, fish, wildlife, and birds. Participants discuss the lesions and the basic pathogenetic mechanisms that underlie them. Prerequisite: PATH 500 or equivalent and permission of instructor. Credit/no credit only. Offered: A/WSpS.

C MED 516 Current Literature in Laboratory Animal Medicine (1, max. 12) *VanHoosier* Critical evaluation of recent articles on laboratory animal medicine and science. Emphasis on literature dealing with spontaneous diseases of laboratory animals, biology and husbandry, zoonotic diseases, and animal models of human disease. Experimental design, use of animals in research, and methods of reviewing manuscripts. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

C MED 518 Clinical Conference Seminar (1, max. 12) *Price* Clinical reports of cases of spontaneous and induced diseases, animal models of human disease, and zoonotic diseases discussed. Disease prevalence and preventive medicine measures. Diagnostic exercises. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

C MED 520 Biology of Laboratory Animals (2) *Pekow, VanHoosier* Fundamentals of the morphological, functional, and applied aspects of anatomy, physiology, pharmacology, biochemistry, and immunology of the commonly used laboratory animal species. Similarities and differences within, and between, species, including man. Husbandry, genetics, behavior, and nutrition. Prerequisite: permission of instructor. Offered: AS.

C MED 521 Biology of Laboratory Animals (2) *Pekow, VanHoosier* Fundamentals of the morphological, functional, and applied aspects of anatomy, physiology, pharmacology, biochemistry, and immunology of the commonly used laboratory animal species. Similarities and differences within, and between, species, including man. Husbandry, genet-

ics, behavior, and nutrition. Prerequisite: permission of instructor. Offered: WS.

C MED 526 Epidemiology of Diseases Communicable from Nature (3) *DiGiacomo, Rausch* Explores the public health aspects of zoonotic diseases, their epidemiology and approaches to control. Focuses on the major viral, rickettsial, bacterial, protozoal, helminthic, and fungal diseases transmitted from wild and domesticated animals to humans. Prerequisite: C MED 511, C MED 512, or C MED 520 or permission of instructor. Offered: jointly with EPI 526; S.

C MED 530- Diseases of Laboratory Animals (3-) *VanHoosier* Analysis of etiology, pathogenesis, pathology, and disease processes in rodents, lagomorphs, carnivores, and nonhuman primates. Prerequisite: permission of instructor. Offered: AS.

C MED 531- Diseases of Laboratory Animals (3-) *VanHoosier* Analysis of etiology, pathogenesis, pathology, and disease processes in rodents, lagomorphs, carnivores, and nonhuman primates. Prerequisite: permission of instructor. Offered: WS.

C MED 540 Animal Models (1) *Dennis* Naturally occurring and experimentally induced analogs of human diseases in animals with emphasis on diseases in search of animal models, and approaches to identifying new models. Animal models of categorical disease (e.g., cancer, atherosclerosis, gerontology) discussed. Prerequisite: permission of instructor. Offered: SpS.

C MED 590 Selected Topics in Animal Medicine (2) *Dennis, VanHoosier* Radiation biology, genetics, anesthesiology and experimental surgery, preventive medicine, and ethical aspects of use of animals in biomedical teaching and research. Specific topics vary from year to year, depending on the expertise of the annual visiting professor. Prerequisite: permission of instructor. Offered: SpS.

C MED 600 Independent Study or Research (*) Credit/no credit only. Offered: A/WSpS.

C MED 601- Internship Rotation—Laboratory Animal Medicine (1-) Credit/no credit only. Prerequisite: DVM degree. Offered: A/WSpS.

C MED 700 Master's Thesis (*) Credit/no credit only. Offered: A/WSpS.

Conjoint Courses

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CONJ 401 Human Anatomy and Physiology (4) *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: either BIOL 201, BIOL 202, and BIOL 203, or BIOL 220; either CHEM 155, CHEM 160, or CHEM 162. Offered: A.

CONJ 402 Human Anatomy and Physiology (4) *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special

permission of instructors. Prerequisite: CONJ 401. Offered: W.

CONJ 403 Human Anatomy and Physiology (4) *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: CONJ 402. Offered: Sp.

CONJ 480 Neuroscience for Rehabilitation Professionals (5) *Anderson, Mulligan, Slimp* Survey of the structure and function of the central nervous system, emphasizing sensorimotor systems and higher integrative functions, coupled with clinical correlations. Required for occupational therapy, physical therapy, and prosthetic/orthotic students. Others by permission.

CONJ 505 P-Pain Clinic Preceptorship (1) One morning a week for a total of 30 hours per quarter spent observing patient care in either inpatient or outpatient settings at University of Washington Medical Center; associated readings. Prerequisite: first- or second-year medical student standing. Coordinator: Pain Center.

CONJ 515 Interdisciplinary Health and Human Services Delivery in Rural Communities (1) *House* Provides opportunities for students in health and human services to explore current trends and issues of service delivery in rural communities. Demographics, economics, community structure, culture, and professional/personal issues are addressed. Prerequisite: major standing in a health or human services profession. Credit/no credit only. Offered: W.

CONJ 520 Anatomy and Autopsy (1/2, max. 2) *Fligner* Students attend autopsies at UWMC affiliated hospitals for demonstration of normal anatomic relationships and gross pathological changes in various diseases. Offered as elective concurrent with HUBIO 520P. Prerequisite: HUBIO 510P or equivalent, permission of instructor, and orientation. Offered: W/Sp.

CONJ 524 Structural Basis of Signal Transduction (1.5) *Xu* Focuses on the structure-function relationship of key enzymes in signal transduction (protein/lipid kinases; phosphatases etc.) and the structural consequences of protein phosphorylation. Teaches students to look into critical structural details using PC or Mac. Prerequisite: undergraduate course in biochemistry and basic cell biology, or permission of instructor. Offered: W.

CONJ 531 Signaling Mechanisms in Excitable Cells (1.5) *Hille* Membrane electricity. Structure and roles of voltage-gated and ligand-gated ion channels in electrical signaling. Calcium as a second messenger. Exocytosis and its regulation. Phototransduction in photoreceptors. Prerequisite: comprehensive undergraduate course in general biochemistry and molecular biology, or permission of instructor. Offered: A.

CONJ 532 Signal Transduction from the Cell Membrane to the Nucleus (1.5) *Beavo, Moon, Storm* Intracellular signaling pathways leading from cell membrane receptors to nucleus. Pathways activated by seven transmembrane receptors and G-proteins, insulin/PI3 kinase, nitric oxide and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction. Prerequisite: basic knowledge of biochemistry. Offered: A.

CONJ 533 The Dynamic Chromosome (1.5) *Henikoff, Roth* The chromosome viewed as the ultimate organelle. How chromosomes are maintained and propagated. Epigenetic regulation of genes. Genetic, biochemical, and cytologic methods for understanding chromosome functions. Prerequisite: cell biology, biochemistry, and genetics. Offered: A.

CONJ 534 Selected Problems in Nervous System Development (1.5) Introduces students to current issues in developmental neurobiology. Topics include regionalization of the neuroectoderm, mechanisms of neurogenesis, axon patterning and plasticity, and cell death. Not intended to be comprehensive; examines the experimental basis for current views in the field of a few topical issues.

CONJ 535 RNA Structure and Biological Function (1.5) *Ferre-D'Amare, Stoddard* Survey of the diversity of cell-biological roles played by RNA with emphasis on structural principles and structure-function relationships. Readings from the current literature to cover both, methods for the study of RNA, and examples of the function of this nucleic acid as part of the machinery for gene expression. Offered: W.

CONJ 536 Experimental Design in Cell Biology (1.5) *Wakimoto, Wright, Hille, Cooper* Focuses on experimental design in cell biology. A topic of current research interest is covered in depth in order to follow a line of investigation and critically evaluate the strengths and limitations of various experimental strategies. Offered: jointly with ZOO 541; W.

CONJ 537 Mechanism of Transcriptional Regulations (1.5) *Tsukiyama* Focuses on biochemical mechanisms of gene transcription covering a broad range of transcriptional regulation, including mechanisms of transcriptional initiation, elongation and termination. Discusses regulation of transcription by chromatin. Includes a special lecture regarding regulation of transcription in cell growth and differentiation. Offered: A.

CONJ 538 Genetic Instability and Cancer (1/1.5) *Maizels, Monnat* Seminar focusing on molecular pathways that maintain genomic stability in all cells and that carry out programmed changes in genomic structure in the immune system. Special attention devoted to understanding how failure in these pathways leads to genomic instability and malignancy. Prerequisite: permission of instructor. Offered: W.

CONJ 539 Biological Basis of Neoplasia (1.5) *Foote, Neiman, Kemp, Zarbl* Lecture/discussion on cellular and molecular mechanisms underlying phenotypes associated with cancer, including genetic pre-disposition, injury, and instability; alteration in control of cell division and cell death; failure of differentiation; tumor angiogenesis and metastasis. Molecular biology of tractable model systems is emphasized. Prerequisite: introductory biochemistry and cell biology. Offered: W.

CONJ 541 Molecular Biology of Cellular Processes (1.5) *Bornstein* Translational control; cytoskeleton and molecular motors; protein targeting, sorting and secretion; apoptosis; regulation of cell function by extracellular matrix. Prerequisite: comprehensive undergraduate course in biochemistry and molecular biology or permission of instructor. Offered: Sp.

CONJ 542 Development (1.5) *Raible, Roelink* Molecular mechanisms of development; molecules and pathways used for the patterning of developing organisms. Similarities and differences in the making of plants, invertebrates, and vertebrates. Prerequisite: Comprehensive undergraduate courses in Biology, Molecular Biology, or permission of instructor. Offered: W.

CONJ 543 Problems in Genetic Analysis (1.5) *Emerman, Edgar, Ostrander* Introduction to the course in problems of genetic analysis using a variety of organisms. Focuses on the use of classical and modern genetic tools to understand fundamental problems in biology and medicine. Presents several widely used genetic approaches in detail. Offered: Sp.

CONJ 544 Protein Structure, Modification and Regulation (1.5) *Stoddard, Strong* Overview of general principles of protein structure, including forces that contribute to folding and stabilization, followed by an extended coverage of the means by which protein structure and function are modified and regulated. Examples from recent developments in protein folding, processing, and allosteric regulation. Prerequisite: introductory biochemistry and cell biology.

CONJ 545 Molecular Interactions and Medicine (1.5) *Verlinde* Forces governing molecular interactions in biology; with a focus on medicine. Principles of computer modeling techniques in use for predicting the molecular behavior of proteins, ligands and their complexes. In computer ligand discovery; drug design, and the understanding at the atomic level of some genetic diseases. Two computer lab sessions. Offered: Sp.

CONJ 546 Survey of Technologies for Molecular Biology (1.5) *Bumgarner* Provides a broad overview of modern technologies used in molecular biology with particular emphasis on DNA sequencing and gene expression. In addition to methods and applications for the technologies, examines the theoretical basis and underlying instrumentation through which these technologies are implemented. Offered: A.

CONJ 547 Molecular Evolution of Viral-Host Interactions (1.5) *Katze* Focuses on the interactions between viruses and the cells they infect, with special emphasis on evolutionary battle that occurs between the invading virus and its host. Examines new technologies being used to molecularly dissect virus-host interactions. Offered: Sp.

CONJ 550 P-Clinical Infectious Diseases (3) *Spach* Lecture series by faculty members from various departments, authorities in the field of clinically important infectious diseases. Lectures, reading assignments, and handouts emphasize epidemiology, clinical manifestations, laboratory findings, diagnosis, treatment, and prevention. Oriented for second-year medical students. Credit/no credit only. Prerequisite: HUBIO 521 or permission of coordinator, Department of Medicine. Offered: W.

CONJ 585 Surgical Anatomy (1-3, max. 12) *Graney* Guided dissection of selected regions, supplemented by conferences. Offered conjointly by the departments of Biological Structure and Surgery. Prerequisite: permission of department. Coordinator: Department of Biological Structure.

CONJ 677 P-Clinical Allergy and Immunology (*, max. 12) *Callanan (Boise Veterans Affairs Hospital), Henderson (University of Washington Medical Center)* Clinic and office experience in diagnosing and managing allergic disease. Clinical conferences, hospital rounds on clinical immunology and allergy. Student may elect a flexible program, emphasizing adult or pediatric allergy. Prerequisite: MED 665 or basic clerkships in Departments of Family Medicine or Pediatrics. (Four weeks, full-time.) Offered: AWSpS.

CONJ 678 P-Pain Clinic Clerkship (8) Full-time, four-week clerkship emphasizing comprehensive care of patients with chronic pain from benign diseases and cancer. Faculty members from multiple departments provide student with didactic and bedside experiences; student member of treatment team. Involves both inpatient and outpatient activities. Prerequisite: completion of human biology series, MED 665.

CONJ 680 P-Detoxification and Rehabilitation Program for Alcoholism and Drug Abuse (*, max. 16) *Reoux* Supervised introduction to alcoholic detoxification and rehabilitation and drug abuse. Supervised clinical experience in a variety of alcoholism and drug abuse treatment programs; accompanied by a core series of lectures and discussions.

For medical students only. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

CONJ 696 P-WRITE Clinical Electives (*, max. 24) Clinical electives for WRITE program. Offered: AWSpS.

CONJ 697 International Exchange Clerkship (12) *Hunt* Participation in health care delivery systems in developing countries; observation of relationship of host country's traditional medicine with Western medicine. Students live in cross-cultural setting to better understand their own assumptions about health care and life styles. Offered: Sp.

CONJ 698 P-Foreign Medical Student Clerkship (*, max. 24) A limited number of students from foreign medical schools are accepted for individually designed clinical clerkships at available sites after all UWMC students are accommodated. Prerequisite: permission of Associate Dean for Academic Affairs, School of Medicine.

CONJ 699 P-Clinical Clerkships (*, max. 32)

Family Medicine

C408 Health Sciences

 *General Catalog Web page:*
www.washington.edu/students/gencat/academic/Family_Medicine.html

 *Department Web page:*
www.fammed.washington.edu

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, clinical clerkships as part of the clinical core curriculum, and other elective courses open to all medical students. A graduate residency program in family practice provides clinical training meeting the standards of the American Board of Family Practice and the Council on Graduate Medical Education of the American Medical Association. Active affiliations are maintained throughout the WWAMI region in predoctoral, residency, fellowship, and continuing medical education in clinical care, teaching, and research.

Faculty

Chair

Alfred O. Berg

Professors

Berg, Alfred O. 1979; MD, 1974, Washington University, MPH, 1979, University of Washington; family medicine.

Carline, Jan D. * 1977, (Adjunct); MEd, 1976, PhD, 1979, University of Washington; assessment of physician performance, evaluation of medical education programs.

Chrisman, Noel J. * 1973, (Adjunct); PhD, 1966, University of California (Berkeley); health beliefs and

practices, social networks and social support; clinically applied anthropology.

Coombs, John B. 1983; MD, 1972, Cornell University; health care outcomes, rural health policy, healthcare workforce issues and applied nutrition.

Ellsworth, Allan J. 1981; PharmD, 1977, Philadelphia College of Pharmacy and Science; primary care, family medicine.

Geyman, John P. 1976, (Emeritus); MD, 1960, University of California (San Francisco); family medicine.

Gloyd, Stephen S. * 1985, (Adjunct); MD, 1973, University of Chicago, MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.

Gordon, Michael J. * 1973, (Emeritus); PhD, 1973, Michigan State University; family medicine.

Hart, Lawrence G. 1982; MS, 1975, University of Utah, PhD, 1985, University of Washington; rural health policy, medical geography.

Katon, Wayne J. * 1976, (Adjunct); MD, 1976, University of Oregon; depression, panic disorder, somatization, adherence.

Mayer, Jonathan D. * 1977, (Adjunct); PhD, 1977, University of Michigan; medical geography, health policy, env. health, epidemiology, intl. health, infectious diseases.

Norris, Thomas E. 1988; MD, 1973, University of Texas (Galveston); clinical applications, health policy and health workforce needs.

Rosenblatt, Roger A. * 1977; MPH, 1971, MD, 1971, Harvard University; research into the organization and delivery of health services, rural health policy.

Schneeweiss, Ronald 1977; MBChB, 1964, University of Capetown (South Africa); family medicine.

Taplin, Stephen H. 1983; MD, 1978, University of California (Davis), MPH, 1985, University of Washington; family medicine.

Walker, Edward A. 1983, (Adjunct); MD, 1983, University of Washington; consultation-liaison psychiatry, medically unexplained physical symptoms.

Associate Professors

Baldwin, Laura M. 1984; MD, 1980, University of Southern California, MPH, 1986, University of Washington; family medicine.

Church, Lili Lucille 1992; MD, 1985, University of Iowa; family medicine.

Crittenden, Robert A. 1981; MD, 1976, MPH, 1987, University of Washington; health plans/policies.

Dobie, Sharon A. 1987; MCP, 1971, University of California (Berkeley), MD, 1979, University of California (San Francisco); family medicine.

Ellsbury, Kathleen E. 1982; MD, 1977, Johns Hopkins University, MPH, 1982, University of Missouri; family medicine.

Farber, Stuart J. 1995, (Clinical); MD, 1974, University of Washington; family medicine, end of life/palliative care research/education, patient-/relationship-centered care.

Goldbaum, Gary M. * 1989, (Adjunct); MD, 1978, University of Colorado (Denver), MPH, 1989, University of Washington; preventive medicine, chronic diseases prevention, injury prevention.

Greer, H. Thomas 1977; MD, 1974, University of Mississippi, MPH, 1979, University of Washington; family medicine.

Leversee, John H. 1973, (Emeritus); MD, 1952, University of Minnesota; family medicine.

Losh, David Paul 1992; MD, 1974, University of Kansas; family medicine.

Mauksch, Larry B. 1985, (Clinical); MEd, 1982, University of Washington; physician/patient communication, underprivileged populations, mental health/primary care integration.

Neighbor, William E, Jr. 1983; MD, 1979, University of Washington; family medicine and preventive cardiology.

Oliver, Lynn M. 1988; MD, 1983, University of Washington; family medicine.

Pinsky, Linda E. 1989, (Adjunct); MD, 1989, University of Washington; general internal medicine.

Robins, Lynne S. * 1999, (Adjunct); PhD, 1990, University of Michigan; cultural competence, physician-patient communication, qualitative research assessment, ethnography.

Saver, Barry G. 1989; MA, 1978, Harvard University, MD, 1983, Columbia University, MPH, 1991, University of Washington; family medicine.

Stevens, Nancy G. * 1982; MD, 1979, MPH, 1982, University of Washington; family medicine.

Taylor, Thomas R. 1979; MBChB, 1957, PhD, 1972, University of Glasgow (UK); family medicine.

Wright, George 1997; MA, 1964, PhD, 1977, University of Michigan; health economics emphasizing primary care, physician competition, rural health.

Assistant Professors

Doescher, Mark 1996; MD, 1989, University of California (San Francisco), MSPH, 1992, University of Colorado; family medicine, medically vulnerable populations, primary care research.

Huntington, Jane 1991; MD, 1994, University of Washington; family medicine.

Kim, Sara 1995; MA, 1990, George Washington University, PhD, 1999, University of Washington; educational technology.

Lynge, Dana C. 1993, (Adjunct); MD, 1985, McGill University (Canada); general surgery.

O'Kane, John 1993, (Adjunct); MD, 1993, University of Vermont; family medicine, sports medicine, team care.

Paluska, Scott A. 2001; MD, 1995, University of Michigan; family medicine, sports medicine.

Spielberg, Freya 1992; MD, 1992, Cornell University, MPH, 1997, University of Washington; family medicine, HIV/STD prevention, behavior change.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

FAMED 499 Undergraduate Research (*) Research activities arranged with University-based or community physicians in diversified areas relating to family

medicine. Prerequisite: permission of course coordinator. Offered: AWSpS.

FAMED 501 P-Introduction to Family Medicine: Preceptorship (2.5) Students spend one morning per week for one or more quarters working with a practicing community family physician. Prerequisite: first- and second-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 505 P-Rural/Urban Preceptorship (*, max. 12) Opportunity to work in a variety of underserved medical settings in rural and urban areas of Washington, Wyoming, Alaska, Idaho, and Montana. Prerequisite: permission of course coordinator. Offered: AWSpS.

FAMED 545 Preclinical Geriatric Elective (2) Covers disease and disability prevention, health promotion, and positive attitudes that can contribute to successful aging. Emphasis on optimum aging, site visits, and extensive contact with diverse older people.

FAMED 546 Preclinical Hospice Volunteer Training Elective (3) Using lectures, small groups, role play, and readings, covers the basic knowledge, skills and attitudes that need to be mastered as a hospice volunteer. Students participate as hospice volunteers as part of their field experience. Offered: jointly with MHE 517.

FAMED 547 Spirituality in Medicine (2) Examination of the beliefs, values, meaning, and spirituality of health professionals for the well-being of their patients as well as for themselves. Offered: jointly with MHE 518.

FAMED 555 P-Wilderness Medicine (2) Elective provides didactic and field experience for third-year medical students in types of medical emergencies and clinical problems unique to rural and wilderness communities, including trauma, survival hypothermia, altitude, frostbite, heat illness, lightning, and river rescue. Prerequisite: permission of course coordinator.

FAMED 556 Spanish for Health Professionals (1) Instruction in interviewing Spanish-speaking patient. Credit/no credit only. Prerequisite: health professions student.

FAMED 560 P-Indian Health Problem-Based Learning Cases (1) For second-year medical students. Presents common Indian health problems via problem-based learning cases over two to three days per case. Offered: A.

FAMED 630 P-WRITE Family Medicine Clinical Clerkship (*, max. 24) Basic clinical clerkship for students enrolled in the WRITE Program.

FAMED 640 P-Clinical Clerkship in Family Medicine—Boise (12) Stresses ambulatory primary care with emphasis on comprehensive, integrated care to patients of both genders and all ages. Student functions as clerk in community/residency site. Participates in care of assigned patients, using office, hospital, home, community resources. Prerequisite: third- or fourth-year medical students. Offered: AWSpS.

FAMED 641 P-Clinical Clerkship in Family Medicine—Spokane (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 642 P-Clinical Clerkship in Family Medicine—Madison (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 643 P-Clinical Clerkship in Family Medicine—Tacoma (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 644 P-Clinical Clerkship in Family Medicine—University of Washington Medical

Center (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 645 P-Clinical Clerkship in Family Medicine—Group Health (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 646 P-Clinical Clerkship in Family Medicine—Swedish (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 647 P-Clinical Clerkship in Family Medicine—Providence (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 648 P-Clinical Clerkship in Family Medicine—Renton Valley (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 649 P-Clinical Clerkship in Family Medicine—Olympia (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 650 P-Clinical Clerkship in Family Medicine—Anacortes (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 651 P-Clinical Clerkship in Family Medicine—Omak (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 652 P-Clinical Clerkship in Family Medicine—Spokane Valley (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 653 P-Clinical Clerkship in Family Medicine—Anchorage (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 655 P-Clinical Clerkship in Family Medicine—Havre (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 656 P-Clinical Clerkship in Family Medicine—Whitefish (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 657 P-Clinical Clerkship in Family Medicine—Pocatello (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 658 P-Clinical Clerkship in Family Medicine—Sea Mar Clinic (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 659 P-Clinical Clerkship in Family Medicine—Country Doctor (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 660 P-Clinical Clerkship in Family Medicine—Yakima (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 661 P-Clinical Clerkship in Family Medicine—Bremerton (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 670 P-Advanced Preceptorship in Underserved WWAMI Area (*, max. 24) Students gain experience, knowledge, and skills needed to care for rural, specific ethnic or underserved populations in Washington, Wyoming, Alaska, Montana, and Idaho. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 671 P-Advanced Preceptorship in United States (*, max. 24) Supplemental experience in rural/urban practice or a family medicine department in a setting not already established through the family medicine curriculum. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 672 P-Advanced Preceptorship International (*, max. 24) For medical students desiring

primary care experience abroad. Special project deals with influences of social, cultural, educational, and economic forces on health care delivery. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 673 P-Advanced Preceptorship at WWAMI Clinical Centers (*, max. 12) Supplemental experience in Family Medicine for late junior or senior medical students at selected WWAMI clinical centers. Prerequisite: completion of basic 6-week clerkship in Family Medicine. Offered: AWSpS.

FAMED 674 Advanced Interviewing in Primary Care (8) Emphasizes the learning of patient-centered interviewing and counseling skills necessary for effective practice of primary care medicine. Prerequisite: permission of course coordinator.

FAMED 680 P-Traditional Indian Medicine Clerkship in Primary Care Setting (*, max. 12) Students learn how western physician collaborate with traditional Indian healers in the provision of health care to an urban Indian population. Prerequisite: completion of required third-year clerkship, UCONJ 530 or permission of instructor. Offered: AWSpS.

FAMED 681 P-Indian Health Care Clerkship (*, max. 12) Individually designed learning experience allows student to choose training opportunities, including Indian IHS Clinics, Tribal 638 Health Programs, IHS Public Health Program, Urban Indian Health programs, Tribal Council Health activities, and Tribal/IHS Alcoholism Treatment programs. Prerequisite: completion of required third-year clerkships, UCONJ 530, and permission of instructor. Offered: AWSpS.

FAMED 698 P-Clinical Clerkship in Family Medicine, Away (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 699 P-WWAMI Family Medicine Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of course coordinator. Offered: AWSpS.

Genome Sciences

K336 Health Sciences Building



General Catalog Web page:

www.washington.edu/students/genecat/academic/Genome_Sciences.html



Department Web page:

www.gs.washington.edu

The Department of Genome Sciences was created in 2001 with the merge of the Department of Genetics and the Department of Molecular Biotechnology.

Graduate Program

Graduate Program Coordinator
K336 Health Sciences, Box 357730
206-616-7297
gradprog@mbt.washington.edu

The Department of Genome Sciences offers two graduate programs leading to the degrees of Master of Science and Doctor of Philosophy, one in genetics and one in molecular biotechnology. Students are admitted only to the doctoral program and may be granted the Master of Science in lieu of or in conjunction with the Ph.D.

Genetics

In the genetics graduate program a student may choose among a wide variety of research areas, while at the same time receiving broad training in genetics. New graduate students join a research project in one of the faculty laboratories during each of the first three quarters in residence. New students thereby become acquainted with several different experimental approaches in genetics research and the projects help them choose an adviser for their thesis work at the end of the first year. In addition to graduate courses offered by the Department of Genome Sciences, students can choose among a large number of courses in related departments to broaden their perspective. Graduate students also participate in undergraduate teaching after gaining expertise in pertinent areas. A General Examination is taken during the second year to gain formal admittance to candidacy for the Ph.D. degree.

Applications for graduate work are invited from students who have emphasized biology, the physical sciences, or mathematics in their undergraduate careers. Applicants are asked to submit Graduate Record Examination scores and three letters of recommendation.

Financial Aid

The Department of Genome Sciences offers financial support to promising students who wish to work toward the doctoral degree.

Research Facilities

The department is currently housed in the H-, J-, and K-wings in the Health Sciences Complex. Students in the department are assigned in the laboratories of faculty members with whom they do their rotations or dissertation research. State-of-the-art research facilities are available in the department for cellular, protein, and DNA analysis. Extensive computer and library resources are also available to students.

Molecular Biotechnology

The graduate program in molecular biotechnology was created with the conviction that the future of biology and medicine lies in the ability to apply a multidisciplinary approach to the analysis of complex systems. The cellular interactions in the immunologic and neural networks regulate some of the most complex behaviors and responses of living organisms. The 100,000 genes that dictate the complex system of human development constitute another example. The organization of these genes on the chromosome, their sequence polymorphism, transcriptional control, and evolutionary relationships must be analyzed to understand fully the intricacies of development. Progress in understanding these systems is directly correlated to the sophistication of the available research tools. The program is committed to training students to focus on the development and/or the application of powerful new tools to leading-edge problems in biology and medicine. The nature of the tools will change in response to the challenges posed by contemporary biology.

The graduate program in molecular biotechnology trains students to bring the knowledge and recent advances in a variety of disciplines—e.g., physics, chemistry, engineering, and computer sciences—to bear on the complex problems of modern biology and medicine. The program emphasizes extensive research experience within an interdisciplinary and state-of-the-art research environment.

The program has a broad, interdisciplinary nature. Therefore, each student's educational objectives will differ. Students are guided by their Dissertation Supervisory Committee to obtain knowledge of selected topics in four areas, as well as a thorough knowledge of topics related to their chosen area of

research. The four areas are (1) molecular/cell biology and genetics, (2) chemistry, (3) physics and instrumentation, and (4) applied mathematics or computer science. This requirement can be met through a combination of molecular biotechnology courses, additional elective courses, and reading assignments tailored to the student's background and specific interests.

Doctor of Philosophy

The molecular biotechnology graduate program is designed to educate and stimulate students at the interface of biological, physical, and computational sciences. Students are trained to focus on the development and/or application of new tools to challenging biological problems. These tools include the development of new chemistries, instruments, and computer hardware or software for the analysis of DNA, proteins, or cells. The goal of the program is to provide students with a sound background in molecular and cellular biology, and a broad access to research expertise in disciplines outside biology. Accordingly, the faculty brings together skills in applied mathematics, biology, chemistry, computer sciences, physics, and instrument design. Particular areas of expertise include immunology, protein chemistry, nucleic-acid chemistry, analytical cytogenetics, large-scale DNA mapping and sequencing (genomics), and computational biology.

Research Facilities

The department is currently housed in the H-, J-, and K-wings in the Health Sciences Complex. Students in the department are assigned space in the laboratories of faculty members with whom they do their rotations or dissertation research. State-of-the-art research facilities are available in the department for cellular, protein, and DNA analysis. Extensive computer and library resources are also available to students.

Admission Requirements

Admission to the Graduate School requires that a prospective student hold a baccalaureate degree from an accredited college or university in the United States or its equivalent in a foreign country. Students are required to have a cumulative GPA of 3.00 ("B") or better, and to have taken and received high scores on the Graduate Record Examination (generally in the 80th percentile or higher).

In addition to completing the application requirements for the Graduate School, an applicant should also forward the following items to Graduate Student Services, Department of Genome Sciences, Box 357730, University of Washington, Seattle, WA 98195-7730: (1) the admissions form, available through the department Web site or through the program office; (2) a copy of the Graduate School Application; (3) official school transcripts; (4) official copies of Graduate Record Examination scores for the general test, as well as the results of an advanced-subject test; (5) a statement of objective; (6) a curriculum vitae, if available; (7) TOEFL scores, if applicable; and (8) three letters of recommendation with evaluation forms, available from the MBT Web site or through the program office. Students are admitted for autumn quarter only. The application deadline is January 15.

Faculty

Chair

Robert H. Waterson

Professors

Aebersold, Rudolf Hans * 1993, (Affiliate); MD, 1984, Yale University; protein biochemical investigation of signal transduction pathways.

Bendich, Arnold J. * 1970, (Adjunct); PhD, 1969, University of Washington; structure and replication of chromosomal DNA molecules in mitochondria, chloroplasts, and bacteria.

Byers, Breck E. * 1970; PhD, 1967, Harvard University; cell biology: mitosis and meiosis, mechanisms of nuclear division and crossing-over in yeast.

Deeb, Samir S. * 1983, (Adjunct Research); PhD, 1964, University of Illinois; genetic factors predisposing to hyperlipidemia and coronary artery disease.

Eisen, Harvey * 1986, (Affiliate); PhD, 1967, University of Toronto (Canada); host-parasite interactions, generation of genetic diversity.

Fangman, Walton L. * 1967, (Emeritus); PhD, 1965, Purdue University; molecular genetics: control of replication of yeast chromosomes, plasmid and mitochondrial DNA.

Felsenstein, Joseph * 1968; PhD, 1968, University of Chicago; estimation of evolutionary trees, models of long-term evolutionary processes.

Fields, Stanley * 1995; MA, 1978, PhD, 1981, Cambridge University (UK); yeast molecular biology and genetics.

Furlong, Clement E. * 1977; PhD, 1968, University of California (Davis); human biochemical genetics in biochemistry of membrane transport systems.

Gallant, Jonathan A. * 1961; PhD, 1961, Johns Hopkins University; molecular genetics, control mechanisms in bacteria, accuracy of translation.

Gartler, Stanley M. * 1957, (Emeritus); PhD, 1952, University of California (Berkeley); mammalian somatic cell genetics with emphasis on the mechanism of x-chromosome inactivation.

Gottschling, Daniel E. * 1996, (Affiliate); PhD, 1984, University of Colorado; dissection of telomere attributes and understanding telomerase in *S. Cerevisiae*.

Green, Philip * 1994; PhD, 1976, University of California (Berkeley); mathematical and computer methods for genome analysis.

Hall, Benjamin D. * 1963; MA, 1956, PhD, 1959, Harvard University; the evolution of nuclear genes in plants and fungi.

Hartwell, Leland H. * 1968; PhD, 1964, Massachusetts Institute of Technology; genetic analysis of chromosome transmission and of the control of division by hormones in yeast.

Hawthorne, Donald C. * 1980, (Emeritus); PhD, 1955, University of Washington; yeast genetics, chromosome mapping, supersuppressors.

Hood, Leroy E. * 1992, (Affiliate); PhD, 1968, California Institute of Technology; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution.

King, Mary-Claire * 1995, (Adjunct); PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.

King, Mary-Claire * 1995; PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.

Laird, Charles D. * 1971, (Adjunct); PhD, 1966, Stanford University; cell and developmental biology, human genetics.

Manoil, Colin C. * 1986; PhD, 1979, Stanford University; molecular genetics, protein localization in bacteria.

Martin, George * 1957, (Adjunct); MD, 1953, University of Washington; somatic cell genetics, pathobiology of aging, neurodegenerative disorders.

Motulsky, Arno G. * 1953, (Emeritus); MD, 1947, University of Illinois; medical genetics.

Olson, Maynard V. 1992; PhD, 1970, Stanford University; methods and applications of large-scale DNA analysis.

Reid, Brian J. * 1983, (Adjunct); PhD, 1975, MD, 1980, University of Washington; genetic and cell cycle abnormalities in neoplastic progression in Barrett's esophagus.

Schubiger, Gerold A. * 1972, (Adjunct); PhD, 1968, University of Zurich (Switzerland); developmental biology of insects, embryonic determination in *Drosophila*.

Sibley, Carol Hopkins * 1976; PhD, 1974, University of California (San Francisco); molecular parasitology and drug resistance.

Smith, Gerald R. * 1983, (Affiliate); PhD, 1970, Massachusetts Institute of Technology; molecular biology of genetic recombination and regulation of gene expression.

Stadler, David R. *, (Emeritus); PhD, 1952, Princeton University.

Stamatoyannopoulos, George 1964; MD, 1958, DrMedS, 1960, University of Athens (Greece); medical genetics.

Thomas, James H. * 1988; PhD, 1985, Massachusetts Institute of Technology; genetics of development and the nervous system in nematodes.

Thompson, Elizabeth A. * 1985, (Adjunct); PhD, 1974, Cambridge University (UK); statistical analysis of human genetic data, population genetics, conservation and computational biology.

Trask, Barbara J. * 1992; PhD, 1985, University of Leiden (Netherlands); in situ hybridization, analytical cytogenetics, analysis of large-scale DNA polymorphism.

Wakimoto, Barbara T. * 1984, (Adjunct); PhD, 1981, Indiana University; developmental genetics, gene expression and chromosome organization in eukaryotes.

Young, Elton * 1969, (Adjunct); PhD, 1967, California Institute of Technology; regulation of gene activity in the yeast *Saccharomyces cerevisiae*.

Associate Professors

Berg, Celeste A. * 1990; PhD, 1986, Yale University; *Drosophila* developmental genetics: Cell communication and cell migration during oogenesis.

Braun, Robert Elmer * 1986; PhD, 1985, Tufts University; mammalian genetics, germ cell development and reproduction.

Goverman, Joan M. * 1992, (Adjunct); PhD, 1981, University of California (Los Angeles); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity.

Kruglyak, Leonid * 1998, (Affiliate); PhD, 1990, University of California (Berkeley); population genetics, statistical genetics, genomics, computational biology.

Monnat, Raymond J, Jr. * 1982, (Adjunct); MD, 1976, University of Chicago; somatic mutation, somatic cell molecular genetics, human genetic disease.

Nickerson, Deborah A. * 1992; PhD, 1978, University of Tennessee; automating the analysis of single nucleotide polymorphisms, human genetics, DNA diagnostics.

Ostrander, Elaine A. * 1994, (Affiliate); PhD, 1987, Oregon Health Sciences University; genetic mapping of simple and complex traits.

Ruohola-Baker, Hannele * 1993, (Adjunct); PhD, 1989, Helsinki University (Finland); oogenesis, developmental genetics.

Wright, Robin L. * 1990, (Adjunct); PhD, 1985, Carnegie Mellon University; membrane dynamics and regulation of sterol biosynthesis in yeast.

Yates, John R., II * 1992, (Affiliate); PhD, 1987, University of Virginia; biological mass spectrometry, protein sequencing, computational methods for data analysis.

Assistant Professors

Nelson, Peter S. * 1993, (Adjunct); MD, 1986, University of Kansas; the study of human carcinogenesis using tools of genomics and bioinformatics.

Pallanck, Leo J. * 1997; PhD, 1992, Albert Einstein College of Medicine; genetic and molecular analysis of symptomatic transmission in *Drosophila melanogaster*.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

Genetics

GENET 411 Gene Action (5) NW Molecular genetics: description of fundamental genetics processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focus is on prokaryotic organisms. Prerequisite: BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: jointly with MICROM 411; W.

GENET 453 Genetics of the Evolutionary Process (3) NW Contributions of genetics to the understanding of evolution. Processes of mutation, selection, and random genetic events as they affect the genetic architecture of natural populations and the process of speciation. Emphasis on experimental data and observation, rather than mathematical theory. Prerequisite: either GENET 371 or GENET 372.

GENET 454 The Origins of Genetics (4) NW Discovery and eventual triumph of Mendelism in the early twentieth century. Concepts of heredity from ancient times to the nineteenth century. Mendel's work and its rediscovery. Evidence contributing to cornerstone of classical genetics—the chromosome theory of heredity. Prerequisite: either GENET 351, GENET 371, or GENET 372. Offered: A.

GENET 465 Advanced Human Genetics (4) NW King, Olson Explores genetic analysis of naturally occurring variation in humans; origins and conse-

quences of mutation, as mediated by selection, migration, population structure and drift; approaches to finding human disease genes and characterizing them at the molecular level; relevance of to other species to analysis of human genes. Prerequisite: GENET 371; either GENET 372 or BIOC 440. Offered: W.

GENET 466 Cancer Genetics (3) NW Focuses on three types of cancer-related genetics. DNA repair, mitotic recombination, chromosome loss and imbalance, and other aspects of genomic instability. Metastatic cancer as an example of natural selection and evolution. Yeast and nematodes as models for the study of cancer genetics. Prerequisite: either GENET 371 or GENET 372. Offered: Sp.

GENET 490 Undergraduate Seminar (2, max. 6) NW Seminar for advanced undergraduate students engaged in individual research projects or those who wish to gain an understanding of genetic research by analysis of the primary literature. Assignments emphasize the rationale for research projects and the presentation and interpretation of research findings. Offered: AWSpS.

GENET 499 Undergraduate Research (*, max. 30) Credit/no credit only. Offered: AWSpS.

GENET 501 Introduction to Research Materials (3, max. 9) The student undertakes a research project in one of the research groups within the department for a quarter at a time. Credit/no credit only. Prerequisite: graduate standing in the Department of Genetics or permission of graduate program coordinator. Offered: AWSpS.

GENET 520 Seminar (1, max. 15) Credit/no credit only. Prerequisite: graduate standing in the Department of Genetics or permission of graduate program coordinator. Offered: AWSp.

GENET 525 Current Literature in Human Genetics (1) Topics from current literature in human genetics. Students and faculty each present one topic per quarter. Credit/no credit only. Prerequisite: graduate or postdoctoral status. Offered: AWSp.

GENET 531 Human Genetics (3) Modern approaches to the identification of human disease genes permitted by their isolation. Functional conservation of proteins throughout eukaryotic evolution as an approach to their function in model systems such as somatic cell culture, transgenic mice, nematodes, *Drosophila*, and yeast. Prerequisite: second-year graduate student. Offered: alternate years.

GENET 540 Introduction to Computational Molecular Biology: Genome and Protein Sequence Analysis (3) Algorithmic and probabilistic methods for analysis of DNA and protein analysis. Students must be able to write computer programs for data analysis. Prior coursework in biology and probability highly desirable. Prerequisite: permission of instructor. Offered: jointly with MBT 540; W.

GENET 541 Introduction to Computational Molecular Biology: Molecular Evolution (3) Computational methods for studying molecular evolution. Students must be able to write computer programs for data analysis. Prior coursework in biology and probability highly desirable. Prerequisite: MBT/GENET 540 or permission of instructor. Offered: jointly with MBT 541; Sp.

GENET 550 Methods and Logic in Genetics (3) Critical reading and detailed discussion of genetics-related scientific research papers. Material emphasizes methodological and logical themes of importance in modern genetics, for example: origin of mutants, genetic epistasis, pulse labelling, and in vivo gene function. Prerequisite: first-year genetics graduate students only. Offered: A.

GENET 551 Basics of Genetic Analysis (3) First course in a three-quarter sequence in formal, molecular, and microbial genetics. Offered: A.

GENET 552 Nature and Consequences of Mutation (3) Origin of mutations and their analysis in human and other genomes. Prerequisite: GENET 551 or permission of instructor. Offered: W.

GENET 553 Chromosome Structure and Mechanics (3) Chromosome structure and DNA replication; molecular basis of recombination and transposition. Prerequisite: GENET 552 or permission of instructor. Offered: Sp.

GENET 562 Population Genetics (4) *Felsenstein* Mathematical and experimental approaches to the genetics of natural populations, especially as they relate to evolution. Emphasis on theoretical population genetics. Prerequisite: permission of instructor. Offered: Sp.

GENET 570 Phylogenetic Inference (3) *Felsenstein* Methods for inferring phylogenies (evolutionary trees)—biological assumptions, statistical foundations, and computational methods. A comprehensive introduction for graduate students in the biological sciences to phylogenetic methods using data from molecular sequences, continuous and discrete characters, and gene frequencies. Prerequisite: introductory courses in evolution and in statistics. Offered: alternate years; Sp.

GENET 572 Population Biology I: Evolution and Systematics (3) Rigorous overview of historical foundations and current perspectives in the fields of evolutionary biology and systematics. Offered: jointly with BOTANY 560/ZOOL 560.

GENET 573 Population Biology II: Ecology and Conservation Biology (3) Rigorous overview of historical foundations and current perspectives in the fields of ecology, population biology, and conservation biology. Offered: jointly with BOTANY 561/ZOOL 561.

GENET 581 Seminar in *Drosophila* Genetics (1) *Berg* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of *Drosophila* development. Credit/no credit only. Offered: AWSp.

GENET 582 Seminar in Mouse Genetics (1) *Braun* Discussion of contemporary research in and novel methods for genetic, cell biological, and molecular analysis of mammalian development, with utilization of transgenic techniques. Credit/no credit only. Offered: AWSp.

GENET 583 Seminar in Molecular Cytology (1) *Byers* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of spindle behavior in the mitotic cell cycle of budding yeast. Credit/no credit only. Offered: AWSp.

GENET 584 Seminar in DNA Replication (1) *Brewer, Fangman* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of budding yeast, with emphasis on the mechanisms and control of DNA replication. Credit/no credit only. Offered: AWSp.

GENET 585 Seminar in Bacterial Genetics (1) *Manoil* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of bacterial assembly mechanisms, with emphasis on the topogenesis of membrane proteins. Credit/no credit only. Offered: AWSp.

GENET 586 Seminar in Mammalian Genetics (1) *Sibley* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of mammalian genetics, with

emphasis on lymphoblast development. Credit/no credit only. Offered: AWSp.

GENET 587 Seminar in Nematode Genetics (1) *Thomas* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of nematode development, with emphasis on neurogenesis and other developmental processes. Credit/no credit only. Offered: AWSp.

GENET 590 Population Genetics Seminar (1) *Felsenstein* Weekly presentation by participants of current literature and ongoing research in evolution, molecular evolution, evolutionary genetics of natural populations, human population genetics, and quantitative genetics applied to animal and plant breeding. Credit/no credit only. Prerequisite: GENET 562 or permission of instructor.

GENET 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

GENET 700 Master's Thesis (*) Offered: AWSpS.

GENET 800 Doctoral Dissertation (*) Offered: AWSpS.

Molecular Biotechnology

MBT 450 Introduction to Molecular Biotechnology (2) Highlights of the current research interests of Molecular Biotechnology faculty. Topics cover the interface between biology and technology for DNA and protein analysis. Credit/no credit only. Offered: A.

MBT 499 Undergraduate Research (1-5, max. 12) Individual research projects in Molecular Biotechnology related to: human genetics, cytogenetics, large-scale sequencing and mapping, protein structure and function, and computational analysis of protein and DNA sequences. Offered: AWSpS.

MBT 501 Introduction to Research (1-9, max. 15) Laboratory rotations for first-year graduate students. Research projects in faculty labs covering various laboratory methods. Prerequisite: graduate student in MBT. Offered: AWSpS.

MBT 510 Technologies for Genome Analysis (3) Discussion of current and newly-emerging technologies in genome analysis with regard to applications in biology and medicine and to potential advantages and limitations. Prerequisite: permission of instructor. Offered: A.

MBT 520 Technologies for Protein Analysis (3) Discussion of current and newly-emerging technologies in protein analysis with regard to applications in biology and medicine and to potential advantages and limitations. Prerequisite: permission of instructor. Offered: W.

MBT 530 Advanced Instrumentation for Genome Analysis (3) Presentation of principles and use of instruments for genome analysis. Discussion of limitations of present instruments and potential improvements. Theory of electrophoretic and fluorescence-based DNA analysis techniques. Prerequisite: permission of instructor. Offered: Sp.

MBT 540 Introduction to Computational Molecular Biology: Genome and Protein Sequence Analysis (3) Algorithmic and probabilistic methods for analysis of DNA and protein analysis. Students must be able to write computer programs for data analysis. Prior coursework in biology and probability highly desirable. Prerequisite: permission of instructor. Offered: jointly with GENET 540; W.

MBT 541 Introduction to Computational Molecular Biology: Molecular Evolution (3) Computational methods for studying molecular evolution. Students must be able to write computer programs for data

analysis. Prior coursework in biology and probability highly desirable. Prerequisite: MBT/GENET 540 or permission of instructor. Offered: jointly with GENET 541; Sp.

MBT 550 Seminar in Molecular Biotechnology (1, max. 12) Presentation of independent research by invited outside speakers and members of the Department of Molecular Biotechnology. Emphasis on new and original contributions to the field of molecular biotechnology. Credit/no credit only. Offered: AWSp.

MBT 551 Seminars in Computational Biology (1) Presentation and discussion of current topics in computational biology by guest speakers. Prerequisite: permission of instructor. Offered: AWSp.

MBT 560 Molecular Biotechnology Literature Conference (1, max. 12) A weekly presentation and discussion by faculty, postdoctorates, and graduate students on state-of-the-art research in molecular biotechnology. Journal Club sessions, during which results gleaned from current literature are discussed and critically analyzed, alternating with Research in Progress sessions, during which students and postdoctorates present their own research work. Prerequisite: permission of instructor. Credit/no credit only. Offered: AWSp.

MBT 561 Research Discussions (1) Oral and written presentations of research objectives, techniques, results and perspectives obtained through laboratory rotations and independent research. Emphasis is placed on improving oral presentation skills. Prerequisite: graduate student standing, permission of Graduate Program Director. Offered: AWSp.

MBT 599 Special Topics in Molecular Biotechnology (*, max. 12) Prerequisite: permission of instructor. Offered: AWSp.

MBT 600 Independent Study or Research (*) Credit/no credit only.

MBT 700 Master's Thesis (*) Credit/no credit only.

MBT 800 Doctoral Dissertation (*) Credit/no credit only.

Human Biology

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

HUBIO 500 P-Medical Practice Preceptorship at WWAMI Sites (1, max. 3) Personal experience with, and insight into, medical practice situations. Student is stationed with carefully selected clinical faculty members in their offices in accordance with the student's preference of discipline at the WWAMI sites. Registration limited to first-year medical students at WWAMI sites. Offered: AWSpS.

HUBIO 501 P-Human Biology Special Projects (*) *Hunt, MacLaren* Designed for medical students electing a special study project related to the Introduction to Clinical Medicine or other human biology courses, which are offered during the first and second years in the School of Medicine. Primarily intended for students in remedial or extended programs. Prerequisite: permission of assistant dean for curriculum. Offered: AWSpS.

HUBIO 505 P-WWAMI Preceptorship (1) Opportunity for first-year medical students at WWAMI sites to gain personal experience with medical practice situations by being assigned to selected clinical faculty members in their offices. Offered: ASP.

HUBIO 510 P-Microscopic Anatomy: Histology (3) *Farr* Lectures and laboratories in microscopic anatomy designed to provide the principles and concepts of histology, to define the morphological characteristics of the cells, tissues, and organs of the human body, and to relate this information to functional processes studied in concurrent and subsequent courses. Offered: A.

HUBIO 511 P-Gross Anatomy and Embryology (7) *Clark* Structural organization of human body at the macroscopic level to provide a foundation for physical examination and functional assessment of the human organism. Integrates embryological development with study of the cadaver and examination of the normal living body. Concentrates on exploration of the body cavities and the viscera they contain. Offered: A.

HUBIO 512 P-Mechanisms in Cell Physiology (5) *Crill* Physiology of the cell membrane, including ionic and electrical potential gradients; active transport, excitability, and action potentials; biophysics of sensory receptors; neuromuscular transmission; muscle energetics and contractility; spinal reflexes and central synaptic transmission; autonomic nervous system; energy metabolism and temperature regulation; epithelial transport; gastrointestinal motility and secretions. Offered: A.

HUBIO 513- P-Introduction to Clinical Medicine (1-) *Goldstein* Instruction in communication skills and interview techniques to form the basis for the doctor-patient relationship and for the skills of communicating with patients. The patient profile is obtained. Attention to developing comfort in the physician role. Offered: A.

HUBIO 514- P-Biochemistry I-A (4-) *Maizels* Classical molecular and cellular biochemistry, cellular physiology and molecular genetics. Metabolic interrelationships as they occur in the individual stressed and related to disturbances in disease states. Offered: A.

HUBIO 516- P-Systems of Human Behavior I-A (3-) *Walker* Effects of behavioral factors in major management problems faced in medical practice relating to cultural background, social role, sexual identity, and belief systems. Acquisition of skills in analyzing behavior, defining objectives, and designing precise treatment strategies. Offered: A.

HUBIO 520 P-Cell and Tissue Response to Injury (6) *Norwood* Patterns of cell and tissue response to injury. Mechanisms of cell injury, the inflammatory process, immunology, immunopathology, thrombosis, normal and abnormal growth, neoplasia, clinicopathological correlation. Offered: W.

HUBIO 521- P-Microbiology and Infectious Disease I-A (4-) *Moseley* 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. Offered: W.

HUBIO -522- P-Introduction to Clinical Medicine (-2-) *Goldstein* Medical history is introduced and instruction in data collection is begun. Experience in conducting medical interviews with patients to obtain the medical history and patient profile. Special problems related to interviewing are addressed. Offered: W.

HUBIO 523 P-Introduction to Immunology (2) *Wilson* Basic concepts such as antigens; antibodies; complement; B- and T-lymphocyte function, including interactions with each other and with accessory cells; immunological tolerance; major histocompatibility complex; and role of these basic concepts in immunopathology (immunodeficiencies, hypersensitivities, autoimmunity, blood transfusion, and transplantation). Offered: W.

HUBIO -524 P-Biochemistry I-B (-3) *Maizels* Classical molecular and cellular biochemistry, cellular physiology and molecular genetics. Metabolic interrelationships as they occur in the individual stressed and related to disturbances in disease states. Offered: W.

HUBIO -526 P-Systems of Human Behavior I-B (-1) *Walker* Effects of behavioral factors in major management problems faced in medical practice relating to cultural background, social role, sexual identity, and belief systems. Acquisition of skills in analyzing behavior, defining objectives, and designing precise treatment strategies. Offered: W.

HUBIO 530 P-Epidemiology (2) *Wald* Community health and disease, including assessment of disease risk and mechanisms of epidemic detection, spread, and control; interpretation of research design, data analysis, bias source; and clinical epidemiology, including evaluation and application of diagnostic tests, natural history of disease, and quantitative aids for clinical decision making. Offered: W.

HUBIO 531 P-Head, Neck, Ear, Nose, and Throat (5) *Graney* 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. Offered: Sp.

HUBIO 532 P-Nervous System (6) *Dacey* Integrated approach to normal structure and function of the nervous system, including the eye. Neuropathological examples, as well as clinical manifestations of neurological disease are presented. Offered: Sp.

HUBIO -534 P-Microbiology and Infectious Disease I-B (-2) *Moseley* 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. Offered: Sp.

HUBIO -535 P-Introduction to Clinical Medicine (-4) *Goldstein* Adult screening physical examination is taught through the use of lecture, audiovisual aids, and small-group tutorial, where students in supervised setting practice the physical examination on one other. Further practice in the performance and recording of the patient profile and medical history. Offered: Sp.

HUBIO 540 P-Cardiovascular System (5.5) *Feigl* Interdisciplinary approach to cardiovascular medicine, including anatomy, physiology, radiology, pathology, medicine, and surgery. Function of the cardiovascular system in health and disease. Offered: A.

HUBIO 541 P-Respiratory System (4) *Culver* Interdisciplinary approach to the respiratory system, including anatomy of thorax and lungs, ventilation mechanics, blood-gas transport, gas exchange, acid-base balance, and the physiology and pathology of obstructive, restrictive, and pulmonary-vascular diseases. Offered: A.

HUBIO 542- P-Introduction to Clinical Medicine (2.5-) *Goldstein* Advanced instruction in interview

technique, history taking, and physical examination, with emphasis on detection of abnormalities. Offered: A.

HUBIO 543 P-Principles of Pharmacology I (4) *Vincenzi* Includes general principles of pharmacology and the specific pharmacology of major drugs acting on the autonomic and cardiovascular systems. Offered: A.

HUBIO 544 P-Endocrine System (2.5) *Weigle* Normal, gross, and microscopic anatomy and physiology of the endocrine system. Illustrations examining the clinical relevance of homeostasis, feedback, and other controlling mechanisms previously learned. Endocrine integration of metabolism. Clinically important endocrine pathophysiology. Offered: A.

HUBIO 546 P-Systemic Pathology (2) *Schmidt* Multidisciplinary approach to some diseases that affect more than one organ system (nervous, cardiovascular, respiratory) and that are caused by different mechanisms (congenital, inflammatory, vascular, traumatic, metabolic, neoplastic). Offered: Sp.

HUBIO -550- P-Introduction to Clinical Medicine (-3.5-) *Goldstein* Advanced instruction in interview technique, history taking, and physical examination, with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms. Offered: W.

HUBIO 551 P-Gastro-Intestinal System (4) *Saunders* Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination. Offered: W.

HUBIO 552 P-Hematology (3) *Gernsheimer* Familiarizes students with the basic pathophysiological mechanisms leading to disturbances of red cell, white cell, and platelet production, as well as abnormalities of hemostasis presenting clinical problems. Pathophysiology, rather than minute details of individual disease, is stressed. Offered: W.

HUBIO 553 P-Musculoskeletal System (4.5) *Teitz* Gross, surface, applied, and radiographic anatomy. Clinical manifestations in the musculoskeletal system and pathophysiology of trauma, aging, infection, and inflammation, as well as congenital and metabolic disorders. Dissections, physical examinations, and problem based learning. Offered: W.

HUBIO 554 P-Genetics (2.5) *Horwitz* Review of basic genetic principles and their applications in clinical medicine. Includes human chromosomal disorders; patterns of inheritance, genetic counseling, amniocentesis; pathogenesis of hereditary diseases, monogenic and multifactorial; role of genetics in common diseases; behavioral genetics; drug-gene interactions; and prevention and treatment of genetic diseases, including prenatal diagnosis and population screening. Offered: A.

HUBIO 555 P-Medicine, Health, and Society (3) *Lafferty* Interdisciplinary introduction to health services designed for future health care practitioners. Examines the history, organization, and effectiveness of the U.S. health care system. Stresses the student's ability to adopt a broad perspective across health care disciplines and traditional boundaries. Offered: W.

HUBIO -560 P-Introduction to Clinical Medicine (-5) *Goldstein* Introduction to clinical and laboratory diagnosis. Offered: Sp.

HUBIO 562 P-Urinary System (4) *Ryan* Anatomy, physiology, and pathology of the kidney, ureter, bladder, and prostate; pathophysiology and treatment of common fluid and electrolyte problems; renal pharmacology; major clinical urinary system syndromes,

with current diagnostic approaches and therapy. Offered: Sp.

HUBIO 563 P-Systems of Human Behavior II (3) *Pascualy* Major psychiatric disorders are defined and described, and a systematic approach to differential diagnosis is presented. Conceptual development, pathogenesis, epidemiology, nomenclature, and the terminology used in psychiatry are discussed. Offered: Sp.

HUBIO 564 P-Principles of Pharmacology II (3) *Chavkin* Lectures and conferences on drugs that act on the central nervous system. Emphasis on physiological and biochemical mechanisms, with consideration of therapeutic and adverse effects. Offered: Sp.

HUBIO 565 P-Reproduction (3.5) *Steiner* Normal development of the human reproductive system. Sexual differentiation, puberty, endocrine control of testicular and ovarian function, gamete biology, fertilization, implantation, immunology and endocrinology of pregnancy, labor and delivery, pathology of the male and female reproductive organs, contraception, prolactin and lactation, aging and infertility. Offered: Sp.

HUBIO 567 P-Skin System (2) *Colven* 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. Offered: A.

HUBIO 568 P-Nutrition for Physicians (1) *Lipkin* Principles and practice of clinical nutrition, including role of nutrients in normal growth and development, pathogenesis of chronic disease, and nutrition in the management of certain disease states. Offered: Sp.

HUBIO 590 P-Introduction to Critical Reading and Evaluation of the Medical Literature (1) *Wolf* An introduction to methods for identifying and retrieving Web-based high quality, relevant evidence, and to methods for describing and applying rigorous criteria when reading primary research studies or reviews of primary studies that report on the effectiveness of therapeutic or preventive interventions. Prerequisite: first-year medical student standing. Offered: W.

HUBIO 598 P-WWAMI Non-Clinical Selectives (*) Courses offered at WWAMI university sites designed to satisfy the non-clinical selective graduation requirement for medical students. Offered: AWSp.

HUBIO 599 P-Independent Study in Medical Science (6) *Marshall* Independent research with faculty sponsor and completion of paper as partial fulfillment of non-clinical selective graduation requirement. Offered: Sp.

Immunology

H564 Health Sciences

 *General Catalog Web page:*
www.washington.edu/students/genecat/academic/immunology.html

 *Department Web page:*
www.immunol.washington.edu

For those contemplating careers in biomedical research, immunology provides challenging and exciting intellectual opportunities. Progress in the discipline in the past decade has been extraordinary, a fact that is nowhere more visible than at the University of Washington. The Department of Immunology, launched in 1989, now boasts more than 200 scien-

tists, students, and technicians, all engaged in elucidating mechanisms underlying immune recognition and responsiveness. Current members of the department have distinguished records in the area of lymphocyte signaling, T and B cell development, macrophage function, antigen processing, immunotolerance, and the structure of antigen receptors.

Consider for a moment the fundamental processes that underlie immune function. First, millions of potentially injurious macromolecules must somehow be recognized. Second, recognition of these macromolecules, generally structures associated with potential pathogens, must trigger powerful effector mechanisms that permit elimination of the offending microorganisms. Finally, these recognition and effector systems must somehow distinguish the universe of potentially harmful molecules from an equally diverse repertoire of structurally similar 'self' components. How is such exquisitely specific molecular recognition achieved? How do the cells responsible for mediating host defense develop, and what signaling systems direct their responses? These questions can now be productively addressed using biochemical, genetic, and cell biological techniques.

Graduate Program Coordinator
H564 Health Sciences, Box 357650
206-685-3955, fax 206-543-1013

The Department of Immunology continues to grow and includes more than 25,000 square feet of laboratory space housed on three floors of the H and I wings of the Health Sciences Center. Joint faculty members (those holding primary appointments in other departments) have laboratory facilities in adjacent buildings. Individual laboratories are well equipped for modern biomedical research, and there are central departmental facilities for fluorescence-activated cell sorting, confocal microscopy, and the production of transgenic animals. Students have access to all the instruments and to state-of-the-art microcomputer-based data manipulation. The departmental library maintains recent copies of all major immunology journals and many more are available online or in the nearby University of Washington Health Sciences Library, which is one of the premier scientific libraries in the United States, providing access to scientific literature in all relevant disciplines.

Students are admitted for autumn quarter; the application deadline is January 1 for U.S. citizens, and November 1 for international applicants. The requirements for admission are flexible; however, most successful applicants will have completed survey courses in biology, chemistry, and physics, one year of organic chemistry, and mathematics through integral calculus. Prior exposure to immunology through formal course work or laboratory research is desirable. All immunology graduate students are assured of financial support for the term of their studies.

Faculty

Chair

Christopher B. Wilson

Professors

Aderem, Alan A. * 1996, (Affiliate); PhD, 1979, University of Capetown (South Africa); signal transduction and the cytoskeleton.

Bevan, Michael J. * 1990; PhD, 1972, National Institute for Medical Research (UK); T lymphocyte development and specificity.

Clark, Edward A. * 1984; PhD, 1977, University of California (Los Angeles); lymphocyte surface molecules, lymphocyte activation and cell communication.

Elkon, Keith B. * 2001; MD, University of Witwatersrand (South Africa), MRCP, 1978, University of London; rheumatology.

Greenberg, Philip D. * 1978; MD, 1971, State University of New York (Downstate Medical Center); molecular, cellular, viral, and tumor immunology.

Lernmark, Ake * 1988, (Adjunct); MD, 1970, PhD, 1971, University of Umea; immunogenetics of organ-specific autoimmunity with emphasis on insulin-dependent diabetes.

Maizels, Nancy * 2000; PhD, 1974, Harvard University; recombination and repair in mammalian cells, especially activated B cells.

Nepom, Gerald T. * 1982, (Affiliate); PhD, 1977, MD, 1978, University of Washington; immunogenetics, immunoregulation, neuroimmunology.

Wilson, Christopher B. * 1980; MD, 1972, University of California (Los Angeles); immunology, infectious diseases.

Associate Professors

Concannon, Patrick J. * 1989, (Affiliate); PhD, 1984, University of California (Los Angeles); development of the human T cell receptor repertoire, genetics of diabetes and ataxia-telangiectasia.

Farr, Andrew G. * 1982, (Adjunct); PhD, 1975, University of Chicago; cell interactions governing lymphocyte production and function.

Fink, Pamela J. * 1990; PhD, 1981, Massachusetts Institute of Technology; T cell differentiation, tolerance induction, molecular and cellular immunology.

Foote, Jefferson * 1994, (Affiliate); PhD, 1985, University of California (Berkeley); biophysics of immune maturation, antibody engineering and immunotherapy, x-ray crystallography.

Goverman, Joan M. * 1992; PhD, 1981, University of California (Los Angeles); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity.

Hockenbery, David M. * 1994, (Adjunct); MD, 1982, Washington University; gastroenterology.

Rawlings, David J. * 2001; MD, 1984, University of North Carolina; immunology and rheumatology.

Rudensky, Alexander Y. * 1992; PhD, 1986, Gabrichevsky Institute for Epidemiology and Microbiology; antigen processing and presentation, T-cell recognition, T cell development.

Willerford, Dennis M. * 1996, (Adjunct); MD, 1995, Washington University; hematology.

Ziegler, Steven F. * 1988, (Affiliate); PhD, 1984, University of California (Los Angeles); genetic and molecular analysis of immune system function.

Assistant Professors

Beeson, Craig C. * 1996, (Adjunct); PhD, 1993, University of California (Irvine); the chemistry and biochemistry of the immune system, regulation of energy metabolism.

Bix, Mark * 1999; PhD, 1993, Massachusetts Institute of Technology; regulation of cytokine gene expression during effector T cell development.

Dong, Chen * 2000; PhD, 1996, University of Alabama; molecular mechanisms of immune and autoimmune responses.

Gu, Yansong * 2001, (Adjunct); PhD, 1994, Thomas Jefferson University; DNA damage signaling and repair pathways.

Kaja, Murali Krishna * 2001; PhD, 1995, Indian Institute of Technology (India); generation and maintenance of immune memory.

Lagunoff, Michael * 2001, (Adjunct); PhD, 1995, University of Chicago; molecular virology of Kaposi's sarcoma-associated herpesvirus.

Nelson, Bradley H. * 1997, (Affiliate); PhD, 1991, University of California (Berkeley); molecular regulation of T lymphocyte proliferation by the interleukin-2 receptor.

Scharenberg, Andrew M. 2000, (Adjunct); MD, 1990, University of North Carolina; immunology.

Strong, Roland K. * 1994, (Affiliate); PhD, 1990, Harvard University; structural immunology: analysis of the functions of proteins mediating immune responses.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsca/.

IMMUN 441 Introduction to Immunology (4) NW

General properties of immune responses; cells and tissues of immune system; lymphocyte activation and specificity; effector mechanisms; immunity to microbes; immunodeficiency and AIDS; autoimmune diseases; transplantation. Prerequisite: BIOL 202; may not be repeated; recommended: GENET 371, GENET 372, BIOC 405, or BIOC 440. Offered: jointly with MICROM 441; A.

IMMUN 447 Immunity, Disease, and Society (2)

Clark Impact and controversies associated with breakthroughs in immunology and infectious diseases. Topics include vaccines, complementary medicine (herbal boosts of the immune system), the mind and the immune system, allergies (asthma), cancer immuno-therapy, genetic screening and autoimmune disease and natural history of infectious disease. Prerequisite: MICROM 441. Offered: jointly with MICROM 447.

IMMUN 499 Undergraduate Research (*, max. 24)

Investigative work on a variety of topics, including mechanisms of antigen recognition, T-cell development and differentiation, immunogenetics, lymphocyte activation, MHC gene structure and function, retrovirology, and the pathogenesis of autoimmune diseases, among others. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 532 Advanced Immunology (4)

Examines the molecular and cellular basis of immune function. Students must have completed a baccalaureate degree in a biological specialty and be conversant with molecular genetics. Topics include: hematopoiesis, antigen receptor structure, lymphocyte development, antigen presentation, and cytokines. Offered: W.

IMMUN 533 Host Defense to Cancer and Infection (3)

Clark Addresses the immune response to cancer, immunity to infection that complicates cancer, and the mechanisms of cellular homeostasis need to prevent cancer of the immune system. Offered: Sp; even years.

IMMUN 534 Central Issues in Immunology (2, max. 4)

Presentations by participants of topics relating to the broad study of immunology. Prerequisite: graduate standing in Immunology. Offered: Sp.

Current Research Conferences Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter.

IMMUN 550 Selected Topics in Immunology (1, max. 30) Formal seminar-discussion course for advanced students focused on recent developments in the field and consisting of literature research and intensive in-depth study of important and timely topics. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 551 Regulation of T Cell-Dependent B Cell Maturation (1, max. 30) *Clark* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 552 Immunogenetics and Autoimmunity (1, max. 30) *Concannon* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 553 Recombination and Repair in B Cell Development (1, max. 30) *Maizels* Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 554 Immunogenetic Aspects of Human Autoimmunity (1, max. 30) *Nepom* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 555 Model of Autoimmune Disease and Their Regulation (1, max. 30) *Goverman* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 557 Thymic Environment (1, max. 30) *Farr* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 559 Cytokine Gene Regulation (1, max. 30) *Bix* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 560 Progress in T Cell Research (1, max. 30) *Bevan, Fink, Rudensky* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 561 Mechanisms of Peripheral Tolerance (1, max. 30) *Fink* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 562 Developmental Regulation of T Cell Function (1, max. 30) *Wilson* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 563 Macrophage Biology: Signaling and Phagocytosis (1, max. 30) *Aderem* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 564 Cellular/Molecular Regulation of T Cell Responses (1, max. 30) *Greenberg* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 565 Signaling and Costimulatory Regulation of T Cell Function (1, max. 30) *Dong* Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 566 Role of Innate Mechanisms in Generation and Maintenance of Protective Immune Memory (1, max. 30) *Kaja* Weekly group conferences concerning ongoing graduate students

and postdoctoral research in immunology. Credit/no credit only. Offered: AWSpS.

IMMUN 567 Antigen Processing and Presentation (1, max. 30) *Rudensky* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 568 Antibody Structure and Function (1, max. 30) *Foote* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 569 Genetics of Diabetes (1, max. 30) *Lernmark* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 570 Cytokine Signaling in Lymphocytes (1, max. 30) *Nelson* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 573 Immunology Seminar Series (1, max. 30) Weekly discussion in which original research results are presented and discussed. Emphasis is on new and original contributions to field of immunology and related areas; occasional seminars are concerned with review of important topics. Credit/no credit only. Prerequisite: firm background in immunology, permission of instructor. Offered: AWSpS.

IMMUN 599 Introduction to Immunology Research (1-7, max. 7) Current problems in immunological research. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

IMMUN 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

IMMUN 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Laboratory Medicine

NW120 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/gencat/academic/Laboratory_Med.html



Department Web page:
www.labmed.washington.edu

The Department of Laboratory Medicine provides service, education, and research. The divisions of the department include clinical chemistry, hematology, microbiology, coagulation, immunology, genetics, molecular diagnostics, virology, and medical informatics. In addition to courses for medical students, the department offers a Master of Science degree program. The department provides residency training in clinical pathology for graduate physicians and postdoctoral training in several subspecialty areas of laboratory medicine.

Graduate Program

Graduate Program Director
NW120 University of Washington Medical Center,
Box 357110
206-598-6131
Imedgrad@u.washington.edu

The Department of Laboratory Medicine offers a graduate program leading to the Master of Science degree. Each student in the program selects one of the major areas of concentration (chemistry, coagulation, hematology, immunology, microbiology, or virology). The chemistry option is approved by the Commission on Accreditation in Clinical Chemistry.

The other options have no comparable accrediting agencies.

A thesis based upon independent research in the student's selected area of concentration is required. Course requirements vary with the option selected. However, the program is flexible and permits each student (with the help of an adviser) to plan a course of study that meets individual needs. A full-time student normally completes the program in two years. The program prepares qualified candidates for supervisory positions in clinical laboratories and for careers in investigation or teaching in an area of clinical laboratory science.

Admission Requirements

Applicants must have a B.S. or B.A. degree in a field appropriate to the graduate study (medical technology, biochemistry, biology, chemistry, or microbiology) and meet the Graduate School requirements for admission. The applicant must also be certified as a medical technologist/clinical-laboratory scientist, or as a specialist in a particular area of laboratory medicine by one of the national certifying agencies. In addition, applicants must take the Graduate Record Examination aptitude test.

Major Requirements

Students must meet the minimum requirements for a master's degree as stated in the Graduate School section of this catalog. In addition, a core of courses is required for all students in the program as well as additional specific course requirements for the various major areas of concentration.

Financial Aid

Research assistantships may be available for second-year students. Opportunities for part-time employment in departmental laboratories may be available, and applications will be considered.

Research Facilities

Each division in the department is equipped with modern facilities for research in its specialty area.

Residency Training Program

The department provides residency training in clinical pathology (laboratory medicine) for graduate physicians in cooperation with the Department of Pathology. Persons who complete the program are eligible for certification by the American Board of Pathology. For additional information, contact the Resident Program Director, Department of Laboratory Medicine, Box 357110.

Faculty

Chair

James S. Fine

Professors

Ashley, Rhoda L. * 1981; PhD, 1977, University of California (Davis); pathogenesis of viral infections, immune response to herpes, rapid diagnosis.

Bauer, Larry * 1980, (Adjunct); PharmD, 1980, University of Kentucky; clinical pharmacokinetics and drug metabolism, drug interactions.

Chandler, Wayne L. * 1982; MD, 1982, St Louis University; clinical chemistry, clinical coagulation, hematology.

Chatrjian, Gian E. 1981, (Emeritus); MD, 1951, University of Naples (Italy); electroencephalography and clinical neurophysiology.

Corey, Lawrence * 1977; MD, 1971, University of Michigan; DX, therapy and pathogenesis of viral infections, AIDS/herpes viruses.

Coyle, Marie B. * 1973, (Emeritus); PhD, 1965, Kansas State University; DNA probes and GLC for rapid identification of Mycobacteria and Corynebacteria.

Detter, James C. * 1970, (Emeritus); MD, 1962, University of Kansas; laboratory diagnosis of genetic disorders, red-cell disorders and laboratory instrumentation.

Fang, Ferric C. 2001; MD, 1983, Harvard University.

Gilliland, Bruce C. * 1970; MD, 1960, Northwestern University; hematology.

Kaplan, Alex 1960, (Emeritus); PhD, 1936, University of California (Berkeley); clinical chemistry.

Kenny, Margaret * 1970, (Emeritus); PhD, 1968, University of Illinois; clinical chemistry, new technologies for in vivo clinical biochemical analysis.

Labbe, Robert F. * 1957, (Emeritus); PhD, 1951, Oregon State University; porphyrin disorders, nutritional biochemistry.

McElrath, Margaret Juliana * 1990, (Adjunct); PhD, 1978, MD, 1980, Medical University of South Carolina; infectious diseases.

Mullins, James I. * 1994, (Adjunct); PhD, 1978, University of Minnesota; retroviruses and AIDS, molecular virology.

Plorde, James J. * 1982, (Emeritus); MD, 1959, University of Minnesota; infectious diseases, antibiotic-resistant nosocomial infections.

Raghu, Ganesh 1981, (Adjunct); MD, 1974, University of Mysore (India); respiratory disease.

Rainey, Petrie M. * 2000; PhD, 1973, University of California (Berkeley), MD, 1980, University of North Carolina; clinical chemistry, medical toxicology, pharmacology of antiviral and antiparasitic drugs.

Raisys, Vidmantas A. * 1971, (Emeritus); PhD, 1969, State University of New York (Buffalo); clinical toxicology, therapeutic drug monitoring.

Rutledge, Joe C. * 1989; MD, 1976, Vanderbilt University; genetic disease pathology, human embryology, mouse mutagenesis, pediatric chemistry/hematology.

Schmer, Gottfried * 1970, (Emeritus); MD, 1956, University of Vienna (Austria); tropical medicine and public health, clinical parasitology, preventive medicine.

Zeh, Judith * 1982, (Adjunct Research); PhD, 1979, University of Washington; estimation of population size and dynamics; robust methods, computing in infectious disease research.

Associate Professors

Astion, Michael L. * 1991; PhD, 1989, MD, 1989, University of Pennsylvania; multi media computer-aided tutorials, immunology.

Chou, David * 1998; MD, 1974, University of Pittsburgh, MS, 1979, University of Minnesota; medical informatics, instrument automation, clinical chemistry.

Clayson, Kathleen J. * 1969, (Emeritus); MS, 1968, University of Minnesota; enzymology in clinical chemistry.

Cookson, Brad T. * 1996; PhD, 1991, MD, 1991, Washington University; cellular immune response to

intracellular bacteria; microbial pathogenesis; clinical microbiology.

Coombs, Robert W. * 1985; PhD, 1977, MD, 1981, Dalhousie University (Canada); diagnosis and pathogenesis of HIV infection.

Delaney, Collene J. * 1982; PhD, 1972, University of Illinois; clinical chemistry, the study of diabetes and alcoholism.

Fine, James * 1977; MD, 1972, MS, 1977, University of Minnesota; enzymology, medical informatics.

Fligner, Corinne L. 1983, (Adjunct); MD, 1976, University of New Mexico; autopsy and forensic pathology, fetal and perinatal pathology, forensic toxicology.

Frenkel, Lisa M. 1994; MD, 1987, University of Kansas; infectious disease.

Fritsche, Thomas R. * 1981; MD, 1981, PhD, 1984, University of Minnesota; systematics and ecology of animal parasites, medical microbiology.

Gretch, David R. * 1990; PhD, 1990, University of Iowa, MD, 1990, University of Iowa; research and diagnostics related to viral hepatitis.

Hackman, Robert C. 1982; MD, 1971, Stanford University; infectious and pulmonary complications in immunocompromised patients.

Lampe, Mary F. * 1988; MS, 1976, University of Washington, PhD, 1984, University of North Carolina; medical technology education, molecular analysis of Chlamydia trachomatis pathogenesis.

Opheim, Kent E. * 1977; PhD, 1972, Cornell University; molecular cytogenetics, pediatric clinical toxicology.

Sabath, Daniel E. * 1993; PhD, 1989, MD, 1989, University of Pennsylvania; regulation of gene expression in hematopoietic cells.

Schiller, Harvey S. * 1982; MD, 1966, Washington University; clinical chemistry, hematology, interpretation of laboratory data.

Stephens, Karen G. * 1989, (Research); PhD, 1982, Indiana University; neurofibromatosis, tumorigenesis, gene mapping and regulation, human genetics.

Tait, Jonathan F. * 1985; PhD, 1983, Washington University, MD, 1983, Washington University; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders.

Wener, Mark H. * 1980; MD, 1974, Washington University; diagnostic immunology, immune complex diseases.

Assistant Professors

Behrens, Joyce A. 1971; MS, 1971, University of Minnesota; clinical hematology and clinical coagulation methodologies.

Brodie, Scott J. 2000, (Research); DVM, 1989, Washington State University, PhD, 1992, Colorado State University.

Jerome, Keith R. 1998; PhD, 1992, MD, 1993, Duke University; virology, immunology, apoptosis.

Koelle, David 1988, (Adjunct); MD, 1985, University of Washington; allergy and infectious diseases.

La Spada, Albert R. 1998; PhD, 1993, MD, 1993, University of Pennsylvania; inherited neurodegenerative disease.

LeCrone, Carol N. * 1967, (Emeritus); MS, 1966, Colorado State University; hematology, hemoglobinopathies.

Limaye, Ajit P. 1998; MD, 1992, University of Washington.

McGonagle, Lee Anne 1969, (Emeritus); MPH, 1969, University of Michigan; clinical microbiology, procedures for diagnostic bacteriology.

Nester, Theresa 2001; MD, 1994, University of Rochester; clinical transfusion medicine, immunohematology, teaching.

Polyak, Stephen J. 1998, (Research); PhD, 1993, McMaster University (Canada); virology, hepatitis C, virus-host interactions.

Posavad, Christine 2001, (Research); PhD, 1993, McMaster University (Canada).

Szabo, La Verne 1970, (Emeritus); MS, 1970, University of Washington; general clinical chemistry, heavy metals in clinical chemistry.

Wald, Anna * 1989, (Adjunct); MD, 1985, Mt Sinai School of Medicine, MPH, 1994, University of Washington; the epidemiology, natural history and therapeutics of HSV and other herpesviruses infections.

Wood, Brent L. * 1998; PhD, 1988, MD, 1990, Loma Linda University; hematopathology, leukemia, lymphoma, flow cytometry, cell sorting.

Zhu, Tuofu 2002; MD, 1984, Jiangxi University (China), PhD, 1990, Peking Union Medical School (China).

Lecturer

Goodyear, Nancy 2000; PhD, 1997, Catholic University of America; clinical microbiology and education.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

LAB M 418 Topics in Clinical Chemistry (5) *Rainey* Continuation of LAB M 322. Lecture and laboratory exercises covering fundamentals of instrumentation and methodology in the clinical chemistry laboratory. Offered: Sp.

LAB M 419 Clinical Coagulation (4) *Behrens* Lecture and laboratory coverage of the theory of the hemostatic system, to include tests used in the diagnosis/monitoring of patients with abnormal bleeding and/or thrombosis. Instrumentation as appropriate for testing included. Quality control and quality assurance discussed. Offered: S.

LAB M 420 Laboratory Analysis of Urine and Body Fluids (3) *Rainey* Lecture and laboratory covering urinalysis testing procedures and associated disease entities. Analysis of other body fluids. Methods of microscopic examination by use of bright-field, phase, and polarizing microscopy. Offered: S.

LAB M 421 Medical Microbiology (1/6, max. 6) *Goodyear* Lecture and laboratory coverage of human infections and diagnostic procedures used for isolation, identification, and antimicrobial susceptibility testing of the microorganisms associated with disease. Offered: S.

LAB M 423- Clinical Chemistry (*-, max. 24) *Rainey* Clinical testing using automated and manual methods. Measurement of pancreatic function and intestinal absorption, renal and liver function, enzymes,

electrolytes, blood gases, lipids, toxicology, urinalysis, endocrinology, and immunology. Offered: AWSp.

LAB M 424- Clinical Microbiology (*-, max. 24) *Goodyear* Techniques used in the diagnostic microbiology laboratory, including quality control, specimen evaluation, identification of pathogenic microorganisms, and antimicrobial susceptibility testing. Offered: AWSp.

LAB M 425- Clinical Hematology (*-, max. 24) *Behrens* Clinical study of techniques used in the diagnostic evaluation of blood cells, including production, proliferation, survival, morphologic, and functional features. Assessment of proteins and cells important in hemostasis included. Quality control and quality assurance issues considered. Biomolecular techniques appropriate for evaluation of the hematologic and hemostatic systems discussed. Offered: AWSp.

LAB M 426 Clinical Immunohematology (7) *Behrens* Lecture and laboratory covering theory of transfusion medicine and serological procedures used in the evaluation of cellular antigen systems. Principles of immunology and genetics included as appropriate for the techniques performed; screening of donor units to provide a safe product discussed. Quality control and quality assurance issues considered. Offered: W.

LAB M 427- Selected Studies in Laboratory Medicine (*-, max. 24) *Behrens, Goodyear, Lampe, Rainey* Selected clinical study in the major scientific disciplines of laboratory medicine, to include molecular diagnostics, or pursuance of a clinical research study. Credit/no credit only. Offered: AWSpS.

LAB M 499 Undergraduate Research (*) Specific project in clinical laboratory investigation. Offered: AWSpS.

LAB M 502 Laboratory Medicine Grand Rounds (1, max. 6) *Gilliland* Grand rounds are concerned with current topics in the field of laboratory medicine. Credit/no credit only. Offered: AWSp.

LAB M 510 Laboratory Medicine Research Conference (1, max. 6) *Tait* Presentation and discussion of ongoing research and development projects by faculty, residents, fellows, and graduate students. Open to graduate students in laboratory medicine and other medical sciences. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

LAB M 520 Seminar in Organization and Management in Laboratory Medicine (3) *Chandler* Core course for the Master of Science degree in laboratory medicine. Prerequisite: graduate student standing in laboratory medicine or permission of instructor. Offered: odd years; Sp.

LAB M 521 Advanced Laboratory Hematology (1, max. 6) *Sabath* Lectures on diagnostic clinical hematology with emphasis on clinicopathological correlation. For laboratory medicine graduate students with special interest in diagnostic clinical hematology. Prerequisite: graduate standing and permission of instructor. Offered: AWSp.

LAB M 522 Hematopathology Seminar (2) *Wood* Identification of normal lymphocyte and bone marrow subpopulations, diagnosis of leukemias, lymphomas, and benign conditions that resemble them. Emphasis on histopathology, cytochemical, immunological, and molecular markers. Clinicopathologic correlation. Offered: jointly with PATH 522; even years; W.

LAB M 590 P-Research Projects in Laboratory Medicine (*) *Tait* Opportunity for laboratory experience on a research problem related to laboratory medicine. Students investigate areas of potential clinical importance. Projects selected from areas such as chemistry, coagulation, hematology, immunology, microbiology, virology, molecular diagnostics, and

computer applications. Research goals established by instructor in discussion with student. Prerequisite: permission of instructor. Offered: AWSpS.

LAB M 596 Clinical Chemistry Seminar (2) *Rainey* Theory and practice of clinical chemistry. For post-doctoral and graduate students in clinical chemistry. Prerequisite: permission of instructor. Offered: AWSp.

LAB M 601 Internship (3-9, max. 9) Credit/no credit only. Prerequisite: graduate standing in laboratory medicine. Offered: AWSpS.

LAB M 680 P-Clinical Laboratory Testing: Methods and Interpretation (*) *Wener* Provides the third- and fourth-year medical student with the opportunity to evaluate clinical laboratory data in the clinical laboratory setting. One-on-one teaching using case material and actual clinical samples. Offered: AWSpS.

LAB M 685 P-Laboratory Case Studies for Clinical Diagnosis (4) *Rutledge* Clinical case presentations and discussions aimed at test selection, disease-induced alterations, efficient algorithms, factors confounding interpretation, testing economics. Prerequisite: completion of required clerkships. (Four weeks half-time) Offered: A.

LAB M 699 P-WWAMI Laboratory Medicine Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

LAB M 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

Medical Education and Biomedical Informatics

E312 Health Sciences



General Catalog Web page:
www.washington.edu/students/genocat/academic/Medical_Ed.html



Department Web page:
www.dme.washington.edu

The Department of Medical Education and Biomedical Informatics is comprised of three divisions: General Medical Education, Biomedical and Health Informatics, and MEDEX Northwest. The Division of General Medical Education serves the medical school and medical education community through program support, evaluation, and research in the field of medical education. The Division of Biomedical and Health Informatics contributes to the conceptualization and development of innovative clinical, academic, and educational information systems, services, and tools for application within the Academic Medical Center, the University, regionally, and nationally. For more information, visit the Biomedical and Informatics Web site (www.dbhi.washington.edu). MEDEX Northwest is a regional program that selects experienced health care providers for training as physician assistants and is dedicated to improving access to medical care and emphasizes delivery of health care services to medically underserved populations in the Northwest. For more information, visit the MEDEX Web site (www.washington.edu/medical/som/depts/medex/).

The Department of Medical Education and Biomedical Informatics offers courses in the theory and application of medical education and biomedical and health informatics. Courses are designed for faculty, graduate and undergraduate students, post-

graduates and fellows in the health sciences who desire further training in the methods, issues, research, and technology of medical education and biomedical informatics. MEDEX Northwest, a physician assistant training program, offers a program of study leading to a certificate with an optional degree available (a Bachelor of Clinical Health Services).

For the most up-to-date program information, see the Department of Medical Education and Biomedical Informatics' Web site or contact the department, E312 Health Sciences, Box 357240, 206-543-2259.

Faculty

Chair

Fredric M. Wolf

Professors

Brinkley, James F., III * 1988; MD, 1974, University of Washington, PhD, 1984, Stanford University; computer applications in medicine and biology; structural informatics.

Carline, Jan D. * 1977; MEd, 1976, PhD, 1979, University of Washington; assessment of physician performance, evaluation of medical education programs.

Dohner, Charles W. * 1967, (Emeritus); PhD, 1966, Ohio State University; program evaluation, administration, faculty development.

Fuller, Sherrilynne S. * 1988; PhD, 1984, University of Southern California; analysis, representation and mapping of research findings (data mining).

Gordon, Michael J. * 1973, (Emeritus); PhD, 1973, Michigan State University; family medicine.

Irby, David M. * 1972, (Affiliate); PhD, 1977, University of Washington; the evaluation and improvement of clinical teaching in medicine.

Norris, Thomas E. 1988, (Adjunct); MD, 1973, University of Texas (Galveston); clinical applications, health policy and health workforce needs.

Scott, Craig S. * 1979; MEd, 1970, California State University, Sacramento, PhD, 1973, University of Iowa; performance-based teaching and evaluation; informatics fluency, medical education outcomes.

Shapiro, Linda G. 1986, (Adjunct); MS, 1972, PhD, 1974, University of Iowa; computer vision, multimedia information systems, medical informatics, pattern recognition.

Stewart, Brent K. * 1993, (Adjunct); PhD, 1988, University of California (Los Angeles); biomedical physics, biomedical image processing, medical imaging, medical information systems.

Wolf, Fredric M. * 1997; MEd, 1977, PhD, 1980, Kent State University; clinical decision making, evaluation of new technology, evidence-based health care.

Associate Professors

Astion, Michael L. * 1991, (Adjunct); PhD, 1989, MD, 1989, University of Pennsylvania; multi media computer-aided tutorials, immunology.

Chou, David * 1998, (Adjunct); MD, 1974, University of Pittsburgh, MS, 1979, University of Minnesota; medical informatics, instrument automation, clinical chemistry.

Dewitt, Dawn E. 1990, (Adjunct); MD, 1990, Harvard University; general internal medicine.

Fine, James * 1977, (Adjunct); MD, 1972, MS, 1977, University of Minnesota; enzymology, medical informatics.

Goldberg, Harold I. 1986, (Adjunct); MD, 1977, Stanford University; applying clinical informatics to health services delivery and quality improvement.

Kalet, Ira J. * 1980; PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Meyer, Kerry E. * 1992, (Adjunct); MN, 1981, Vanderbilt University, PhD, 1990, University of Maryland; health informatics, expert systems in support of clinical decision making, and geriatrics.

Pinsky, Linda E. 1989, (Adjunct); MD, 1989, University of Washington; general internal medicine.

Robins, Lynne S. * 1999; PhD, 1990, University of Michigan; cultural competence, physician-patient communication, qualitative research assessment, ethnography.

Smith, Curtis Scott 1987, (Adjunct); MD, 1980, University of Washington; general internal medicine.

Tarczy-Hornoch, Peter 1992; MD, 1989, Stanford University; bioinformatics and clinical informatics: clinical systems and integrating genetic databases.

Wright, Jeffrey A. 1988, (Adjunct); MD, 1978, University of Missouri; general pediatrics.

Assistant Professors

Brock, Douglas M. 1985; MEd, 1987, PhD, 1995, University of Washington; usability and human factors.

Doctor, Jason N. * 1995; PhD, 1995, University of California (San Diego); medical decision making, health economics, decision theory.

Dunbar, Peter J. 1991, (Adjunct); MBChB, 1978, University of Aberdeen (UK).

Gennari, John H. 2002; PhD, 1990, University of California (Irvine); medical informatics and knowledge representation.

Karras, Bryant Thomas 2000, (Adjunct); MD, 1995, University of Wisconsin; public health informatics, guidelines, bioterrorism surveillance.

Kim, Sara 1995, (Adjunct); MA, 1990, George Washington University, PhD, 1999, University of Washington; educational technology.

Langer, Steve G. 1996, (Adjunct); PhD, 1994, Oakland University; medical physics.

Lober, William B. 1997, (Research); MD, 1994, University of California (San Francisco); clinical informatics, public health informatics, bioterrorism surveillance, telemedicine.

Pratt, Wanda 2002; PhD, 1999, Stanford University; information retrieval, human-computer interaction, text mining, medical informatics.

Senior Lecturers

Ballweg, Ruth A. 1981; BS, 1969, Southern Oregon State College; women's health issues, physician assistant education.

Schaad, Douglas C. * 1975; MEd, 1974, PhD, 1986, University of Washington; medical education and evaluation; educational assessment; salmonid recovery; riparian restoration.

Stoll, Henry 1978; BA, 1971, Brown University; physician assistant education and professional issues, curriculum development.

Lecturers

Ambrozy, Donna M. 1995; MA, 1994, Eastern Michigan University, PhD, 1998, University of Washington; standardized patients, teaching methodology.

Cupp, Randal C. 1996; BCHS, 1999, University of Washington; physician assistant education.

Dale, Linda 1997; MSOD, 2001, Central Washington University; physician assistant education.

Flynn, Barbara G. 1994; BA, 1977, Seattle Pacific University; physician assistant education.

Gianola, Fred J. 1987; PA-C, 1975, University of Washington; physician assistant education.

Landel, Grace P. 1990; MEd, 1999, University of Washington; physician assistant education.

MacLaren, Carol F. 1989; MS, 1980, PhD, 1985, University of Pennsylvania; educational research.

Masuda, David 1997; MD, 1980, University of North Dakota, MS, 1996, University of Wisconsin; biomedical and health informatics.

Plummer, William T. 1992; BS, 1974, University of Nebraska; physician assistant education.

Roulston, Maria Carmen 1998; PA-C, 1997, University of Washington; physician assistant education.

Scott, Terry B. 1983; BS, 1993; physician assistant education, underserved and minority population health care.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

MEDED 499 Undergraduate Research (*, max. 12) Investigative research or directed readings in medical education and in biomedical and health informatics. Prerequisite: permission of instructor.

MEDED 510 Topics in Medical Education Research (1/3, max. 12) Selected research topics in medical education. Development of skills in critical analysis and production of original research. Optional: 1 additional credit for seminar focusing on application of issues in education practice. Credit/no credit only. Offered: AWSp.

MEDED 511 Current Issues in Medical Education (2) *Dohner, Robins, Scott, Wolf* Addresses current issues in medical education in the context of historic and contemporary developments. Topics include curriculum development, teaching, and learning, clinical knowledge and reasoning, assessment, professional development, program evaluation, and certification. Offered: A.

MEDED 512 Leadership in Academic Medicine (1) *Dohner, Robins, Scott, Wolf* Explores the theoretical and practical aspects of leadership in academic medicine. Topics include qualities of effective leadership, leadership styles, and impact of institutional organization and culture on leadership. Prerequisite: permission of instructor. Offered: S.

MEDED 520 Teaching Methods in Medical Education (2) *Ambrozy* Empirical and theoretical merits of different teaching methods as applied to medical education. Structuring and leading group discussions, using questions, organizing and delivering lectures, identifying styles of clinical supervi-

sion, providing constructive feedback, and presenting effective clinical demonstrations. Offered: W.

MEDED 521 Evaluation of Learning in the Health Sciences (3) *Carlino* Basic issues and methods for evaluation of learning: cognitive performance, psychomotor skills, and reasoning abilities in classroom, laboratory, and clinical settings. Practical applications of instruments such as multiple-choice questions, essays, oral examinations, checklists, rating scales, simulations, and patient management problems. Recommended: 520. Offered: Sp.

MEDED 522 Research in Medical Education (2) *Scott* Individualized, problem-based overviews of research methods and research design pertinent to research and scholarship in medical education. Development and sequencing of research projects from conceptualization through literature review, including proposal development, project implementation, data management, analysis, and write-up. Assessment and critical reading of related literature stressed. Offered: A.

MEDED 530 Medical Informatics (3) *Masuda* Overview of biomedical and health informatics concepts, theories, and applications, including the historical evolution and the current and future research directions within the context of information flow in health care settings. Offered: A.

MEDED 531 Computing Concepts for Medical Informatics (3) *Kalet* Introduction to computing concepts underlying the solution of problems in medical information management, medical problem solving and medical informatics research. Algorithms, data structures, programming languages, object-oriented programming. Prerequisite: some prior experience with computer programming and application computers in medical care. Offered: A.

MEDED 532 Computing Concepts for Medical Informatics II (3) *Kalet* Continuation of topics begun in MEDED 531: multiprogramming and operating system principles, client-server, network programming with sockets, macros, higher level languages, software engineering. Prerequisite: MEDED 531 or equivalent. Offered: W.

MEDED 534 Biology for Informaticists (4) *Yarfitz A* computing and information oriented treatment of the core concepts of human biology, addressing structure and function at three levels or organization: organism, cell, and gene. Each level includes examples of key anatomic and physiologic concepts, presented from a computational perspective and with the use of electronic resources. Offered: A.

MEDED 535 Clinical Topics for Informaticists (3) *Karras* Builds on Biology for Informaticists and introduces the student to a variety of clinical disciplines, representative clinical problems from these disciplines, and informatics issues and applications within these disciplines. Lecturers include faculty from the Schools of Medicine, Nursing, Pharmacy, and Dentistry. Prerequisite: MEDED 530, MEDED 531, MEDED 534. Offered: W.

MEDED 536 Bioinformatics and Gene Sequence Analysis (3) *Rose* Nature and relevance of molecular sequence information, computer-based protein, and DNA sequence analysis, molecular sequence and genomic databases, and methods for database accession and interrogation. Prerequisite: background in molecular biology and permission of instructor. Offered: jointly with PABIO 536; W.

MEDED 537 Informatics Research and Evaluation Methods (4) *Carlino, Brock* Introduces the many facets of evaluation and research for Biomedical and Health Informatics projects. Focuses on formal studies of the application of information technology in medicine, conducted while an information resource

is under development and after the resource is in routine service. Offered: W.

MEDED 540 Critically Appraising and Applying Evidence in Health Care (2) *Pinksky, Wolf* Literature appraisal skills for various articles (therapy effectiveness, diagnostic tests, literature reviews, clinical measurement, prognosis, quality of care, decision analysis, causation/etiology, guidelines, and economic evaluation). Appraisal of clinical information from literature, strengths/weaknesses of data, analyses, study design/applicability to a current patient's problem. Prerequisite: permission of instructor. Offered: jointly with HSERV 528; W.

MEDED 541 Introduction to Systematic Reviews and Meta-analysis of Evidence (2) *Wolf* Conceptual understanding of the quantitative methods used to synthesize evidence. Methods for pooling evidence across independent studies, pooling binary/continuous outcomes, differences between fixed and random effects models, and guidelines for appraising published systematic reviews/meta-analyses. Prerequisite: introductory level courses in statistics, epidemiology or biostatistics. Prerequisite: permission of instructor. Offered: jointly with HSERV 529; Sp.

MEDED 552 Clinical Decision Support (3) *Doctor* Provides foundation in clinical decision making and support (including decision analysis, Bayesian analysis, belief networks, artificial intelligence, neural networks) presented in the context of local and national decision support systems and the movement to decrease errors in healthcare. Prerequisite: MED 530, MED 531, MED 535, MED 537, CSE 415 or permission of instructor. Offered: A.

MEDED 570 Information Access in Health Sciences (3) *Fuller* Characteristics of users of health sciences information, environments including academic health sciences centers, hospitals, clinics, and public libraries, evaluation of information resources, types of uses of information management systems, health information policy, professional standards, education and certification of health professionals including health science librarians. Prerequisite: LIS 520, LIS 521, or permission of instructor. Offered: jointly with LIS 528.

MEDED 590 Selected Topics in Health Informatics (1-3, max. 12) Computers and information technology are improving and changing healthcare education, research, and clinical practice. Informatics faculty and researchers from the UW and affiliated institutions present their research findings as well as discuss their views of national developments in their respective disciplines. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with HSMGMT 526; AWSp.

MEDED 598 Special Topics in Biomedical and Health Informatics (1-4, max. 12) Readings, lectures, and discussions pertaining to a significant biomedical and health informatics problem or an emerging issue. Topics vary. Offered: AWSpS.

MEDED 599 Independent Study or Research (*, max. 12)

MEDED 600 Independent Study/Research (1-10, max. 10) Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite: permission of instructor.

MEDED 700 Master's Thesis (1-15, max. 15) Prerequisite: permission of instructor. Offered: AWSpS.

Medical History and Ethics

A204 Health Sciences Building



General Catalog Web page:
www.washington.edu/students/gencat/academic/Med_History_Ethics.html



Department Web page:
depts.washington.edu/mhdedept/

Graduate Program

Graduate Program Coordinator
A204 Health Sciences, Box 357120
206-543-5145
mhinfo@u.washington.edu

The Department of Medical History and Ethics offers a program of study leading to a Master of Arts in Bioethics which provides competencies in ethical theory, clinical ethics, and research ethics and methods, along with the historical foundations of bioethics. Students develop skills in research, writing, and public speaking about bioethics, as well as the ability to communicate about and frame ethical issues in health care and biomedical research from a multidisciplinary perspective.

The Master of Arts program brings together students from diverse backgrounds: those with a bachelor of arts in philosophy, or equivalent, who plan to pursue a Ph.D. in bioethics or a related humanities discipline, and those with a professional or master's degree in a health care or health policy field who wish to incorporate bioethics into their professional activities. Applicants with a B.A. must take the GRE. The GRE is not required of applicants with a professional or master's degree.

The program of study includes 45 to 56 credits, comprised of required courses, elective courses that enhance multidisciplinary understanding of ethical issues, and practicum experiences in the University's affiliated hospitals, ethics committees, and institutional review boards. All students complete a master's project in an area of personal scholarly interest.

While the program is designed to be completed in two years (six quarters), a very focused student might complete the program in five quarters. Options of earning a concurrent M.A. in bioethics are available for students enrolled in M.D. or J.D. programs at the University of Washington.

Faculty

Chair

Wylie Burke

Professors

Benson, Keith R. * 1981; MA, 1973, PhD, 1979, Oregon State University; history of modern American biology, marine biology, and evolutionary biology.

Berryman, Jack W. * 1975; MS, 1971, MA, 1974, University of Massachusetts, PhD, 1976, University of Maryland; history of exercise, sports medicine, and health behavior/philosophy.

Burke, Wylie 1984; PhD, 1974, MD, 1978, University of Washington; ethical and policy implications of genetic information.

Hudson, Leonard D. 1973, (Adjunct); MD, 1964, University of Washington; respiratory diseases.

Jecker, Nancy A. S. * 1982; MA, 1982, Stanford University, MA, 1984, PhD, 1986, University of Washington; philosophical and ethical aspects of health care delivery and policy.

Jonsen, Albert R. * 1987, (Emeritus); MA, 1956, Gonzaga University, PhD, 1967, Yale University; philosophical, historical values affecting practice and delivery of health care.

Kuszler, Patricia Carol * 1994, (Adjunct); MD, 1978, Mayo Medical School/graduate School, JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.

Pearlman, Robert A. * 1981, (Adjunct); MD, 1975, Boston University; gerontology.

Whorton, James C. * 1970; PhD, 1969, University of Wisconsin; history of American medicine, public health, alternative healing.

Associate Professors

Back, Anthony L. 1984, (Adjunct); MD, 1984, Harvard University; oncology.

Braddock, Clarence H. * 1993, (Adjunct); MD, 1981, University of Chicago; doctor-patient communication, informed consent, bioethics education.

Diekema, Douglas S. 1990, (Adjunct); MD, 1985, University of North Carolina, MPH, 1993, University of Washington; pediatric emergency medicine.

Shannon, Sarah E. 1984, (Adjunct); PhD, 1992, MSN, 1992, University of Washington; clinical ethics; decision-making surrounding use of life-sustaining therapies.

Sullivan, Mark D. 1985, (Adjunct); PhD, 1982, MD, 1984, Vanderbilt University; depression and chronic medical illness, chronic pain, ethics, quality of life.

Assistant Professors

Dudzinski, Denise M. 2001; MTS, 1993, PhD, 2001, Vanderbilt University; biomedical ethics, clinical ethics, philosophical and theological foundations of values.

Fryer-Edwards, Kelly 2001; MA, 1995, PhD, 2000, University of Washington; innovation in medical education, professional identity development, clinician-patient relationships.

Mastroianni, Anna C. * 1996, (Adjunct); JD, 1986, University of Pennsylvania, MPH, 1997, University of Washington; law, ethics and policy genetics, reproduction, human subjects research.

Tonelli, Mark R. 1993, (Adjunct); MD, 1989, University of Colorado (Boulder); pulmonary and critical care medicine.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsca/.

MHE 401 History of Modern Medicine (3) I&S *Whorton* Survey of evolution of medical theory, practice, and institutions in European and American society from the late 18th century present. Medical back-

ground not required. Recommended: prior courses in sciences and/or history.

MHE 402 Ethical Theory (5) I&S *Jecker* Review of principal theories for normative ethical discourse, such as utilitarianism and deontology, and major metaethical commentary on those theories. Illustrated by classical and modern authors. Recommended: one basic course in ethics.

MHE 404 Metaethical Theory (5) I&S *Jecker* Study of major ethical writings in the twentieth century, with principal emphasis on the Anglo-American tradition. Recommended: one introductory philosophy course.

MHE 411 Introduction to Bioethics (3) I&S Basic concepts, principles, and methods of analysis, with application to some major issues in the field of bioethics. Case studies utilized to illustrate nature of questions arising in bioethics and to provide students with opportunity to develop skills in ethical analysis.

MHE 413 History of Alternative Healing (3) I&S *Whorton* Analysis of historical development of alternative healing in American society over last two centuries. Emphasis on evolution of theory, practice, and professional institutions for major alternative systems and interactions of alternative modalities with conventional medicine. Medical background not required.

MHE 417 Disease in History (3) I&S *Whorton* Study of Western civilization's experience with epidemic disease, the growth of understanding of the causes of disease, the formation of a philosophy of prevention, and the development of programs to protect the public health. Emphasis on the last two centuries. Medical background not required.

MHE 422 History of Evolution Theory (5) I&S *Benson* Development of evolution theory from its early-nineteenth-century roots through the work of Charles Darwin. Impact of evolution theory on society and the formulation of the theory in the twentieth century.

MHE 424 Modern Biology in Historical Perspective (5) I&S *Benson* Two diverse traditions of biology, natural history, and physiology, in their nineteenth-century development and their subsequent merging after Darwin's evolution theory. Emergence of specialty areas in biology after the beginning of the twentieth century.

MHE 440 Philosophy of Medicine (5) I&S *Jecker* Familiarizes students with central issues in the philosophy of medicine. Focuses on the nature of medical knowledge, the connection between theory and observation, the meaning of medical concepts, and the relationship between theories and the world. Recommended: prior courses in philosophy, history of science, or history of medicine. Offered: jointly with PHIL 459.

MHE 474 Justice in Health Care (5) I&S/VLPA *Jecker* Examination of the ethical problem of allocating scarce medical resources. Emphasis on fundamental principles of justice that support alternative health policies. Recommended: prior courses in philosophy or medical ethics. Offered: jointly with PHIL 411.

MHE 481 The Pursuit of Health in American Society (3) I&S *Berryman, Whorton* Examination of the development of concern for personal health over the past two centuries, and of the evolution of philosophies and practices of health promotion. Emphasis on the influence of both medicine and popular culture on shaping of attitudes toward diet, exercise, dress, sex, and other health behavior.

MHE 483 The Rise and Development of Sports Medicine (3) I&S *Berryman* Evolution of medical thought related to exercise for good health, training

for sport participation, and treatment of sport-related injuries. Begins with ancient period, concludes with present. Development of specialization in sports medicine, sport team physicians, preventive medicine, concepts of fitness and wellness as related to exercise prescription, and sports medicine clinics.

MHE 485 Concepts of the Body in Nineteenth- and Twentieth-Century America (3) I&S *Berryman* Investigation of ideas relating to corporeal self in nineteenth- and twentieth-century America. Evolution of physical ideals of manliness/femininity, how ideals related to surrounding culture, how different bodily activities developed to realize ideals. Athleticism, physiognomy, beauty contests, body building, decorations, cosmetics, anthropometry, artificial parts.

MHE 497 Medical History and Ethics Special Electives (*)

MHE 498 Undergraduate Thesis (*)

MHE 499 Undergraduate Research (*, max. 5) Investigative work in biomedical ethics or history of the biomedical sciences.

MHE 501 Alternative Approaches to Healing (2) *Whorton* Philosophies and practices of the major alternative approaches to healing. Historical characterization of alternative medicine accompanied by presentations by practitioners of chiropractic, naturopathic, homeopathic, and traditional Chinese medicine. Credit/no credit only.

MHE 505 Professional Seminar I (2) Methods for identifying a bioethics research question and developing a systematic approach to investigating it, including utilization of bibliographic sources in bioethics, philosophy, history. Prerequisite: permission of instructor.

MHE 506 Professional Seminar II (1) Capstone course for M.A. in Bioethics. Includes conducting research in ethics, writing, giving oral presentations, facilitating seminars, developing curriculum vitae, and career planning.

MHE 511 P-Medical Ethics (2) Ethics course designed especially for first- and second-year medical students. Study of ethical problems arising in clinical setting of medicine, introducing students to philosophical analysis and argument in practical contexts. Seminar-discussion format with readings from contemporary authors. Credit/no credit only.

MHE 512 P-The Human Face of Medicine (2) Foundation of human values undergirding medical practice. Images of physician—motivations for medicine, empathy *versus* detachment in doctor-patient relationship, health for the health-professional—the art of coping, limits of power—when medicine fails to cure, uses/abuses of technology, physician's role in public health issues, the healing process.

MHE 513 P-Ethical Responsibilities of Medical Practice (2) Provides intensive and practical guidance about management of principal ethical and legal problems that arise in clinical practice: informed consent, confidentiality, decisions regarding life-support, advance directives and surrogate decision-makers, duty to care for indigent and risky patients. Offered: one-week intensive; S.

MHE 514 Legal, Ethical, and Social Issues in Public Health Genetics (3) *Kuszler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with PHG 512/LAW E 562.

MHE 516 Ethical Frameworks for Public Health Genetics (2) *Mastroianni* Case-based application of ethical principles in genetic medicine to range of

problems arising in genetics practice, policy, research. Examination of traditional problems including eugenics and testing/screening for genetic disease, as well as emerging problems in population and environmental genetics. Prerequisite: MHE 514/PHG 512. Offered: jointly with PHG 522.

MHE 517 Preclinical Hospice Volunteer Training Elective (3) *Farber, McCormick* Using lectures, small groups, role play, and readings, covers the basic knowledge, skills and attitudes that need to be mastered as a hospice volunteer. Students participate as hospice volunteers as part of their field experience. Offered: jointly with FAMED 546; WSp.

MHE 518 Spirituality in Medicine (2) *Farber, McCormick* Examination of the beliefs, values, meaning, and spirituality of health professionals for the well-being of their patients as well as for themselves. Offered: jointly with FAMED 547.

MHE 521 The Ethical Challenges of Modern Medicine (3) *McCormick* Case-study approach to contemporary ethical issues in medicine, utilizing techniques of ethical analysis and argument in examining actual cases arising in our pluralistic culture, where values are often in conflict. Open to graduate and professional students and others with appropriate background.

MHE 522 Ethical Problems Surrounding Death (3) *McCormick* Issues arising in care and treatment of dying patients and their families, including truthful disclosure, use of life-supports, "euthanasia," coping with death and grief. Intersection of patient and professional values related to care in terminal phase of illness. Open to graduate and professional students and others with appropriate background.

MHE 523 Biomedical Ethics (3) *McCormick* Selected topics in medical ethics emphasizing methods of ethical reasoning about moral dilemmas and contributions of philosophical theories and principles to practical problems of medicine. Students provided with opportunities to test their value assumptions and analytical skills. Open to graduate and professional students and others with appropriate background.

MHE 535 Medical Ethics and Jurisprudence (3) *Jonsen* Relationship between bioethics and law. Review of basic concepts of both disciplines; their theoretical and practical connections. Analysis of principal legal cases and statutes illustrating such issues as informed consent to treatment, foregoing life support, research with human subjects, confidentiality, allocation of health care resources. For graduate and professional students.

MHE 541 Exercise in Modern Medicine (1) *Berryman* Survey of role and place of exercise in modern medicine. Historical and contemporary analysis of physical activity and sports medicine in the American health system. Presentations by clinicians about their experiences in: orthopaedics, exercise physiology, sports nutrition, sports psychology, pediatric sports medicine, special issues of female athletes, environmental medicine.

MHE 548 Introduction to Clinical Ethics (5) *Burke* Introduction to history, practice, and research methods in clinical ethics. Case-based examination of methods including principlism, casuistry, narrative methods, virtue ethics. Prerequisite: permission of instructor.

MHE 549 Current Topics in Clinical Ethics I (3) *Dudzinski* Analysis of complex ethical cases from UWSOM clinical departments, literature, and media. Case discussion focuses on implications for delivery of medical care. Prerequisite: MHE 548.

MHE 550 Current Topics in Clinical Ethics II (3) *Fryer-Edwards* Analysis of complex ethical cases from UWSOM clinical departments, literature, and

media. Case discussion focuses on implications for delivery of medical care. Prerequisite: MHE 548.

MHE 595- Ethics Practicum (3-6, max. 6) Students participate in clinical ethics rounds, case discussions, review of research protocols, or other professional activities related to bioethics. For majors only.

MHE 596 Masters Research Project (1-12, max. 12) Research project culminating in a scholarly paper suitable for publication in a peer-reviewed journal. Credit/no credit only. Majors only.

MHE 600 Independent Study or Research (*)

Medicine

RR512 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/genecat/academic/Medicine_Prog.html



Department Web page:
depts.washington.edu/medweb/

domchair@u.washington.edu

Active programs in teaching, research, and patient care are carried on at the University of Washington Medical Center, Seattle Veterans Affairs Medical Center, Harborview Medical Center, Pacific Medical Center, the Puget Sound Blood Center, the Northwest Kidney Center, and the Fred Hutchinson Cancer Research Center. Major affiliations for clinical teaching also exist with Providence Medical Center and Swedish Hospital Medical Center. There are many additional affiliations with community hospitals in Seattle, the state of Washington, and the WWAMI region. Medical students, interns, medical residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

Faculty

Chair

William J. Bremner

Professors

Abkowitz, Janis L. 1980; MD, 1977, Harvard University; hematology.

Abrass, Christine K. 1984; MD, 1973, Case Western Reserve University; nephrology.

Abrass, Itamar B. 1983; MD, 1966, University of California (San Francisco); gerontology.

Aderem, Alan A. * 1996, (Affiliate); PhD, 1979, University of Capetown (South Africa); signal transduction and the cytoskeleton.

Albers, John J. * 1971; MS, 1967, PhD, 1969, University of Illinois; lipoprotein metabolism and pathophysiology.

Alpers, Charles E. 1986, (Adjunct); MD, 1978, University of Rochester; clinical/experimental glomerular disease, AIDS in man and experimental simian AIDS, vascular biology.

Altman, Leonard * 1974, (Clinical); MD, 1969, Harvard University; mechanisms of tissue injury produced by bacteria, leukocytes, or toxins.

Anasetti, Claudio 1985; MD, 1980, University of Perugia (Italy); oncology.

Andress, Dennis 1982; MD, 1978, University of Oklahoma; nephrology.

Appelbaum, Frederick R. 1978; MD, 1972, Tufts University; oncology.

Argenyi, Zsolt B. 2001; MD, 1978, Semmelweis Medical University (Hungary); dermatopathology.

Austin, Melissa A. * 1988, (Adjunct); PhD, 1985, University of California (Berkeley); genetic epidemiology of chronic diseases and public health genetics.

Baskin, Denis G. * 1979; PhD, 1969, University of California (Berkeley); neuroendocrinology; obesity; CNS regulation of body weight; histochemistry; expression of receptors.

Beeson, Paul B. 1982, (Emeritus); MD, 1933, McGill University (Canada).

Bensinger, William I. 1981; MD, 1973, Northwestern University; oncology.

Bird, Thomas D. 1976; MD, 1968, Cornell University; neurology, neurogenetics.

Bishop, Michael J. 1979, (Adjunct); MD, 1974, University of California (San Diego).

Blagg, Christopher R. 1966, (Emeritus); MD, 1954, MBChB, 1954, University of Leeds (UK); nephrology.

Bomsztyk, Karol 1983; MD, 1977, University of Rochester; role of cytokine-induced protein kinases in the regulation of gene expression.

Bornstein, Paul * 1967; MD, 1958, New York University; structure and function of connective tissue macromolecules, wound healing.

Boyko, Edward J. * 1989; MD, 1979, University of Pittsburgh; epidemiology of inflammatory bowel disease and non-insulin-dependent diabetes mellitus.

Bremner, William J. 1982; MD, 1969, University of Washington, PhD, 1977, Monash University (Australia); endocrinology.

Broudy, Virginia C. 1985; MD, 1980, University of California (San Francisco); hematology.

Brown, B. Greg 1981; PhD, 1969, MD, 1969, Johns Hopkins University; cardiology.

Bruce, Robert A. 1987, (Emeritus); MD, 1943, University of Rochester; cardiology.

Brunzell, John D. * 1975; MD, 1963, University of Washington; nutritional and metabolic aspects of lipoproteins and diabetes.

Buchwald, Dedra S. 1987; MD, 1981, University of California (San Diego); internal medicine.

Burke, Wylie 1984, (Adjunct); PhD, 1974, MD, 1978, University of Washington; ethical and policy implications of genetic information.

Byers, Peter H. * 1976; MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics.

Caldwell, James H. 1983; MD, 1970, University of Missouri; positron emission tomography imaging of myocardial oxygenation, metabolism and sympathetic function.

Carithers, Robert L. 1990; MD, 1969, University of Pennsylvania; gastroenterology/hepatology.

Chait, Alan * 1977; MBChB, 1967, MD, 1974, University of Capetown (South Africa); clinical nutrition with special emphasis on lipid metabolism.

Charan, Nirmal B. 1980; MBBS, 1968, Christian Medical College of Ludhiana; respiratory disease.

Chesnut, Charles * 1974; MD, 1966, University of Florida; nuclear medicine.

Clark, Joan G. 1985; MD, 1974, Washington University; pulmonary and respiratory disease.

Cobb, Leonard A. 1957, (Emeritus); MD, 1952, University of Minnesota; cardiology.

Collier, Ann C. 1982; MD, 1978, Dartmouth College; infectious diseases.

Collins, Steven J. * 1982; MD, 1973, Columbia University; retinoic acid receptors and the pathogenesis of malignancy.

Copass, Michael K. 1971; MA, 1964, MD, 1964, Northwestern University; neurology/emergency services.

Corey, Lawrence * 1977; MD, 1971, University of Michigan; DX, therapy and pathogenesis of viral infections, AIDS/herpes viruses.

Counts, Richard B. 1973; MD, 1967, Washington University; hematology.

Couser, William G. 1982; MD, 1965, Harvard University; nephrology.

Cummins, Richard 1981; MD, 1972, Case Western Reserve University, MPH, 1977, University of Washington; emergency medicine.

Dale, David C. 1974; MD, 1966, Harvard University; internal medicine.

Dale-Crunk, Beverly A. * 1972, (Adjunct); PhD, 1968, University of Michigan; keratin biochemistry, epithelial differentiation, antimicrobial peptides.

Dean, Larry S. 2000; MD, 1980, University of Alabama; cardiology.

Deeb, Samir S. * 1983; PhD, 1964, University of Illinois; genetic factors predisposing to hyperlipidemia and coronary artery disease.

Deeg, H. Joachim 1994; DrMed, 1972, University of Bonn (Germany); oncology.

Dennis, Melvin B. * 1971, (Adjunct); DVM, 1961, Washington State University; comparative medicine, including animal models and experimental surgery.

Deyo, Richard A. * 1986; MD, 1975, Pennsylvania State University; health status measurement and evaluation of common medical practices.

Dichek, David A. 2001; MD, 1984, University of California (Los Angeles); cardiology.

Disteche, Christine M. * 1980, (Adjunct); PhD, 1976, University of Liege (Belgium); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics.

Drewnowski, Adam * 1998, (Adjunct); PhD, 1977, Rockefeller University; taste and psychology of food choice in disease prevention.

Eisenberg, Mickey * 1978; MD, 1971, Case Western Reserve University, PhD, 1978, University of Washington; sudden cardiac arrest and acute myocardial infarction.

Eliel, Leonard P. 1985, (Emeritus); MD, 1940, Harvard University; metabolism and endocrinology.

Elkon, Keith B. * 2001; MD, University of Witwatersrand (South Africa), MRCP, 1978, University of London; rheumatology.

Ensinck, John W. * 1961, (Emeritus); MDCM, 1956, McGill University (Canada); the role of GI hormones in fuel homeostasis.

- Fefer, Alexander 1968; MD, 1964, Stanford University; oncology.
- Fields, Stanley * 1995; MA, 1978, PhD, 1981, Cambridge University (UK); yeast molecular biology and genetics.
- Figley, Melvin M. 1958, (Emeritus); MD, 1944, Harvard University; thoracic and pulmonary radiology.
- Fihn, Stephan * 1982; MD, 1977, St Louis University, MPH, 1981, University of Washington; internal medicine.
- Finch, Clement A. 1949, (Emeritus); MD, 1941, University of Rochester; hematology.
- Fleckman, Philip H. 1982; MD, 1973, Washington University; dermatology.
- Fujimoto, Wilfred Y. * 1969, (Emeritus); MD, 1965, Johns Hopkins University; metabolism, endocrinology, nutrition.
- Furlong, Clement E. * 1977; PhD, 1968, University of California (Davis); human biochemical genetics in biochemistry of membrane transport systems.
- Gartler, Stanley M. * 1957, (Emeritus); PhD, 1952, University of California (Berkeley); mammalian somatic cell genetics with emphasis on the mechanism of x-chromosome inactivation.
- Gilliland, Bruce C. * 1970; MD, 1960, Northwestern University; hematology.
- Glomset, John A. * 1977; MD, 1960, University of Uppsala (Sweden); membrane structure and function.
- Goodner, Charles J. * 1962, (Emeritus); MD, 1955, University of Utah; metabolism and endocrinology.
- Greenberg, Philip D. * 1978; MD, 1971, State University of New York (Downstate Medical Center); molecular, cellular, viral, and tumor immunology.
- Handsfield, Hunter 1979; MD, 1968, Columbia University; infectious diseases.
- Hansen, John A. 1977; MD, 1970, Stanford University; oncology.
- Harlan, John M. * 1978; MD, 1973, University of Chicago; vascular biology with emphasis on leukocyte-endothelial adhesion.
- Hartwell, Leland H. * 1968, (Adjunct); PhD, 1964, Massachusetts Institute of Technology; genetic analysis of chromosome transmission and of the control of division by hormones in yeast.
- Hazzard, William R. 2000; MD, 1962, Cornell University; gerontology and geriatric medicine.
- Heitkemper, Margaret M. * 1981, (Adjunct); MN, 1975, University of Washington, PhD, 1981, University of Illinois; gastroenterology, enteral nutrition, gerontology.
- Henderson, Maureen M. * 1975, (Emeritus); MBBS, 1949, DPH, 1956, University of Durham (UK); epidemiology of chronic diseases, dietary prevention of disease.
- Henderson, William R. 1979; MD, 1973, University of California (San Francisco); allergy and infectious disease.
- Hildebrandt, Jacob * 1966; PhD, 1966, University of Washington; respiratory physiology.
- Hirsch, Irl B. 1990; MD, 1984, University of Missouri; metabolism and endocrinology/diabetes.
- Hirschmann, Jan V. 1976; MD, 1970, University of Washington; internal medicine.
- Hlastala, Michael P. * 1972; PhD, 1969, State University of New York (Buffalo); respiratory physiology, inert gas analysis of respiratory function.
- Holmes, King K. * 1967; MD, 1963, Cornell University, PhD, 1967, University of Hawaii; clinical epidemiology and pathogenesis of infectious diseases.
- Hooton, Thomas M. 1982; MD, 1973, University of Texas (Dallas); internal medicine.
- Hudson, Leonard D. 1973; MD, 1964, University of Washington; respiratory diseases.
- Kahn, Steven Emanuel 1986; MBChB, 1978, University of Capetown (South Africa); metabolism and endocrinology.
- Kaushansky, Kenneth * 1979; MD, 1979, University of California (Los Angeles); blood cell development, its cellular and molecular components.
- Kennedy, J. Ward 1966; MD, 1959, University of Rochester; cardiology.
- Kimball, Ann M. * 1992, (Adjunct); MD, 1976, MPH, 1981, University of Washington; emerging infections, public health response to epidemic disease.
- Kimmy, Michael 1979; MD, 1979, Washington University; gastroenterology/endoscopy.
- King, Mary-Claire * 1995; PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.
- Kiviat, Nancy C. * 1979, (Adjunct); MA, 1970, MD, 1975, University of Washington; epidemiologic and molecular biologic studies of the relationship between HPV, HIV, and neoplasia.
- Klebanoff, Seymour * 1962, (Emeritus); MD, 1951, University of Toronto (Canada), PhD, 1954, University of London (UK); infectious disease.
- Knopp, Robert H. * 1974; MD, 1964, Cornell University; metabolism and endocrinology.
- Koepsell, Thomas D. * 1979, (Adjunct); MD, 1972, Harvard University, MPH, 1979, University of Washington; injuries, neuroepidemiology, veterans health, epidemiologic methods, program and policy evaluation.
- Koerker, Donna J. * 1982; PhD, 1970, University of Michigan; endocrinology, intermediate metabolism of carbohydrates.
- Kreiss, Joan K. * 1984; MD, 1978, Washington University, MPH, 1984, University of California (Los Angeles); epidemiology of AIDS, particularly in Africa.
- Kudenchuk, Peter J. 1986; MD, 1979, University of Washington; cardiology.
- Lakshminarayan, S. 1977; MBBS, 1965, All-India Institute of Medical Sciences; pulmonary medicine.
- Larson, Eric B. * 1977; MD, 1973, Harvard University; internal medicine.
- Leboeuf, Renee C. * 1987, (Adjunct); PhD, 1985, Harvard University, MD, 1987, University of Massachusetts; genetic and nutritional regulation of proteins involved in lipid transport.
- Lee, Sum Ping 1985; MD, 1970, University of Hong Kong, PhD, 1978, University of Auckland (New Zealand); gastroenterology.
- Lernmark, Ake * 1988; MD, 1970, PhD, 1971, University of Umea; immunogenetics of organ-specific autoimmunity with emphasis on insulin-dependent diabetes.
- Lipsky, Benjamin A. 1982; MD, 1973, Cornell University; internal medicine.
- Livingston, Robert B. 1982; MD, 1967, University of Oklahoma; oncology.
- Logerfo Sr., James P. * 1974; MD, 1968, University of Rochester, MPH, 1974, University of Washington; quality-of-care assessment.
- Longstreth, W. T., Jr. * 1981, (Adjunct); MD, 1975, University of Pennsylvania, MPH, 1982, University of Washington; neurology.
- Lukehart, Sheila A. * 1980; PhD, 1978, University of California (Los Angeles); immunology of infectious diseases, microbiology, sexually transmitted diseases.
- Lukehart, Sheila A. * 1980; PhD, 1978, University of California (Los Angeles); immunology of infectious diseases, microbiology, sexually transmitted diseases.
- Mannik, Mart * 1966, (Emeritus); MD, 1959, Case Western Reserve University; rheumatology.
- Martin, Paul J. 1978; MD, 1974, University of Pennsylvania; oncology.
- Martin, Thomas R. 1982; MD, 1973, University of Pennsylvania; pulmonary medicine.
- Matsumoto, Alvin M. 1982; MD, 1975, University of Washington; metabolism and endocrinology.
- Mayer, Jonathan D. * 1977, (Adjunct); PhD, 1977, University of Michigan; medical geography, health policy, env. health, epidemiology, intl. health, infectious diseases.
- McArthur, James R. 1973, (Emeritus); MD, 1956, Harvard University; hematology.
- McDonald, George B. 1973; MD, 1967, Washington University; gastroenterology.
- McElrath, Margaret Juliana * 1990; PhD, 1978, MD, 1980, Medical University of South Carolina; infectious diseases.
- Merriam, George R. 1991; MD, 1976, Harvard University; metabolism and endocrinology.
- Miller, Samuel I. * 1995; MD, 1979, Baylor University; salmonella pathogenesis and bacterial-eucaryotic cell interactions.
- Monsen, Elaine R. * 1969, (Adjunct); MS, 1959, PhD, 1961, University of California (Berkeley); nutrition, dietetics.
- Motulsky, Arno G. * 1953, (Emeritus); MD, 1947, University of Illinois; medical genetics.
- Mullins, James I. * 1994; PhD, 1978, University of Minnesota; retroviruses and AIDS, molecular virology.
- Neiman, Paul E. * 1971; MD, 1964, University of Washington; oncology.
- Nelp, Wil B. 1962, (Emeritus); MD, 1955, Johns Hopkins University; nuclear medicine.
- Nelson, Judith Lee 1981; MD, 1977, University of California (Davis); rheumatology.
- Norris, Thomas E. 1988, (Adjunct); MD, 1973, University of Texas (Galveston); clinical applications, health policy and health workforce needs.
- Olerud, John E. 1975; MD, 1971, University of Washington; dermatology.
- Olson, Maynard V. 1992; PhD, 1970, Stanford University; methods and applications of large-scale DNA analysis.

- Oram, John Fisher * 1975; PhD, 1972, Pennsylvania State University; cellular lipid transport and metabolism; lipoprotein interactions.
- Otto, Catherine M. 1982; MD, 1979, University of Washington; cardiology.
- Paauw, Douglas 1985; MD, 1979, University of Washington; general internal medicine.
- Pagon, Roberta A. 1979, (Adjunct); MD, 1972, Harvard University; medical genetics.
- Palmer, Jerry P. 1973; MD, 1970, State University of New York (Upstate Medical Center); metabolism and endocrinology, diabetes.
- Papayannopoulou, Thalia 1974; MD, 1961, DrMedS, 1964, University of Athens (Greece); hematology.
- Paulsen, C. Alvin 1958, (Emeritus); MD, 1952, University of Oregon; metabolism and endocrinology.
- Pearlman, Alan S. 1978; MD, 1970, Harvard University; cardiology.
- Pearlman, Robert A. * 1981; MD, 1975, Boston University; gerontology.
- Petersdorf, Robert G. 1994; MD, 1952, Yale University.
- Pierson, David John 1976; MD, 1969, Johns Hopkins University; respiratory diseases.
- Plorde, James J. * 1982, (Emeritus); MD, 1959, University of Minnesota; infectious diseases, antibiotic-resistant nosocomial infections.
- Pope, Charles E. 1964, (Emeritus); MD, 1957, Case Western Reserve University; gastroenterology.
- Porte, Daniel, Jr. 1982, (Emeritus); MD, 1957, University of Chicago; metabolism and endocrinology.
- Press, Oliver W. * 1982; PhD, 1977, MD, 1979, University of Washington; treatment of hematologic malignancies with monoclonal antibody immunocongugates.
- Preston, Thomas A. 1973; MD, 1962, University of Pennsylvania; cardiology.
- Price, Thomas H. 1975; MD, 1966, Johns Hopkins University; hematology.
- Probstfield, Jeffrey L. 1993; MD, 1967, University of Washington; cardiology.
- Psaty, Bruce M. * 1984; PhD, 1979, MD, 1981, Indiana University; cardiovascular disease, coronary heart disease, hypertension, pharmacoepidemiology.
- Raghu, Ganesh 1981; MD, 1974, University of Mysore (India); respiratory disease.
- Ramsey, Paul G. 1980; MD, 1975, Harvard University; infectious diseases, internal medicine.
- Reid, Brian J. * 1983; PhD, 1975, MD, 1980, University of Washington; genetic and cell cycle abnormalities in neoplastic progression in Barrett's esophagus.
- Riddell, Stanley R. 1985; MD, 1979, University of Manitoba (Canada); oncology.
- Robertson, H. Thomas 1975; MD, 1968, Harvard University; respiratory diseases.
- Root, Richard K. 1991; MD, 1963, Johns Hopkins University; infectious diseases.
- Rosen, Henry 1977; MD, 1972, University of Rochester; allergy and infectious diseases.
- Roth, Gerald J. 1984; MD, 1967, Harvard University; hematology.
- Rubin, Cyrus E. 1954, (Emeritus); MD, 1945, Harvard University; gastroenterology.
- Saunders, David R. * 1969, (Emeritus); MD, 1957, McGill University (Canada); intestinal absorption, effect of drugs on GI mucosa.
- Schoene, Robert B. 1981; MD, 1972, Columbia University; respiratory diseases.
- Schuffler, Michael D. 1973; MD, 1966, University of Illinois; gastroenterology.
- Schwartz, Michael W. 1983; MD, 1983, Rush Medical College; metabolism and endocrinology.
- Schwartz, Robert S. * 1979, (Affiliate); MD, 1974, Ohio State University; internal medicine and geriatrics.
- Schwartz, Stephen Mark * 1974, (Adjunct); MD, 1967, Boston University, PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.
- Scott, C. Ronald * 1965, (Adjunct); MD, 1959, University of Washington; diagnosis and nutritional management of genetic disorders of children.
- Scribner, Belding H. 1957, (Emeritus); MD, 1945, Stanford University, MS, 1951, University of Minnesota; nephrology.
- Sherrard, Donald J. 1968; MD, 1960, University of Washington; nephrology.
- Simkin, Peter A. 1969; MD, 1961, University of Pennsylvania; rheumatology.
- Siscovick, David S. * 1987; MD, 1976, University of Maryland; epidemiology.
- Slichter, Sherrill J. 1970; MD, 1963, George Washington University; hematology.
- Smith, Charles B. 1991, (Emeritus); MD, 1962, Harvard University; infectious diseases.
- Spence, Alexander M. 1974, (Adjunct); MD, 1965, University of Chicago; neurology, neuro-oncology.
- Stamatoyannopoulos, George 1964; MD, 1958, DrMedS, 1960, University of Athens (Greece); medical genetics.
- Stamm, Walter E. * 1979; MD, 1971, Harvard University; infectious disease.
- Starkebaum, Gordon A. 1970; MD, 1970, Columbia University; rheumatology.
- Stevens, Dennis L. 1982; PhD, 1967, Montana State University, MD, 1971, University of Utah; infectious diseases.
- Stewart, Douglas 1972; MD, 1965, Harvard University; cardiology.
- Stewart, Forrest Mark 2000; MD, 1997, Indiana University; oncology.
- Storb, Rainer F.; MD, 1960, University of Freiburg (Germany).
- Stratton, John R. 1982; MD, 1973, Yale University; cardiology.
- Sullivan, Sean * 1992, (Adjunct); PhD, 1992, University of California (Berkeley); health economics, pharmaceutical outcomes research and health policy.
- Surawicz, Christina M. 1981; MD, 1973, University of Kentucky; gastroenterology.
- Swanson, Phillip D. 1964, (Adjunct); MD, 1958, Johns Hopkins University, PhD, 1964, University of London (UK); movement disorders, neurology.
- Swenson, Erik R. 1983; MD, 1979, University of California (San Diego); pulmonary medicine.
- Sybert, Virginia 1979; MD, 1974, State University of New York (Buffalo); genetics and dermatology.
- Tempel, Bruce L. 1988, (Adjunct); PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.
- Thomas, E. Donnell 1963, (Emeritus); MA, 1943, University of Texas (Austin), MD, 1946, Harvard University; oncology.
- Thompson, Arthur R. 1982; MD, 1966, PhD, 1972, University of Washington; hematology.
- Turck, Marvin 1964; MD, 1959, University of Illinois; infectious diseases.
- Van Citters, Robert L. * 1962, (Emeritus); MD, 1953, University of Kansas; cardiovascular physiology.
- Van Voorhis, Wesley C. * 1986; PhD, 1983, Rockefeller University, MD, 1984, Cornell University; infectious diseases.
- Verdugo, Pedro * 1974, (Adjunct); MD, 1965, State University of Chile; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology.
- Volwiler, Wade 1949, (Emeritus); MD, 1943, Harvard University; gastroenterology.
- Wallace, James F. 1968; MD, 1961, Washington University; internal medicine.
- Watkins, Sandra L. 1981, (Adjunct); MD, 1981, University of Texas (Houston); nephrology.
- Wijsman, Ellen M. * 1987; PhD, 1981, University of Wisconsin; human quantitative and population genetics.
- Zager, Richard A. 1985; MD, 1969, Northwestern University; nephrology.

Associate Professors

- Ahmad, Suhail 1979; MBBS, 1968, University of Allahabad (India); nephrology.
- Aitken, Moira L. 1982; MChB, 1978, University of Edinburgh (UK); respiratory disease.
- Anawalt, Bradley D. 1989; MD, 1989, University of California (Davis); general internal medicine.
- Back, Anthony L. 1984; MD, 1984, Harvard University; oncology.
- Barnhart, Scott * 1979; MD, 1979, George Washington University; occupationally related lung disease.
- Belcher, Donald W. * 1976, (Emeritus); MD, 1962, University of Pennsylvania; ambulatory medicine.
- Benditt, Joshua O. 1994; MD, 1982, University of Washington; pulmonary and critical care medicine.
- Benedetti, Jacqueline K. * 1980, (Adjunct); PhD, 1974, University of Washington; statistical methodology in infectious disease research, cancer clinical trials.
- Berg, Daniel 1997; MD, 1985, University of Toronto (Canada); dermatological surgery.
- Blau, Carl A. 1989; MD, 1986, Ohio State University; hematology.
- Braddock, Clarence H. * 1993; MD, 1981, University of Chicago; doctor-patient communication, informed consent, bioethics education.

- Bradley, Katharine A. 1990; MD, 1987, Stanford University, MPH, 1993, University of Washington; general internal medicine.
- Brodtkin, Carl * 1989; MD, 1983, University of Colorado (Denver); hepatic effects of occupational solvent exposure; ventilatory decline in asbestos-exposed workers.
- Bronner, Mary P. 1993, (Adjunct); MD, 1989, University of Pennsylvania; gastrointestinal and hepatic pathology, neoplastic progression and transplantation pathology.
- Buchter, Carol M. 2001; MD, 1978, Case Western Reserve University; cardiology.
- Carvalho, Paula G. 1984; MD, 1984, University of Washington; pulmonary and critical care medicine.
- Celum, Connie L. 1987; MD, 1984, University of California (San Francisco); infectious diseases.
- Chauncey, Thomas R. 1985; MD, 1985, Rush Medical College; oncology.
- Cheng, Edith Y. 1995, (Adjunct); MS, 1979, Sarah Lawrence College, MD, 1987, University of Washington; genetics, perinatal medicine.
- Childs, Marian T. * 1978, (Emeritus); PhD, 1950, University of California (Berkeley); nutrition.
- Coombs, Robert W. * 1985; PhD, 1977, MD, 1981, Dalhousie University (Canada); diagnosis and pathogenesis of HIV infection.
- Corson, Marshall A. 1994; MD, 1981, Baylor University; cardiology.
- Culver, Bruce H. 1974; MD, 1969, University of Washington; respiratory diseases.
- Curtis, Jared R. 1988; MD, 1988, Johns Hopkins University, MPH, 1994, University of Washington; pulmonary diseases and critical care medicine.
- Cusack, Barry J. 1982; MD, 1980, University College of Dublin (Ireland); gerontology.
- Davidson, Robert C. 1968, (Emeritus); MD, 1953, University of Washington; nephrology.
- Davis, Connie 1991; MD, 1980, University of Washington; nephrology.
- Deem, Steven A. 1992, (Adjunct); MD, 1984, Southern Illinois University; critical care.
- Dewitt, Dawn E. 1990; MD, 1990, Harvard University; general internal medicine.
- Disis, Mary L. 1990; MS, 1986, MD, 1986, University of Nebraska; oncology.
- Doney, Kristine 1981; MD, 1972, University of Michigan; hematology/oncology.
- Dugdale, David C. 1991; MD, 1982, University of Pennsylvania; general internal medicine.
- Dugowson, Carin E. 1977; MD, 1976, University of Illinois, MPH, 1986, University of Washington; rheumatology.
- Ellis, Georgiana K. 1982; MD, 1982, University of Washington; oncology.
- Elmore, Joann G. 1996; MD, 1987, Stanford University, MPH, 1992, Yale University; clinical epidemiology, breast cancer screening, diagnostic accuracy.
- Fishbein, Daniel P. 1981; MD, 1980, Albert Einstein College of Medicine; cardiology.
- Fleet, Wendell P. 1972; MD, 1965, Creighton University; internal medicine.
- Gardner, Gregory C. 1989; MD, 1984, Baylor University; rheumatology.
- Gavrin, Jonathan R. 1991, (Adjunct); MD, 1978, Dartmouth College.
- Geballe, Adam Philip * 1988; MD, 1978, Duke University; translational regulation of viral and cellular gene expression.
- Gibran, Nicole 1990, (Adjunct); MD, 1985, Boston University; general, burn, and trauma surgery.
- Gill, Edward A. 1984; MD, 1984, University of Washington; cardiology.
- Gilligan, Diana Mary 2001; PhD, 1985, MD, 1985, Albert Einstein College of Medicine; hematology.
- Glass, Ian 2000, (Adjunct); MD, 1991, University of Otago (New Zealand); genetics.
- Glenny, Robb * 1987; MD, 1984, University of Virginia; determinants of regional pulmonary blood flow and ventilation distribution.
- Goldberg, Harold I. 1986; MD, 1977, Stanford University; applying clinical informatics to health services delivery and quality improvement.
- Goldberg, Steven L. 2000; MD, 1984, University of Kansas; cardiology.
- Goldstein, Erika A. 1981; MD, 1981, University of Rochester; general internal medicine.
- Goodman, Richard B. 1986; MD, 1982, University of Oklahoma; pulmonary and critical care medicine.
- Gretch, David R. * 1990, (Adjunct); PhD, 1990, MD, 1990, University of Iowa; research and diagnostics related to viral hepatitis.
- Griep, Robert J. 1982; MD, 1958, University of Texas (Galveston); internal medicine/radiology.
- Gruenewald, David A. 1983; MD, 1983, University of Chicago; gerontology and geriatric medicine.
- Harrington, Robert D. 1989; MD, 1983, Tufts University; teaching and research studies involving HIV entry into CD4 cells.
- Higano, Celestia S. 1982; MD, 1979, University of Massachusetts; oncology.
- Hockenbery, David M. * 1994; MD, 1982, Washington University; gastroenterology.
- Horwitz, Marshall S. * 1983; PhD, 1988, MD, 1990, University of Washington; inherited white blood cell disorders, including leukemia.
- Jackson, J. Carey 1990; MPH, 1980, University of Hawaii, MD, 1986, Michigan State University; general internal medicine.
- Jarvik, Gail P. * 1991; PhD, 1986, University of Michigan, MD, 1987, University of Iowa; quantitative genetics and genetic epidemiology, focusing on common diseases.
- Jobe, Kathleen A. 1986; MD, 1986, University of Colorado (Denver); internal medicine.
- Kaufman, Joel D. * 1988; MD, 1986, University of Michigan, MPH, 1990, University of Washington; occupational and environmental epidemiology: etiologic research and public health surveillance.
- Kavanagh, Terrance J. 1985, (Adjunct); MS, 1980, PhD, 1985, Michigan State University; free radical toxicology, glutathione metabolism, toxicology and aging.
- Keifer, Matthew C. * 1982; MD, 1982, University of Illinois; the human health effects of pesticide exposure.
- Kowdley, Kris V. 1993; MD, 1985, Mt Sinai School of Medicine; gastroenterology.
- Lafferty, William E. 1988, (Adjunct); MD, 1978, University of Kansas; STDs, HIV/AIDS, surveillance and epidemiology of STD, managed care.
- Lampe, Mary F. * 1988; MS, 1976, University of Washington, PhD, 1984, University of North Carolina; medical technology education, molecular analysis of Chlamydia trachomatis pathogenesis.
- Lehmann, Kenneth G. 1990; MD, 1979, University of California (San Diego); cardiology.
- Lessler, Daniel * 1990; MD, 1986, Stanford University, MHA, 1992, University of Washington; health services research pertaining to cost-effectiveness, quality of care, medical management.
- Levy, Wayne C. 1985; MD, 1985, Loma Linda University; cardiology.
- Liles, W. Conrad 1990; PhD, 1987, MD, 1987, University of Washington; infectious diseases.
- Lindner, Armando 1970; MD, 1964, University of Buenos Aires (Argentina); nephrology.
- Linenberger, Michael L. 1986; MD, 1982, University of Kansas; hematology.
- Linker, David T. 1993; MD, 1976, Stanford University; diagnostic ultrasound in cardiology and cardiovascular pathophysiology.
- Lipkin, Edward W. * 1981; PhD, 1977, MD, 1978, Case Western Reserve University; mineral metabolism, nutrition support, non-human primate physiology.
- Madtes, David K. 1994; MD, 1979, University of Pittsburgh; pulmonary and critical care medicine.
- Maloney, David G. 1995; MD, 1985, PhD, 1991, Stanford University; medical oncology.
- Marra, Christina M. 1984, (Adjunct); MS, 1979, Oregon State University, MD, 1984, University of Oregon; neurology, infectious diseases.
- Martin, Gary V. 1984; MD, 1980, University of Arizona; cardiology.
- Martin, Thomas G. 1996; MD, 1977, Pennsylvania State University; general internal medicine.
- McMullen, W. Russell 1981; MD, 1978, University of Cincinnati; internal medicine, emergency medicine.
- McCormick, Wayne C. 1987; MD, 1983, Washington University; gerontology and preventative medicine.
- McGee, Steve R. 1987; MD, 1980, Washington University; general internal medicine.
- McTiernan, Anne * 1989, (Adjunct Research); PhD, 1982, University of Washington; breast and colon cancer, womens health, exercise and obesity.
- Mengert, Terry J. 1984; MD, 1984, University of Washington; emergency medicine.
- Miller, Richard A. 1981; MD, 1977, Harvard University; infectious diseases.
- Nash, Richard A. 1994; MD, 1977, University of Manitoba (Canada); oncology.
- Nguyen, Toan D. 1994; MD, 1978, University of Chicago; gastroenterology.
- Nielson, Christopher P. 1983; MD, 1978, University of California (Los Angeles); gerontology and geriatric medicine.
- O'Brien, Kevin 1984; MD, 1984, University of Washington; cardiology.

350 SCHOOL OF MEDICINE / MEDICINE

- O'Donnell, Paul V. 2001; PhD, 1973, Cornell University, MD, 1992, Johns Hopkins University; oncology.
- Olson, Carin M. 1994; MD, 1978, Ohio State University; general internal medicine.
- Ott, Susan M. 1980; MD, 1974, University of Washington; nephrology.
- Oxorn, Donald C. 1998, (Adjunct); MD, 1978, McGill University (Canada).
- Petersdorf, Effie Wang 1982; MD, 1982, McGill University (Canada); oncology.
- Petersdorf, Stephen H. 1983; MD, 1983, Brown University; oncology.
- Pinsky, Linda E. 1989; MD, 1989, University of Washington; general internal medicine.
- Poole, Jeanne E. 1981; MD, 1980, University of Washington; cardiology.
- Presland, Richard B. * 1994, (Adjunct Research); PhD, 1987, University of Adelaide (Australia); epithelial/epidermal differentiation, genetic diseases, regulation of development.
- Quinn, Lebris S. * 1980; PhD, 1982, University of Washington; control of muscle precursor cell proliferation and differentiation; muscle growth.
- Radich, Jerald P. 1983; MS, 1979, Harvard University, MD, 1983, University of California (Davis); oncology.
- Ralph, David D. 1981; MD, 1972, Stanford University; respiratory diseases.
- Ramsey, Scott D. * 1990; MD, 1990, University of Iowa, PhD, 1994, University of Pennsylvania; economics in medicine.
- Raskind, Wendy H. 1982; PhD, 1977, MD, 1978, University of Washington; medical genetics.
- Raugi, Gregory J. 1980; PhD, 1975, Duke University, MD, 1975, Duke University; dermatology.
- Reed, May J. 1990; MD, 1986, Harvard University; geriatric medicine and gerontology.
- Reilly, Dominic F. 1991; MD, 1988, University of Washington; general internal medicine.
- Russell, David W. 1991; PhD, 1988, Rockefeller University, MD, 1989, Cornell University; hematology.
- Sabath, Daniel E. * 1993, (Adjunct); PhD, 1989, MD, 1989, University of Pennsylvania; regulation of gene expression in hematopoietic cells.
- Sandmaier, Brenda M. 1987; MD, 1983, University of Alberta (Canada); oncology.
- Sasso, Eric H. 1984; MD, 1980, University of California (San Diego); rheumatology.
- Schmidt, Rodney 1984, (Adjunct); PhD, 1984, MD, 1984, University of Washington; surgical pathology, pulmonary pathology, sarcomas, image analysis, electron microscopy.
- Schnapp, Lynn M. 2000; MD, 1986, University of Pennsylvania; pulmonary and critical care medicine.
- Schubach, William H. 1994; PhD, 1971, University of California (Santa Cruz), MD, 1974, Columbia University; oncology.
- Shankland, Stuart J. 1994; MBChB, 1983, University of Capetown (South Africa); nephrology.
- Sheffield, John V. L. 1989; MD, 1989, Harvard University; general internal medicine.
- Skerrett, Shawn J. 1983; MD, 1978, New York University; pulmonary and critical care medicine.
- Smith, Curtis Scott 1987; MD, 1980, University of Washington; general internal medicine.
- Spach, David H. 1986; MD, 1986, Duke University; infectious diseases.
- Stadius, Michael L. 1993; MD, 1978, University of Oregon; cardiology.
- Stapleton, Ann E. 1987; MD, 1984, Albert Einstein College of Medicine; allergy and infectious diseases.
- Steinbach, Gideon 2001; PhD, 1975, City University of New York, MD, 1981, Albert Einstein College of Medicine; gastroenterology.
- Steinberg, Kenneth P. 1989; MD, 1985, New York Medical College; pulmonary and critical care medicine.
- Stephens, Karen G. * 1989, (Research); PhD, 1982, Indiana University; neurofibromatosis, tumorigenesis, gene mapping and regulation, human genetics.
- Stern, Eric J. 1992, (Adjunct); MD, 1985, University of Medicine and Dentistry of New Jersey; chest radiology.
- Stivelman, John C. 2000; MD, 1978, University of Pennsylvania; nephrology.
- Sugg, Nancy K. 1983; MD, 1983, University of Maryland; internal medicine.
- Tait, Jonathan F. * 1985, (Adjunct); PhD, 1983, MD, 1983, Washington University; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders.
- Thompson, John A. 1979; MD, 1979, University of Alabama; oncology.
- Weigle, David S. 1981; MD, 1978, Harvard University; endocrinology and metabolism.
- Wener, Mark H. * 1980, (Adjunct); MD, 1974, Washington University; diagnostic immunology, immune complex diseases.
- Whimbey, Estella 2001; MD, 1978, Cornell University; allergy and infectious diseases.
- Willerford, Dennis M. * 1996; MD, 1995, Washington University; hematology.
- Willson, Richard 1973; MD, 1962, University of Minnesota; gastroenterology.
- Wipf, Joyce E. 1984; MD, 1984, University of Minnesota; general internal medicine.
- Witherspoon, Robert P. 1976; MS, 1970, MD, 1970, Baylor University; oncology.
- Wood, Francis C, Jr. * 1961, (Emeritus); MD, 1954, Harvard University; metabolism and endocrinology.
- Wood, Robert W. 1977; MD, 1970, University of Rochester; internal medicine.
- Yeung, Raymond S. 1997, (Adjunct); MD, 1982, University of Toronto (Canada); general and surgical oncology.
- Ziskind, Andrew A. 1999; MD, 1984, University of Pennsylvania; clinical programs.
- Baas, Arnold S. 1994; MD, 1989, University of Texas (Southwestern); cardiology.
- Boeckh, Michael J. J. 1994; MD, 1985, Freie University of Berlin (Germany); allergy and infectious diseases.
- Brentnall, Teresa A. 1991; MD, 1987, University of Washington; gastroenterology.
- Bridge, Janis D. 1991; MPH, 1983, University of California (Los Angeles), MD, 1984, University of Washington; general internal medicine.
- Brodkin, Kayla I. 1989; MD, 1982, State University of New York (Stony Brook); gerontology and geriatric medicine.
- Buckner, Frederick S. 1992; MD, 1988, University of Washington; infectious diseases.
- Clurman, Bruce E. * 1991; PhD, 1988, MD, 1989, Cornell University.
- Colven, Roy M. 1987; MD, 1987, University of Washington; dermatology.
- Cook, David G. * 1998, (Research); PhD, 1991, Yale University; molecular mechanisms of Alzheimer's disease.
- Cummings, David E. * 1987; MD, 1987, Harvard University; genetic determinants of obesity. Interplay between body weight and reproduction.
- Dominitz, Jason A. 1998; MD, 1991, University of Maryland, MS, 1996, Duke University; gastroenterology.
- Drachman, Jonathan G. 1989; MD, 1989, Harvard University; hematology.
- Duchin, Jeffrey S. 1995; MD, 1985, Rutgers University; infectious diseases and epidemiology.
- Evans, Timothy C. 1980; MD, 1974, PhD, 1976, University of Michigan; diabetes management.
- Fero, Matthew L. 1993; MD, 1990, University of California (Irvine); oncology.
- Fitzgibbon, Dermot R. 1992, (Adjunct); MBChB, 1983, Cork Regional Hospital; pain management.
- Flowers, Mary E. 1994; MD, 1977, Centro de Ciencias da Saude da Universidade Federal do Rio Grande do Norte Brazil (Brazil); oncology.
- Frank, Leonard R. 1997; MD, 1988, Albany Medical College; emergency medicine.
- Fredricks, David N. 2001; MD, 1990, Case Western Reserve University; allergy and infectious diseases.
- Freeman, Rosario 2001; MD, 1995, Loyola University; cardiology.
- Gaster, Barak 1993; MD, 1993, University of California (San Francisco); general internal medicine.
- Georges, George E. 1994; MD, 1990, University of California (San Francisco); oncology.
- Gernsheimer, Terry B. 1984; MD, 1979, State University of New York (Stony Brook); hematology.
- Golden, Matthew R. 1994; MPH, 1993, MD, 1994, Johns Hopkins University; allergy and infectious diseases.
- Goss, Christopher Hooper 1997; MD, 1992, University of Colorado (Denver); pulmonary and critical care medicine.
- Goss, J. Richard 1993; MD, 1987, Oregon Health Sciences University, MPH, 1995, University of Washington; internal medicine.
- Assistant Professors**
- Amory, John K. 1997; MD, 1994, University of California (San Francisco); endocrinology.
- Ayub, Kamran 2001; MBBS, 1983, University of Peshawar (Pakistan), MRCP, 1989, Royal College of Physicians (UK); gastroenterology.

Gralow, Julie R. 1992; MD, 1988, University of Southern California; oncology.

Greenberg, Deborah L. 1990; MD, 1990, Washington University; general internal medicine.

Holmberg, Leona A. 1987; MD, 1986, University of Miami (Florida); oncology.

Hornung, Robin L. 1999, (Adjunct); MD, 1990, Yale University, MPH, 1996, University of North Carolina; dermatology.

Iwamoto, Satori 1993; MD, 1989, Harvard University; dermatology.

Jain, Sanjeev 2001; MD, 1990, PhD, 1990, University of Wisconsin (Madison); allergy and infectious diseases.

John Stewart, Grace C. 1992; MD, 1987, University of Michigan, MPH, 1995, University of Washington; mother-to-child HIV-1 transmission (specifically, Africa, cofactors, breastmilk).

Johnson, Kay M. 1991; MD, 1991, University of Minnesota; general internal medicine.

Kapur, Vishesh 1993; MD, 1989, Yale University; pulmonary and critical-care medicine.

Kearney, David J. 1996; MD, 1989, University of Missouri; gastroenterology.

Kiem, Hans-Peter 1992; MD, 1987, University of Ulm (Germany); oncology/hematology.

Kitahata, Mari M. 1991; MD, 1987, University of Pennsylvania, MPH, 1995, University of Washington; allergy and infectious diseases.

Koelle, David 1988; MD, 1985, University of Washington; allergy and infectious diseases.

Kuechle, Melanie K. 1995; MD, 1989, Baylor University; dermatology.

Kuver, Rahul P. 1989; MD, 1989, University of Michigan; gastroenterology.

Larson, Anne M. 1991; MD, 1991, University of Washington; gastroenterology.

Laya, Mary B. 1993; MD, 1982, Creighton University, MPH, 1995, University of Washington; general internal medicine.

Limaye, Ajit P. 1998; MD, 1992, University of Washington.

Lingappa, Jaisri * 1999, (Adjunct); PhD, 1985, Harvard University, MD, 1987, University of Massachusetts; cell biology of virus assembly; host proteins involved in assembly of HIV and other viruses.

Marrazzo, Jeanne M. 1992; MD, 1988, Jefferson Medical College, MPH, 1994, University of Washington; infectious diseases.

McNeely, Marguerite J. 1991; MD, 1988, MPH, 1993, University of Washington; general internal medicine.

Migeon, Mary 1988; MD, 1993, University of Washington; general internal medicine.

Montgomery, R. Bruce 1990; MD, 1987, Duke University; oncology.

Muczynski, Kimberly Ann 1989; PhD, 1984, MD, 1984, University of Washington; nephrology.

Neff, Margaret J. 1997; MD, 1993, Stanford University, MSc, 2000, University of Washington; pulmonary and critical care medicine.

Nelson, Karin M. 2001; MD, 1995, University of Minnesota, MSHS, 2000, University of California (Los Angeles); general internal medicine.

Nelson, Peter S. * 1993; MD, 1986, University of Kansas; the study of human carcinogenesis using tools of genomics and bioinformatics.

Neuzil, Kathleen M. 1998; MD, 1987, Johns Hopkins University, MPH, 1998, Vanderbilt University; allergy and infectious diseases.

Park, David R. 1988; MD, 1988, University of Vermont; pulmonary and critical care medicine.

Pickett, Cheryl A. 1998; PhD, 1984, University of California (Davis), MD, 1988, University of Colorado (Denver); metabolism, endocrinology, nutrition.

Powell, Heidi Sara 1993; MD, 1986, Oregon Health Sciences University; general internal medicine.

Ramakrishnan, Lalita * 2001, (Adjunct); MD, 1983, Baroda Medical College (India), PhD, 1990, Tufts University; contributions of mycobacteria and hosts to maintenance of chronic tuberculosis.

Rhoads, Caroline S. 1989; MD, 1989, University of Pennsylvania; general internal medicine.

Rubinfeld, Gordon 1991; MD, 1987, Jefferson Medical College, MPH, 1996, University of Washington; pulmonary and critical care medicine.

Ryan, Michael J. 1986; MD, 1986, University of Michigan; nephrology.

Schuetze, Scott 1996; PhD, 1993, MD, 1993, Oregon Health Sciences University; oncology.

Schwarze, Ulrike 1993, (Adjunct); MD, 1989, Medical Academy of Dresden (Germany); inherited disorders of connective tissue.

Shadlen, Marie-Florence 1995; MD, 1983, Brown University; gerontology and geriatric medicine.

Shuhart, Margaret C. 1991; MD, 1988, Dartmouth College; gastroenterology.

Staiger, Thomas O. 1990; MD, 1985, University of Washington; general internal medicine.

Stehman-Breen, Catherine O. 1990; MD, 1990, University of Chicago, MS, 1996, University of Washington; cardiovascular epidemiology among patients with end-stage renal disease.

Stempien-Otero, April S. 1994; MD, 1990, University of Connecticut; cardiology.

Sutton, Paul R. 1999; PhD, 1992, University of Illinois, MD, 1994, University of Chicago; internal medicine.

Tabet, Stephen R. 1991; MD, 1991, University of New Mexico, MPH, 1993, University of Washington; infectious diseases.

Thompson, William H. 1988; MD, 1988, Johns Hopkins University; pulmonary and critical care medicine.

Tonelli, Mark R. 1993; MD, 1989, University of Colorado (Boulder); pulmonary and critical care medicine.

Townes, David A. 2001; MD, 1993, University of Massachusetts, MPH, 1998, University of Chicago; emergency medicine.

Trence, Dace L. 2000; MD, 1997, University of Minnesota; endocrinology.

Tu, Shin-Ping 1993; MD, 1989, University of Cincinnati, MPH, 1996, University of Washington; general internal medicine.

Tung, Bruce Y.; MD, 1992, University of Chicago; gastroenterology.

Wald, Anna * 1989; MD, 1985, Mt Sinai School of Medicine, MPH, 1994, University of Washington; the epidemiology, natural history and therapeutics of HSV and other herpes viruses infections.

Warren, Edus Houston 1993; PhD, 1988, MD, 1991, Harvard University; oncology.

Watanabe, Jill M. 1998; MD, 1990, MPH, 1991, Johns Hopkins University; general internal medicine.

Wong, Emily Y. 1995; MD, 1990, University of Washington; internal medicine.

Wu, Daniel Y. 1991; PhD, 1990, MD, 1991, Loma Linda University; oncology.

Yee, Cassian 1991; MD, 1986, University of Manitoba (Canada); oncology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

MED 498 Undergraduate Thesis (*) *Paauw* Offered: AWSpS.

MED 499 Undergraduate Research (*) *Paauw* Case studies, with laboratory research. Available to undergraduates and medical students. Offered: AWSpS.

MED 505 P-Preceptorship in Medicine (1) *Paauw* To provide opportunity for first- and second-year medical students to gain personal experience with medical practice situations by being stationed with carefully selected clinical faculty members in their offices. Credit/no credit only. Prerequisite: permission of department. Offered: AWSpS.

MED 510 Health Issues of Sexual Minorities (1) *Greenberg* Introduction to the special health care issues and barriers confronting persons identified as bisexual, gay, lesbian, or transgendered. Includes lectures, panels, and case presentations by faculty and community experts. Offered: Sp.

MED 530 AIDS: A Multidisciplinary Approach (2) *Koutsky, Kreiss* Comprehensive overview of the public health, clinical, and laboratory aspects of human immunodeficiency virus (HIV) infection and disease. Topics include the pathogenesis, natural history, and management of (HIV) infections. The impact of HIV/AIDS on community and global health care and prospects for prevention and control. Credit/no credit only. Offered: jointly with EPI 530; A.

MED 531 P-Human Genetics (*) *Stamatoyannopoulos* Weekly seminar dealing with a variety of topics in medical genetics given by faculty of the Division of Medical Genetics and related departments and divisions. Open to medical students with a good foundation in genetics. Offered: AWSpS.

MED 532 Statistical Methods in Medical Genetics (2) *Wijsman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications stressed with reference to assumptions and limitations. Data sets analyzed with current computer programs. Prerequisite: knowledge of genetics or permission of instructor. Offered: jointly with BIOST/PHG 532; Sp.

MED 533 P-Clinical Endocrinology (2) *Cummings* Emphasis on the most major and dependable symp-

toms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated. Limited to second-year medical students. Offered: W.

MED 546 Clinical Applications of Gene Therapy (2) *Lieber* Overview of the current status of gene therapy. Discusses its role in the future practice of medicine. Lecture and literature reviews. Offered: S.

MED 547 Quantitative Methods in Medical Genetics (2) Computational methods of use for medical genetics. Review of problem sets. Topics range from basic probability to linkage analysis. Prerequisite: genetics and permission of instructor.

MED 549 Clinical Medical Genetics (1) Review of current clinical advances in medical genetics. Includes lectures and discussion of cases from medical genetics clinic. Prerequisite: genetics or human genetics and permission of instructor. Offered: AWSp.

MED 550 P-An Introduction to Emergency Medicine (1) *Mengert* Presentation of common medical and surgical emergencies and their urgent management, especially within the framework of rapid patient assessment and stabilization. Lecture topics include chest pain and myocardial infarction, basic arrhythmia management, and burn and wound care. Offered: Sp.

CONJ 550 P-Clinical Infectious Diseases (3) *Spach* See Conjoint Courses.

MED 555 P-Mind, Body, and Pen: Writing and the Art of Becoming a Physician (1) Provides forum for medical students to write about issues in medicine and medical education. Focuses on writing as a process for giving voice to the conflicting demands and dilemmas of becoming a physician. Explores personal narratives, dreams and disappointments, chronic illness and death, empathy and revulsion, authenticity and power. Offered: W.

UCONJ 555 Principles of STD/HIV Research (3) *Lukehart* See University Conjoint Courses.

MED 599 P-Transfusion Machine (3) *Reiner* Group discussions and didactic sessions cover broad category of transfusion medicine. Hands-on laboratory experience in red cell serology/compatibility, coagulation, and histocompatibility with emphasis on diagnosis and management of clinical problems. Based at Puget Sound Blood Center. Prerequisite: fourth-year medical student standing; third-year student standing with permission of instructor.

MED 604 P-Clinical Preceptorship in Internal Medicine (8) *Shima (Forks)* 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, the student evaluates and manages inpatients and outpatients on a primary care, consultative, and emergency basis. Prerequisite: MED 665. (Four weeks, full-time.) Offered: AWSpS.

MED 640 P-Dermatology Clinic (*, max. 5) *Olerud* Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Two half-days per week. Prerequisite: MED 665. Offered: AWSpS.

MED 642 P-Clinical Oncology (8) *Stewart (Fred Hutchinson Cancer Research Center)* Students functioning as primary physicians are responsible for the workups 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. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 644 P-Management of Sexually Transmitted Diseases (2) *Golden, Handsfield* Instruction and clinical experience in diagnosis, treatment, management, and patient counseling of sexually transmitted diseases. Instruction in genitourinary physical examination skills; relevant laboratory techniques and management of patients with STDs. Prior to the elective, each student must review a packet of didactic materials. Prerequisite: MED 665, SURG 665, and OB GYN 665. Offered: AWSpS.

MED 650 P-Advanced Medical Genetics (*, max. 5) *Jarvik, Horwitz, Stamatoyannopoulos* Summer course intended for third-year students who would like to increase their background in specific areas of medical genetics. Involves seeing patients with the instructor, reviewing the literature, analyzing clinical information, and writing a review on a selected topic. Prerequisite: HUBIO 554. Offered: S.

MED 655 P-Clinical HIV Care (8) *Harrington* Full-time outpatient and inpatient elective in HIV care for senior medical students. Students see patients for routine care and acute medical problems that do not require hospitalization, as well as provide inpatient consults. Prerequisite: MED 665.

MED 656 P-Clinical Nutrition (8) *Bruemmer, Purnell, Weigle* Instruction in nutritional assessment and care of both inpatients and outpatients. Students work with preceptors at a variety of hospital and clinic teaching sites, attend nutrition-related seminars, and practice interview skills on standardized patients. Prerequisite: HUBIO 568; MED 665.

MED 665 P-Clinical Clerkship (*, max. 24) *Paauw* Third-year medical students assume increasing responsibility for care of hospitalized patients in a teaching-hospital setting and participate in a four-week outpatient experience emphasizing continuity of care. Daily rounds with resident and attending physicians, with lectures and conferences. Progress evaluated by supervising physicians and a written examination. (Twelve weeks, full-time.) Offered: AWSpS.

MED 666 P-Advanced Clinical Clerkship in Internal Medicine-WWAMI (12) *Paauw* Advanced clinical clerkship in internal medicine in three small urban communities. Supervised, 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: MED 665. (Six weeks, full time. Limit: six students.) Offered: AWSpS.

CONJ 677 P-Clinical Allergy and Immunology (*, max. 12) *Henderson* See Conjoint Courses.

MED 678 P-Clinical Dermatology (8) *Olerud* Participation in dermatology clinics and inpatient consultations at University of Washington Medical Center; Harborview Medical Center; Children's Hospital Medical Center; Seattle V.A. Hospital; Meridian, Idaho; Casper, Wyoming; and Bellingham, Washington. Journal club and clinical conferences each week with entire staff. A continuing series of teaching seminars and weekly dermatopathology conferences. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 679 P-Clinical Gastroenterology (8) *Lee, Novan (Sacred Heart Spokane)* Participation in consulting ward rounds, procedures, conferences, and selected clinics with full-time divisional staff at University and Veterans Administration hospitals, and at Pacific and Harborview medical centers, plus directed tutorial work. Prerequisite: MED 665. (Four weeks, full-time.) Offered: AWSpS.

MED 680 P-Rheumatology (8) *Elkon* 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 of Washington Medical Center, Harborview Medical Center, or VAMC. Emphasis on concepts in pathophysiology, diagnosis, and treatment of these diseases. In addition to patient contact, reading, seminars, and preceptorial sessions are the methods of instruction. Prerequisite: MED 665. Offered: AWSp.

MED 681 P- Dermatologic Surgery (8) Dermatologic surgery elective for senior medical students. Instruction in Mohs surgery, conventional skin surgery, cosmetic procedures, wound healing and closure, and intraoperative and postoperative patient management. Prerequisite: MED 665.

MED 682 P-Clinical Cardiology and Electrocardiography (8) *Caldwell (Seattle V.A. Hospital), Corson (Harborview Medical Center), Herzog (Anchorage Veterans Administration Hospital), Mascette (Madigan Hospital Medical Center), Novan (Sacred Heart, Spokane), Otto (University of Washington Medical Center)* Clerkship in clinical cardiology-combined inpatient-outpatient assignments, ECG interpretation. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 683 P-Clinical Respiratory Disease and Critical Care Medicine (8) *Lakshminarayana (Seattle V.A. Hospital), Pierson (Harborview Medical Center), Roth (Madigan) Thompson (Boise Veterans Administration Medical Center), Tonelli (University of Washington Medical Center)* Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary function testing and interpretation. Inpatient and outpatient teaching rounds, conferences, and basic science integration. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 684 P-Clinical Hematology/Oncology (8) *Abkowitz (University of Washington Medical Center), Broudy (Harborview Medical Center), Collins (Boise Veterans Administration Medical Center), Roth (Seattle V.A. Hospital), Zuckerman (Boise Veterans Administration Medical Center)* Outpatient and inpatient experience with hematologic/oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 685 P-Clinical Genetics (*, max. 24) *Bird, Byers, Motulsky, Stamatoyannopoulos* Full-time clinical clerkship in medical genetics. Provides extensive exposure to variety of genetic diseases and genetic counseling. Students work in three clinics (Monday, Tuesday, Thursday), response to in-house consultation requests, attend rounds at Children's Hospital and Medical Center and University of Washington Medical Center and seminars at University of Washington Medical Center (Wednesday, Friday). Prerequisite: MED 665. Offered: AWSpS.

MED 688 P-Ward Medicine Subinternship (*, max. 24) *Harvey (Anchorage), R. Jones (Madigan Hospital Medical Center), McGee (Veterans Administration Medical Center), Paauw (University of Washington Medical Center), Schoene (Providence), Sheffield (Harborview Medical Center)* Students act in the capacity of interns on the medical wards under supervision of house staff and visiting physicians. They attend all regular medicine rounds and conferences as their schedules permit. Prerequisite: MED 665. (Four or six weeks.) Offered: AWSpS.

MED 689 P-Clinical Infectious Diseases (8) *Stamm (University of Washington Medical Center)* Students participate in the consulting service throughout the hospital, attend daily plate rounds, conferences, and seminars. (Four weeks.) *Corey (Fred Hutchinson Cancer Research Center), Holmes (Harborview*

Medical Center), Miller (Seattle V.A. Hospital), Morris (Madigan Army Medical Center), Novan (Spokane), Stevens (Boise Veterans Administration Hospital). Participate in consulting service throughout hospital to learn microbiological aspects of infectious diseases through the clinical laboratories. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

MED 690 P-Cardiology Subinternship (8) *Otto* (University of Washington Medical Center) Students act in the capacity of interns on the cardiology service under the supervision of house officer. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

MED 691 P-Primary Care (8/12) *Paauw* Six-week, full-time ambulatory care block in primary care internal medicine. Students participate in several clinics at University of Washington Medical Center following a panel of patients in medicine, rheumatology, and virology clinics. Prerequisite: MED 665 and permission of instructor. Offered: AWPpS.

MED 692 P-Clinical Endocrinology and Metabolism (*, max. 12) *Weigle* (Seattle-based program); *Bunner* (Madigan) Clerkship in clinical endocrinology and metabolism combined inpatient and outpatient assignments at selected hospitals. Prerequisite: MED 665. Offered: AWPpS.

MED 693 P-Nephrology and Fluid Balance (8) *Couser* (University of Washington Medical Center), *Narasimhan* (Boise Veterans Administration Hospital), *Novan* (Spokane Sacred Heart), *Sherrard* (Seattle V.A. Hospital), *Zager* (Harborview Medical Center) 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, participate in seminars with clerks from all three hospitals. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

MED 694 P-Harborview Evening Clinic (2) *Assefi* A longitudinal elective for senior medical students who assume primary responsibility for a panel of medical patients in an outpatient clinic. Direct care of patients is supplemented by didactic sessions dealing with issues in ambulatory care. Students are strongly encouraged to participate for four quarters. Prerequisite: MED 665 and permission of instructor. Offered: AWPpS.

MED 695 P-Clinical Aspects of Aging (8) *Abrass*, *Hazzard* (Harborview Long Term Care Service, Harborview Medical Center, and Seattle V.A. Medical Center), *Cusak* (Boise V.A. Medical Center) Work with elderly patients as subintern with Senior Care Program. Inpatient and ambulatory setting in nursing homes and patients' homes. Interdisciplinary approach. Prerequisite: MED 665. Offered: AWPpS.

MED 697 P-Medicine Special Electives (*, max. 24) *Paauw* Special clerkship, externship, or research opportunities that can at times be made available at institutions other than University of Washington. Faculty can advise students of opportunities. Students wishing to elect this course should obtain from Dean's office a special assignment form at least three months before preregistration. Prerequisite: permission of department. (Two, four, six, or twelve weeks.) Offered: AWPpS.

MEDEX Northwest

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

MEDEX 450 Basic Science in Clinical Medicine for PAs (6) *Evans, Stoll* Intensive review course on important basic science concepts relevant to clinical medicine at the physician assistant level. Topics covered include cell biology, microbiology, genetics and immunity. Prerequisite: admission to the MEDEX Program. Offered: S.

MEDEX 451 Anatomy and Physiology for the MEDEX Practitioner (6) *Cauldwell, Landel* Anatomy and physiology of the following organ systems: HEENT, respiratory, cardiovascular, gastrointestinal, reproductive, renal, musculoskeletal, and neurologic. Required for entering students to the MEDEX program who have not satisfied program prerequisites in anatomy and physiology. Offered: S.

MEDEX 452 Basic Clinical Pathology for the MEDEX Practitioner (6) *Stoll* Basic pathological and pathophysiological concepts of diseases commonly encountered in primary-care practice. Pathophysiology studied per organ system. Offered: A.

MEDEX 453 Basic Clinical Skills for the MEDEX Practitioner (6) *Cupp* Provides the student with mastery of a screening history and physical examination and thoroughness in data-collection skills. Branching examinations of major organ systems and medical record-keeping and verbal presentation skills by the problem-oriented method are taught. Offered: A.

MEDEX 454 Adult Medicine I (7) *Cupp, Evans* Problem-oriented approach to the diagnosis and management of common primary care conditions. Introduction to relevant laboratory and radiological procedures. Organ system approach. Offered: W.

MEDEX 455 Adult Medicine II (7) *Cupp, Evans* Continuation of MEDEX 454. Offered: Sp.

MEDEX 456 Maternal and Child Health for the MEDEX Practitioner I (3) *Dale* Designed to acquaint students with principles of prenatal care and primary-care pediatrics. Offered: W.

MEDEX 457 Behavioral Science Skills for the MEDEX Practitioner I (2) *Lurie* Process skills and interpersonal skills needed for primary-care practice, assessment skills needed for the diagnosis of emotional problems, and management skills used in primary-care practice to deal with these problems. Offered: A.

MEDEX 458 Behavioral Science Skills for the MEDEX Practitioner II (2) *Lurie* In-depth coverage of common emotional problems seen in primary care. Offered: W.

MEDEX 459 Behavioral Science Skills for MEDEX Practitioner III (2) *Lurie* Continuation of MEDEX 458. In-depth approaches to assessment and management of specific primary-care problems. Advanced interviewing skills with videotaped feedback included. Offered: Sp.

MEDEX 460 Principles of Patient Management for the MEDEX Practitioner I (3) *Stoll* Systematic approach to patient management applicable to a primary-care setting. Majority of course is devoted to

drug therapy and its administration. The other half includes health maintenance, risk factor identification, and nonpharmacological models of therapy. Offered: W.

MEDEX 461 Principles of Patient Management for the MEDEX Practitioner II (3) *Stoll* Continuation of 460. Offered: Sp.

MEDEX 462 Maternal and Child Health for the MEDEX Practitioner II (3) *Dale* Continuation of 456. Emphasis on diagnosis and treatment of common pediatric problems. Offered: Sp.

MEDEX 463 Clinical Clerkships for the MEDEX Practitioner I (19) *Scott* Full-time clinical clerkship spent in institution-based or specialty practice settings, such as occupational health, surgery, emergency medicine, psychiatry, or geriatrics. Credit/no credit only. Offered: AWPpS.

MEDEX 465 Clinical Clerkships for the MEDEX Practitioner II (19) *Plummer* Continuation of clinical clerkships spent in institution-based or specialty practice settings, with emphasis on inpatient medicine. Credit/no credit only. Offered: AWPpS.

MEDEX 466 Family Practice Clerkship for the MEDEX Practitioner I (19) *Ballweg* Family practice under the supervision of physicians throughout the Pacific Northwest. Common primary-care problems. Students and preceptors are educated in the utilization and management of the physician assistant in practice. Students keep computerized records of patient encounters and complete a variety of written assignments. Credit/no credit only. Offered: AWPpS.

MEDEX 467 Family Practice Clerkship for the MEDEX Practitioner II (19) *Flynn* Further experience in primary-care practice with emphasis on independent patient management by the student supervised by family practitioners. Credit/no credit only. Offered: AWPpS.

MEDEX 468 Emergency Medicine I for the MEDEX Practitioner (3) *Landel* Approach to the diagnosis and management of common emergency conditions for primary care physician assistants. Organ system approach. Offered: W.

MEDEX 469 Emergency Medicine II for the MEDEX Practitioner (3) *Landel* Continuation of MEDEX 468. Approach to diagnosis and management of common emergency conditions for primary care physician assistant. Organ system approach. Offered: Sp.

MEDEX 470 PA Role Course I (1) *Ballweg* Introduction to the history, current status and future development of the PA profession. Description and discussion of state medical practice acts and reimbursement status. Other course topics are the roles of physicians and nurse practitioners. Offered: A.

MEDEX 471 PA Role Course II (1) *Ballweg* Continuation of MEDEX 470. Health access issues, health care politics and managed care issues. Offered: W.

MEDEX 472 PA Role Course III (1) *Ballweg* Continuation of MEDEX 471. Focuses on health care issues for specific underserved populations. Cross-cultural simulations introduce course concepts. Students work in small groups and present their findings to fellow students. Offered: Sp.

MEDEX 499 Special Field Projects/Independent Study (1-12, max. 12) Clinical clerkships and independent study activities for students enrolled in the MEDEX Northwest Physician Assistant Program. Credit/no credit only. Offered: AWPpS.

Microbiology

G315 Health Sciences



General Catalog Web page:
www.washington.edu/students/genocat/academic/MicrobiologyM.html



Department Web page:
depts.washington.edu/micro/

Microbiology is a natural science that deals with microorganisms such as bacteria, fungi, protozoa, algae, and viruses. It is concerned with the nature and properties of these organisms, their effects on humans and the environment, and how they can be exploited to provide useful products.

Graduate Program

Graduate Program Coordinator
G315 Health Sciences, Box 357242
206-543-2572
advmicro@u.washington.edu

The Department of Microbiology offers a graduate program leading to the Doctor of Philosophy degree. Students interested in graduate work should obtain the necessary application forms from the department.

The choice of an adviser and research problem are matters of mutual consent between the student and a faculty member. The course work taken by a graduate student depends to a certain extent upon the student's background and chosen area of specialization, but in general, courses are chosen from the fields of microbiology, immunology, biochemistry, genetics, and cell biology. A master's degree program either with or without thesis is available on a very limited basis. An M.S. degree is not necessarily a prerequisite for the Ph.D. degree.

Applicants are evaluated by a committee that considers the student's grades, scores on the Graduate Record Examination, research experience, letters of recommendation, and any other data that might provide an indication of the student's capabilities for success in a career in science.

Students are normally admitted into the graduate program only in autumn quarter, and all application materials should be received by the department no later than the preceding December 31. Graduate Record Examination aptitude scores are required as part of the application, and the examination should be taken no later than October. Three letters of recommendation must also be sent directly to the department.

Students with a variety of academic backgrounds are accepted for graduate study in microbiology, but it is highly desirable that their undergraduate preparation include at least a year of general chemistry and a year of college physics, courses in organic chemistry and quantitative analysis, calculus, one year of biology, and courses in genetics, biochemistry, and microbiology.

Students in the Ph.D. program are usually supported by funds from training grants, research grants, or teaching assistantships.

Faculty

Chair

James I. Mullins

Professors

Aebersold, Rudolf Hans * 1993, (Affiliate); MD, 1984, Yale University; protein biochemical investigation of signal transduction pathways.

Champoux, James J. * 1972; PhD, 1970, Stanford University; DNA replication, tumor virology.

Clark, Edward A. * 1984; PhD, 1977, University of California (Los Angeles); lymphocyte surface molecules, lymphocyte activation and cell communication.

Corey, Lawrence * 1977, (Adjunct); MD, 1971, University of Michigan; DX, therapy and pathogenesis of viral infections, AIDS/herpes viruses.

Coyle, Marie B. * 1973, (Emeritus); PhD, 1965, Kansas State University; DNA probes and GLC for rapid identification of mycobacteria and corynebacteria.

Evans, Charles A. 1946, (Emeritus); MD, 1937, PhD, 1943, University of Minnesota; microbial flora of human skin, medical virology.

Fields, Stanley * 1995, (Adjunct); MA, 1978, PhD, 1981, Cambridge University (UK); yeast: molecular biology and genetics.

Galloway, Denise A. * 1982; PhD, 1976, City University of New York; viral pathogenesis and neoplasia.

Gilliland, Bruce C. * 1970, (Adjunct); MD, 1960, Northwestern University; hematology.

Gordon, Milton * 1959, (Adjunct); PhD, 1953, University of Illinois; molecular basis of plant tumors, control of gene expression in plants.

Greenberg, Philip D. * 1978, (Adjunct); MD, 1971, State University of New York (Downstate Medical Center); molecular, cellular, viral, and tumor immunology.

Hakomori, Sen-Itiroh * 1967; MD, 1951, DrMedS, 1956, Tohoku Imperial University (Japan); membrane biochemistry and glycoproteins.

Holmes, King K. * 1967, (Adjunct); MD, 1963, Cornell University, PhD, 1967, University of Hawaii; clinical epidemiology and pathogenesis of infectious diseases.

Hu, Shiu-Lok 1988; PhD, 1978, University of Wisconsin; virus-host interactions, AIDS vaccines and pathogenesis of primate lentivirus infection.

Hughes, Kelly T. * 1989; PhD, 1984, University of Utah; genetics, gene regulation, microbial physiology, and metabolism.

Katze, Michael Gerald * 1987; PhD, 1980, Hahnemann Medical College; regulation of viral gene expression at the translational level.

Kenny, George E. * 1961, (Adjunct); PhD, 1961, University of Minnesota; antigenic structure.

Lamont, Richard J. * 1988, (Adjunct); PhD, 1985, University of Aberdeen (UK); pathogenic mechanisms of oral bacteria, host pathogen interactions, biofilms, gene regulation.

Lidstrom, Mary E. * 1995; MS, 1975, PhD, 1977, University of Wisconsin; biomolecular engineering, metabolic engineering, bioremediation.

Linial, Maxine L. * 1982; PhD, 1970, Tufts University; retroviral replication and genetics, retroviral transformation.

Lory, Stephen * 1984, (Affiliate); PhD, 1980, University of California (Los Angeles); biochemistry, genetics of microbial virulence factors.

Lukehart, Sheila A. * 1980, (Adjunct Research); PhD, 1978, University of California (Los Angeles); immunology of infectious diseases, microbiology, sexually transmitted diseases.

Miller, Samuel I. * 1995; MD, 1979, Baylor University; salmonella pathogenesis and bacterial-eucaryotic cell interactions.

Mullins, James I. * 1994; PhD, 1978, University of Minnesota; retroviruses and AIDS, molecular virology.

Nester, Eugene W. * 1962; PhD, 1959, Case Western Reserve University; genetics and biochemistry, of bacterial-plant cell interactions.

Rubens, Craig E. * 1984, (Adjunct); PhD, 1978, Medical University of South Carolina, MD, 1982, University of Washington; infectious diseases/pathogenesis of gram(+) bacterial infections.

Sherris, John C. * 1959, (Emeritus); MBBS, 1948, MD, 1950, University of London (UK); medical microbiology, antibiotic action and resistance.

Stahl, David A. 2000, (Adjunct); MS, 1975, PhD, 1978, University of Illinois (Urbana).

Staley, James T. * 1971; PhD, 1967, University of California (Davis); freshwater bacteriology, microbial ecology, general microbiology.

Stuart, Kenneth Daniel * 1985, (Adjunct); PhD, 1969, University of Iowa; molecular biology of parasites.

Tarr, Phillip I. 1983, (Adjunct); MD, 1980, Yale University; gastroenterology/infectious diseases.

Vessella, Robert L. 1989, (Adjunct); PhD, 1974, University of Mississippi; tumor markers and immunology.

Associate Professors

Fritsche, Thomas R. * 1981; MD, 1981, PhD, 1984, University of Minnesota; systematics and ecology of animal parasites, medical microbiology.

Geballe, Adam Philip * 1988, (Adjunct); MD, 1978, Duke University; translational regulation of viral and cellular gene expression.

Haigwood, Nancy L. * 1994; PhD, 1980, University of North Carolina; host immunity in the control and prevention of AIDS.

Herwig, Russell P. * 1983, (Adjunct Research); PhD, 1989, University of Washington; environmental microbiology, bioremediation, molecular microbial ecology, microbial phylogenetics.

Hill, Walter E. * 1992, (Affiliate); PhD, 1972, University of Washington; genetic methods for detecting and characterizing food-borne microbial pathogens.

Lampe, Mary F. * 1988, (Adjunct); MS, 1976, University of Washington, PhD, 1984, University of North Carolina; medical technology education, molecular analysis of Chlamydia trachomatis pathogenesis.

Lara, Jimmie Cano * 1972; PhD, 1970, University of California (Riverside); microbial physiology and crytology, sporulation and gas vesicle synthesis and regulation.

Leigh, John A. * 1985; PhD, 1983, University of Illinois; bacterial physiology, biochemistry, genetics.

Moseley, Stephen L. * 1985; PhD, 1981, University of Washington; molecular basis of pathogenesis in *E. coli* diarrhea.

Rose, Timothy M. * 1991, (Adjunct); PhD, 1981, University of Geneva (Switzerland); molecular biology of tumor viruses, cell growth, differentiation, and transformation.

Traxler, Beth A. * 1992; PhD, 1987, Carnegie Mellon University; bacterial physiology, genetics, and membrane protein biochemistry.

Assistant Professors

Cookson, Brad T. * 1996; PhD, 1991, MD, 1991, Washington University; cellular immune response to intracellular bacteria; microbial pathogenesis; clinical microbiology.

Freitag, Nancy E. 2000, (Adjunct); PhD, 1989, University of California (Los Angeles); bacterial pathogenesis and regulation of gene expression.

Lagunoff, Michael * 2001; PhD, 1995, University of Chicago; molecular virology of Kaposi's sarcoma-associated herpesvirus.

Mittler, John E. * 1999; PhD, 1992, University of California (Irvine); microbial population biology, mathematical modeling of dynamical systems, HIV pathogenesis.

Ramakrishnan, Lalita * 2001; MD, 1983, Baroda Medical College (India), PhD, 1990, Tufts University; contributions of mycobacteria and hosts to maintenance of chronic tuberculosis.

Samudrala, Vaikuntanath V. * 2001; PhD, 1997, Center for Advanced Research in Biotechnology; modeling the structure and function of whole genomes.

Senior Lecturers

Anderson, Denise G. 1982; MS, 1985, University of Washington; microbiology laboratory teaching.

Fulton, Janis R. 1983; MS, 1977, Montana State University; microbiology laboratory teaching.

Lecturers

Barnes, Glover W. * 1969; MA, 1955, PhD, 1961, State University of New York (Buffalo); tissue, organ immunology.

Chandler, Mark S. 1998; PhD, 1998, University of Illinois; microbiology laboratory teaching.

Gray, Kendall M. 2000; PhD, 1989, University of Southern California; microbiology laboratory teaching.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscaat.

MICROM 402 Fundamentals of General Microbiology Laboratory (3) NW Fulton, Gray Isolation of a broad range of nonpathogenic bacteria from natural sources, using selective and enrichment techniques, with microscopic, biochemical, and molecular identification. Related exercises include genetics, physiology, quantitation, and growth energetics. Prerequisite: either BIOL 200 or BIOL 201; rec-

ommended: MICROM 410 which may be taken concurrently. Offered: Asp.

MICROM 410 Fundamentals of General Microbiology I (3) NW Lara, Traxler Survey of the microbial world, metabolism, biosynthesis, regulation, growth, structure, and function. Required for students majoring in microbiology; recommended for students majoring in biology. Prerequisite: either BIOL 200 or BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: A.

MICROM 411 Gene Action (5) NW Gray, Hughes, Manoil Molecular genetics: description of fundamental genetic processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focuses on prokaryotic organisms. Prerequisite: either BIOL 200 or BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: jointly with GENET 411; W.

MICROM 412 Fundamentals of General Microbiology III (3) NW Leigh Structure, biochemical properties, and genetics of the major groups of prokaryotes. Prerequisite: either BIOL 200, BIOL 201, or BIOL 203; recommended: either CHEM 223, CHEM 237, or CHEM 335; MICROM 410. Offered: Sp.

MICROM 431 Prokaryotic Recombinant DNA Techniques (3) NW Anderson, Chandler Laboratory course emphasizing concepts and techniques/methodologies in recombinant DNA research employing bacteria and their viruses. Topics and experiments/demonstrations include genomic and plasmid DNA isolation, restriction mapping, cloning, transposon mutagenesis, sequencing, and Western and Southern blotting. No auditors. Prerequisite: either BIOL 200, BIOL 201, or MICROM 301. Offered: W.

MICROM 435 Microbial Ecology (3) NW Staley Consideration of the various roles that microorganisms, particularly bacteria and cyanobacteria, play in environmental processes. The interrelationships among microorganisms and the effects of the physical, chemical, and biological properties of their environment are discussed and assessed. Prerequisite: either BIOL 180, BIOL 201, or BIOL 203. Offered: even years; Sp.

MICROM 440 Introductory Bacteriology for Medical Technologists (1) NW Anderson Limited introduction to basic microbiology, with focus on structure, metabolism, and genetics of medically important organisms. Open only to medical technology students. Credit/no credit only. Offered: A.

MICROM 441 Introduction to Immunology (4) NW General properties of immune responses; cells and tissues of immune system; lymphocyte activation and specificity; effector mechanisms; immunity to microbes; immunodeficiency and AIDS; autoimmune diseases; transplantation. Prerequisite: BIOL 202; recommended: either GENET 371, GENET 372, BIOC 405, or BIOC 440. Offered: jointly with IMMUN 441; A.

MICROM 442 Medical Bacteriology (3) NW Cookson, Lampe Medically important bacterial pathogens are discussed in terms of the clinical, therapeutic, and epidemiological aspects of diseases caused by them, molecular mechanisms of pathogenesis and their identification in the clinical laboratory. Laboratory course 443 coordinates. Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410; MICROM 441. Offered: W.

MICROM 443 Medical Microbiology Laboratory (3) NW Anderson, Chandler, Fritsche, Fulton Required for medical technology students, microbiology majors; elective for medical students. Procedures for isolation and identification of pathogenic bacteria, testing their susceptibility to antibiotics. No auditors.

Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410. Offered: AW.

MICROM 444 Medical Mycology and Parasitology (4) NW Anderson, Fritsche, Fulton, Novicki 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. Prerequisite: either BIOL 200 or BIOL 201; recommended: immunology. Offered: Sp.

MICROM 445 Medical Virology (2) NW Lagunoff, Mullins, Thouless An introductory course emphasizing basic understanding of medical virology and viral pathogenesis. The biochemical, replication, host-parasite relationships and pathogenesis of animal viruses are examined. Prerequisite: either BIOL 180, BIOL 200, or BIOL 201; recommended: MICROM 441. Offered: jointly with PABIO 445; Sp.

MICROM 447 Immunity, Disease and Society (2) Clark Impact and controversies associated with breakthroughs in immunology and infectious diseases. Topics include vaccines, complementary medicine (herbal boosts of the immune system), the mind and the immune system, allergies (asthma), cancer immuno-therapy, genetic screening and autoimmune disease and natural history of infectious disease. Prerequisite: MICROM 441. Offered: jointly with IMMUN 447.

MICROM 450 Molecular Biology of Viruses (3) NW Champoux Introduction to the molecular biology of viruses and virus-host relationships. Designed for advanced undergraduates and graduate students in the biological sciences. Coverage includes bacterial and animal viruses, with an emphasis on the molecular mechanisms of viral gene expression and regulation. Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410, MICROM 411, GENET 371, or GENET 372. Offered: W.

MICROM 495- Honors Undergraduate Research (*-) Leigh Specific problems in microbiology or immunology. Offered: AWSpS.

MICROM 496 Undergraduate Library Research (2) An introduction to library research techniques and to microbiological literature. Staff assign a topic and supervise the project. Offered: AWSpS.

MICROM 499- Undergraduate Laboratory Research (*-) Leigh Specific problems in microbiology or immunology. Credit/no credit only. Offered: AWSpS.

MICROM 500 Introduction to Research (*, max. 20) Introduction to research areas of the faculty and the techniques employed in their investigations. Credit/no credit only. Prerequisite: graduate standing in microbiology or permission of instructor. Offered: AWSpS.

MICROM 510 Physiology of Bacteria (3) Traxler Topics of current interest concerning the molecular biology and physiology of bacteria. Prerequisite: MICROM 410 and BIOC 440, 441, and 442, or permission of instructor. Offered: odd years; W.

MICROM 518 Microbial Degradation of Toxic Contaminants (3) Herwig, Strand Detailed survey of current understanding of microbiology and degradative pathways of industrial organic compounds, pesticides, plastics, oil, and metals. Microbial requirements for bioremediation. Methods of scientific investigation of microbial transformations. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with CEE 542/ESC 518; W.

MICROM 520 Seminar (1) Leigh Credit/no credit only. Offered: AWSpS.

MICROM 522 Current Research in Microbiology (1) *Hughes* Weekly student and faculty seminar presentations based on the current literature. Credit/no credit only. Prerequisite: graduate standing in microbiology. Offered: AWSp.

MICROM 526 Research of Cell Surface Problems (1) *Traxler* Weekly research seminar and discussion of scientific literature pertaining to the process of membrane protein biogenesis. Credit/no credit only. Prerequisite: permission of instructor.

MICROM 527 Genetic Approach to Complex Biological Processes (1) *Hughes* Current research as it applies to genetic approaches to complex biological processes in the area of microbiology. Offered: AWSpS.

MICROM 528 Salmonella Genetics (1) *Hughes* Review current literature in the area of gene regulation in *Salmonella typhimurium* and related studies in *Escherichia coli*. Prerequisite: graduate student standing; advanced undergraduates by permission of instructor. Offered: AWSpS.

MICROM 530 Evolution of Prokaryotic Diversity (3) *Leigh* Evolution, diversity, and genomics of prokaryotic microorganisms. Lectures, discussions, and reading of current literature. Open to graduate students in the biological sciences and advanced undergraduates with permission of instructor. Offered: odd years; A.

MICROM 531 Prokaryotic Diversity and Evolution Laboratory (2) *Leigh* Enrichment, isolation, and molecular phylogenetic characterization of selected prokaryotic organisms. Prerequisite: permission of instructor. Offered: odd years; A.

MICROM 532 Seminar in General Microbiology (1, max. 15) *Leigh* Weekly seminar concerning research topics in the genetics and biochemistry of selected bacteria. Credit/no credit only. Prerequisite: MICROM 410, permission of instructor. Offered: AWSpS.

MICROM 553 Molecular Mechanisms of Bacterial Pathogenesis (3) *Hughes, Moseley, Rubens* Mechanisms of bacterial pathogenesis explored at the molecular, genetic, and cellular levels through selected models as presented in the current scientific literature. Prerequisite: MICROM 411 or equivalent. Offered: even years; A.

MICROM 554 Seminar in Molecular and Medical Microbiology (1, max. 15) *Hughes* Weekly one-hour seminar in which recent advances in molecular biology of microbial pathogenesis or the current research of the participants is presented and discussed critically. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

MICROM 555 Advanced Clinical Microbiology (2.5) *Cookson, Fritsche, Limaye* Attendance at daily plate rounds of the Division of Clinical Microbiology. Designed to increase understanding of clinical microbiological work and its application to the care of the patient. Credit/no credit only. Prerequisite: MICROM 443 and permission of instructor. Offered: AWSp.

MICROM 556 Clinical Microbiology Training and Research (*, max. 12) *Fritsche* Training in clinical microbiology and applied research. Attendance at daily laboratory rounds in addition to bench-side training and research. For medical students and microbiology graduate students only. Credit/no credit only. Prerequisite: MICROM 443 and permission of instructor.

MICROM 560 Research and Journal Club in Retrovirology (1) *Linial* Weekly research seminar and discussion of literature in areas of retroviral replication and transformation. Prerequisite: graduate or permission of instructor. Offered: AWSpS.

MICROM 562 Oncogene and Retrovirus Research Seminar (1) *Linial, Overbaugh* Weekly discussions of ongoing research related to retroviral replication, retroviral oncogenes and pathology. Prerequisite: graduate standing or permission of instructor. Offered: AWSpS.

MICROM 585 Research in Cell and Molecular Biology (1, max. 15) *Champoux* Weekly research seminar. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MICROM 588 Research in Applied Microbiology (1) *Lidstrom* Weekly research seminar and discussion of scientific literature pertaining to applied microbiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with CHEM E 588; AWSpS.

MICROM 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

MICROM 700 Master's Thesis (*) Credit/no credit only.

MICROM 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Neurological Surgery

700 9th Avenue, Harborview Medical Center



General Catalog Web page:
www.washington.edu/students/gencat/academic/Neurological_Surgery.html



Department Web page:
depts.washington.edu/neurosurg/

askuwns@u.washington.edu

The Department of Neurological Surgery is dedicated to teaching and research in the entire spectrum of diseases of the central and peripheral nervous system. Instruction in this area is provided for medical students and postgraduate physicians.

The department's medical-student instruction includes participation in the human-biology curriculum as well as in elective basic-science and clinical experiences. These are available at Harborview Medical Center, University of Washington Medical Center, Veterans Affairs Puget Sound Health Care Center, and Children's Hospital and Regional Medical Center. The department also has several course offerings correlating research and clinical problems of the nervous system, including the neuroscience research seminar, and clinical and basic-science correlates of the epilepsies.

Selected medical students also may elect research experience within the Department of Neurological Surgery. The department research facilities are housed in the Medical Research Tower of the University of Washington Medical Center, at Harborview Research and Training Building, and at Veterans Affairs Puget Sound Health Care System. Investigations are under way at these institutions in many areas of neurophysiology, in behavioral research, in light and electron microscopic examination of the anatomy of the nervous system, in cerebrovascular physiology, and in neuro-oncology.

In addition to undergraduate instruction, a fully certified residency program in neurological surgery is available for selected postgraduate physicians. The eight-year program emphasizes preparation for a career in academic neurosurgery.

Faculty

Acting Chair

Richard G. Ellenbogen

Professors

Alvord, Ellsworth C. * 1960, (Adjunct); MD, 1946, Cornell University; neuropathology, experimental allergic encephalitis.

Anderson, Gail * 1981, (Adjunct); PhD, 1987, University of Washington; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma.

Chatrian, Gian E. 1981, (Emeritus); MD, 1951, University of Naples (Italy); electroencephalography and clinical neurophysiology.

Cohen, Wendy A. 1987; MD, 1975, Harvard University; neuroradiology.

Dikmen, Sureyya S. * 1974, (Adjunct); PhD, 1973, University of Washington; clinical neuropsychology, traumatic brain injury.

Domino, Karen B. 1986, (Adjunct); MA, 1974, University of New Mexico, MD, 1978, University of Michigan; neuroanesthesia.

Eskridge, Joseph M. 1987; MD, 1981, University of Louisville; neuroradiology.

Fraser, Robert T. 1976; PhD, 1976, University of Wisconsin; psychology.

Gruss, Joseph S. 1991, (Adjunct); MBChB, 1969, University of Witwatersrand (South Africa); craniofacial and maxillofacial surgery.

Harris, A. Basil 1967, (Emeritus); MD, 1954, University of Alabama; neurosurgery, neuroanatomy, microvascular, arteriovenous malformations, epilepsy mechanisms.

Haynor, David R. * 1979, (Adjunct); PhD, 1971, University of California (Berkeley), MD, 1979, Harvard University; medical image processing and segmentation; image deformation; functional MRI; expression arrays.

Jaffe, Kenneth M. * 1981, (Adjunct); MD, 1975, Harvard University; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects.

Kelly, William A. 1959, (Emeritus); MD, 1954, University of Cincinnati; neurosurgery, neuroendocrinology.

Lam, Arthur M. 1986; MD, 1974, Western Ontario University (Canada); neuroanesthesia.

Levy, Rene H. * 1970; PhD, 1970, University of California (San Francisco); metabolic interactions among antiepileptic drugs and between cytokines and drugs.

Loeser, John D. 1969; MD, 1961, New York University; pain, neurophysiology.

Maravilla, Kenneth R. 1986; MD, 1970, State University of New York (Brooklyn); neuroradiology and neurosurgery.

Miller, John W. 1999; MD, 1977, PhD, 1981, University of Illinois; epilepsy and clinical neurophysiology.

Morrison, Richard S. * 1994; PhD, 1982, University of California (Los Angeles); genetic pathways regulating neuronal cell death in disease and injury.

Newell, David W. 1989; MD, 1982, Case Western Reserve University; clinical neurosurgery and neurovascular mechanizing of cerebral ischemia.

Ojemann, George A. 1966; MD, 1959, University of Iowa; neurophysiology, organization of higher functions in brain, language, memory.

Pitkethly, David T. 1983, (Clinical); MD, 1961, Duke University; clinical neurosurgery.

Reh, Thomas A. * 1989, (Adjunct); PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.

Roberts, Theodore S. 1985, (Emeritus); MS, 1952, MD, 1955, University of Wisconsin; neurological surgery, stereotaxic surgery, pituitary and cerebrovascular disease.

Rubel, Edwin W. * 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Spence, Alexander M. 1974, (Adjunct); MD, 1965, University of Chicago; neurology, neuro-oncology.

Westrum, Lesnick E. * 1966; MD, 1963, University of Washington, PhD, 1966, University College, London (UK); neuroanatomy, synaptology, plasticity, olfactory and trigeminal systems, dental pathways.

Winn, H. Richard * 1983; MD, 1968, University of Pennsylvania; physiology of cerebral blood flow regulation.

Associate Professors

Chapman, Jens R. 1990; MD, 1983, Technical University of Munich (Germany); orthopaedics, spine trauma/reconstruction.

Dalley, Robert W. 1987; MD, 1982, University of Utah; neuroradiology.

Ellenbogen, Richard G. 1997; MD, 1983, Brown University; pediatric neurosurgery, neuro-oncology, complex spine.

Geyer, Jeffrey R. 1984; MD, 1977, Wayne State University; hematology/oncology.

Goodkin, Robert 1987; MD, 1964, Chicago Medical School; neurological surgery.

Hicks, Ramona R. * 1999, (Adjunct); PhD, 1993, University of Connecticut; brain injury, neural plasticity, cell death and regeneration.

Jarvik, Jeffrey G. 1993; MD, 1987, University of California (San Diego); neuroradiology, outcomes research.

Kliot, Michel 1990; MD, 1984, Yale University; peripheral nerve injury and diseases, nerve injury/regeneration.

Mirza, Sohail K. 1989; MD, 1989, University of Colorado (Denver); spinal surgery/spine biomechanics.

Ojemann, Linda M. 1974, (Emeritus); MD, 1960, University of Illinois; neurology, treatment of epilepsy.

Shaffrey, Christopher I. 1999; MD, 1986, University of Virginia; spinal disorders including fractures, tumors, spinal deformity, and degenerative conditions.

Silber, John R. 1990, (Research); PhD, 1977, University of Florida; neuro-oncology.

Silbergeld, Daniel L. 1984; MD, 1984, University of Cincinnati; brain tumors, epilepsy.

Temkin, Nancy R. * 1977; PhD, 1976, State University of New York (Buffalo); clinical trials, recovery models,

statistical modeling of epileptic phenomena, survival analysis.

Troster, Alexander I. 2000, (Adjunct); PhD, 1991, University of California (San Diego), San Diego State University; neuropsychology of movement disorders, cognitive and quality of life outcomes.

Wilensky, Alan J. 1975; MD, 1967, Western Ontario University (Canada), PhD, 1973, University of Toronto (Canada); neurology, treatment of epilepsy, testing and use of anticonvulsants.

Assistant Professors

Becker, Kyra J. 1996; MD, 1989, Duke University; stroke, neurophysiology.

Bobola, Michael S. 1997, (Research); PhD, 1991, University of New Hampshire; pediatric neuro-oncology.

D'Ambrosio, Raimondo 1995, (Research); PhD, 1995, University of Milan (Italy); glial cells and traumatic brain injury.

Diaz, Aidnag Z. 2000; MD, 1988, Columbia University.

Douglas, James G. 1988; MD, 1980, Case Western Reserve University.

Emmi, Adriana 1997, (Research); MD, 1992, PhD, 1996, University of Palermo (Italy); epilepsy and basic mechanism of ischemic damage.

Horner, Philip J. 2001; PhD, 1995, Ohio State University; stem cells and regeneration of the central nervous system.

Nelson, Peter S. * 1993, (Adjunct); MD, 1986, University of Kansas; the study of human carcinogenesis using tools of genomics and bioinformatics.

Park, Jongsoo 2000, (Clinical); MD, 1993, University of Rochester; clinical neurosurgery.

Rostomily, Robert C. 1987; MD, 1987, Case Western Reserve University; surgery of adult brain and cranial base tumors, molecular biology of nervous system tremors.

Samii, Ali 1998; MD, 1989, McGill University (Canada); movement disorders.

West, G. Alexander 1988; PhD, 1984, MD, 1989, University of Virginia; vascular disease, epilepsy, brain and spinal cord trauma.

Lecturer

Kinoshita, Yoshito 1990; PhD, 1982, Tohoku University (Japan); neuronal cell death.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

NEUR S 498 Undergraduate Thesis (*) *Bobola, D'Ambrosio, Horner, Silber* Offered: AWSpS.

NEUR S 499 Undergraduate Research (*) *Bobola, D'Ambrosio, Horner, Silber* 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 of instructor. Offered: AWSpS.

NEUR S 505 P-Preceptorship in Academic Neurosurgery (1) *Ellenbogen, Goodkin, Kliot, Newell, Ojemann, Rostomily, Shaffney, Silbergeld, West, Winn* Opportunity for first- and second-year medical students to observe the research, teaching, and patient-care activities of academic neurosurgery. Prerequisite: permission of instructor. Offered: AWSpS.

NEUR S 542 Clinical and Basic Research Correlates of Epilepsy (2) *G. Ojemann, Westrum* Clinical symptoms and treatment of epilepsy; related basic research in neuroanatomy, neurophysiology, neuropsychology, and neuropharmacology of epilepsy. Prerequisite: HUBIO 532 for medical students; permission of instructor for others.

NEUR S 680 P-Neurological Surgery Clerkship (*, max. 8) *Newell, Silbergeld* 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 of Washington Medical Center or a University-affiliated hospital may be selected, subject to approval of the department. Prerequisite: HUBIO 563. (Four weeks.) Offered: AWSpS.

NEUR S 697 P-Neurological Surgery Special Electives (*, max. 24) *Ellenbogen, Goodkin, Kliot, Newell, Ojemann, Rostomily, Shaffney, Silbergeld, West, Winn* By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. Offered: AWSpS.

NEUR S 699 P-WWAMI Neurological Surgery Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Neurology

RR650 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/genecat/academic/Neurology.html



Department Web page:
depts.washington.edu/neurolog/

Neurology, previously a division of the Department of Medicine, became an independent department at the University of Washington School of Medicine in autumn of 1995. The four-year residency program (including an internship) offers superb training in all facets of neurology in a setting of great institutional strength in fundamental neuroscience research. In addition, the Department of Neurology offers exceptional training programs in the Divisions of Neurogenetics and Pediatric Neurology and in the Epilepsy Center. A clinical-clerkship program provides basic training in neurology patient care. The Neurology Department is active in teaching, research, and patient care at the University of Washington Medical Center, Seattle Veterans Affairs Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, and the Fred Hutchinson Cancer Research Center. Medical students, interns, neurology residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

Faculty

Chair

Bruce R. Ransom

Professors

Bird, Thomas D. 1976; MD, 1968, Cornell University; neurology, neurogenetics.

Chamberlain, Jeffrey S. 2000; PhD, 1985, University of Washington; neurogenetics, Duchenne's muscular dystrophy.

Chance, Phillip F. 1998; MD, 1978, University of Tennessee; pediatric neurology and genetics.

Copass, Michael K. 1971; MA, 1964, MD, 1964, Northwestern University; neurology/emergency services.

Crill, Wayne E. * 1967; MD, 1962, University of Washington; properties of spinal and cortical neurons, mechanisms of repetitive firing of CNS neurons.

Dodrill, Carl B. 1987, (Emeritus); MS, 1967, PhD, 1970, Purdue University; neurophysiology of epilepsy.

Farrell, Donald F. 1971; MD, 1965, George Washington University; neurology, clinical neurophysiology including intraoperative monitoring, evoked potentials.

Franklin, Gary M. * 1988, (Adjunct Research); MD, 1969, George Washington University, MPH, 1982, University of California (Berkeley); occupational injury, neurological epidemiology, public health nutrition.

Fraser, Robert T. 1976; PhD, 1976, University of Wisconsin; psychology.

Gospe, Sidney M. 2000; PhD, 1980, MD, 1981, Duke University; pyridoxine-dependent seizures, developmental neurotoxicity of second-hand tobacco smoke and toluene.

Kraft, George Howard * 1969, (Adjunct); MD, 1963, Ohio State University; psychiatry.

Longstreth, W. T., Jr. * 1981; MD, 1975, University of Pennsylvania, MPH, 1982, University of Washington; neurology.

Miller, John W. 1999; MD, 1977, PhD, 1981, University of Illinois; epilepsy and clinical neurophysiology.

Ransom, Bruce Robert * 1995; PhD, 1972, MD, 1972, Washington University; neurology, neuroscience research.

Spence, Alexander M. 1974; MD, 1965, University of Chicago; neurology, neuro-oncology.

Stahl, William L. * 1975; PhD, 1963, University of Pittsburgh; neurochemistry of brain ATPase systems.

Sumi, Shuzo Mark 1966, (Emeritus); MD, 1956, University of Toronto (Canada); neuropathology, neuromuscular disease, neurodegenerative diseases.

Swanson, Phillip D. 1964; MD, 1958, Johns Hopkins University, PhD, 1964, University of London (UK); movement disorders, neurology.

Associate Professors

Marra, Christina M. 1984; MS, 1979, Oregon State University, MD, 1984, University of Oregon; neurology, infectious diseases.

Milstein, Jerrold M. 1980; MD, 1964, University of Minnesota; pediatric neurology.

Shadlen, Michael N. * 1995, (Adjunct); PhD, 1985, University of California (Berkeley), MD, 1988, Brown University; neurobiology of vision and cognition.

Spain, William * 1981; MD, 1977, Columbia University; signal transduction in the central nervous system.

Tapscott, Stephen J. * 1986; PhD, 1982, MD, 1982, University of Pennsylvania; molecular and developmental biology.

Van Brederode, Johannes 1987; PhD, 1987, Medical College of Wisconsin; neurophysiology of epilepsy.

Wilensky, Alan J. 1975; MD, 1967, Western Ontario University (Canada), PhD, 1973, University of Toronto (Canada); neurology, treatment of epilepsy, testing and use of anticonvulsants.

Assistant Professors

Becker, Kyra J. 1996; MD, 1989, Duke University; stroke, neurophysiology.

Bowen, James D. 1982; MD, 1982, Johns Hopkins University; multiple sclerosis.

Brown, Angus M. 1999, (Research); PhD, 1990, University of Manchester (UK); neuroscience research.

Cramer, Steven C. 1997; MD, 1988, University of Southern California, MMSc, 1997, Harvard University; stroke, sensorimotor human brain mapping, in healthy and diseased subjects.

Drane, Daniel L. 2001; MS, 1989, Georgia State University, PhD, 1994, Fuller Graduate School of Psychology; neuropsychology.

Garden, Gwenn A. 2000; PhD, 1994, MD, 1994, University of Washington; caspase enzymes and apoptosis in HIV neural injury.

Kraus, Eric E. 1991; MD, 1991, University of Minnesota; general neurology.

Kuratani, John D. 1999; MD, 1990, Tulane University; pediatric epilepsy, EEG.

Leverenz, James B. 1992; MD, 1985, University of Washington; neurology, psychiatry and behavioral sciences, Alzheimer's.

Moeller, Thomas 2000, (Research); PhD, 1996, Freie University of Berlin (Germany); neurophysiology.

Nichter, Charles A. 2001; MD, 1976, Temple University; pediatric movement disorders.

Pinter, Joseph D. 1990; MD, 1990, University of California (Los Angeles); pediatric neurology.

Poolos, Nicholas P. 2001; MD, 1991, PhD, 1991, Stanford University; epilepsy, functional properties of dendrites and neuronal excitability.

Samii, Ali 1998; MD, 1989, McGill University (Canada); movement disorders.

Saneto, Russell P. 2001; PhD, 1981, University of Texas; DO, 1994, Des Moines University; pediatric epilepsy.

Sotero De Menezes, Marcio 1996; MD, 1984, Rio De Janeiro State University Medical School (Brazil); pediatric neurology, epilepsy, EEG.

Tirschwell, David L. 1991; MD, 1991, Cornell University; neurology, stroke.

Weiss, Michael D. 2001; MD, 1991, Albert Einstein College of Medicine; EMG, EEG, neuropathology and neuromuscular disorders.

Yang, Claire C. 1993, (Adjunct); MD, 1988, Vanderbilt University; neurourology and electrophysiology testing.

Zunt, Joseph R. 1991; MD, 1991, University of Minnesota, MPH, 1998, University of Washington; infectious disease, neuroepidemiology of AIDS/HIV.

Instructors

Firestone, Jordan A. 1991, (Acting); PhD, 1993, MD, 1995, University of Colorado, MPH, 2000, University of Washington; neurotoxicology.

Golumbek, Paul T. 2000, (Acting); MD, 1995, PhD, 1995, Johns Hopkins University; pediatric neurology.

Meekins, Gregg D. 2000; MD, 1993, Tulane University; neurophysiology, EMG.

Watson, Nathaniel F. 2000; MD, 1996, University of North Carolina (Chapel Hill); clinical neurophysiology, sleep disorders.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

NEURL 495 Community Rehabilitation of the Neurologically Impaired: Internship (*, max. 5)

Fraser, Clemmons Supervised work with a neurologically disabled vocational rehabilitation population within a multidisciplinary vocational rehabilitation unit. Offered: AWSpS.

NEURL 499 Undergraduate Research (*, max. 25)

Provides an opportunity to gain research experience and direct participation in clinical or basic science investigation in neurological topics. Offered: AWSpS.

NEURL 505 P-Preceptorship in Neurology (1)

Kraus Provides an opportunity for first and second year medical students to gain personal experience with neurology practice situations by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of instructor. Offered: Sp.

NEURL 510 Pathophysiology of Neurological Disease (2)

Fern Analysis of the clinical features of a number of the major neurological diseases, integrated with a state-of-the-art overview of the cellular, molecular, and whole-system research pertaining to the disease.

NEURL 536 Topics in Clinical Neurology (1)

Spain Lectures on epilepsy, stroke, coma, drug overdose, dementia, headache, myelopathies, infectious disease. Offered: S.

NEURL 646 P-Clinical Electroencephalography (*, max. 12)

Farrell, Holmes For third- and fourth-year medical students. Clinical applications of electroencephalography long-term EEG-video-audio monitoring, computer-averaged evoked potentials. Prerequisite: completion of Human Biology series. Offered: AWSpS.

NEURL 681 P-Seizure Clinic Clerkship (2.5) A.

Wilensky Evaluation and follow-up of patients with seizure disorders. Limited contact with inpatients. Prerequisite: MED 665 and permission of instructor. Offered: AWSpS.

NEURL 686 P-Clinical Neurology (8)

Swanson Clerkship including both inpatient and outpatient experiences and didactic sessions on neurological subjects. Student assigned to one of the affiliated

hospitals and supervised by neurology residents and full-time staff. Offered: AWSpS.

NEURL 687 P-Advanced Clinical Clerkship in Child Neurology (*, max. 8) *Gospe* Advanced course in neurology dealing with neurological disease in children. Supervision by child neurology residents and attending. Prerequisite: NEURL 665, third and fourth year medical students. (Limit: one student.) Offered: AWSpS.

NEURL 697 P-Neurology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions outside the WWAMI region. Students should obtain special assignment form from the Dean's Office at least one month prior to preregistration. Prerequisite: permission of department advisor. Offered: AWSpS.

NEURL 699 P-WWAMI Neurology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of advisor. Offered: AWSpS.

Obstetrics and Gynecology

BB617 Health Sciences Building



General Catalog Web page:
www.washington.edu/students/genecat/academic/Obstetrics.html



Department Web page:
depts.washington.edu/obgyn/

The Department of Obstetrics and Gynecology is involved with teaching, patient care, and research in the areas of normal and abnormal human reproduction: growth and development of the fetus, normal and complicated obstetrics, and surgical and medical diseases of the female reproductive system, including endocrinology, oncology, infectious disease, urogynecology, psychosocial problems, primary and preventive health care, and ethics.

Faculty

Chair

David A. Eschenbach

Professors

Benedetti, Thomas J. * 1979; MD, 1973, University of Washington; perinatal medicine.

Bremner, William J. 1982, (Adjunct); MD, 1969, University of Washington, PhD, 1977, Monash University (Australia); endocrinology.

Brown, Zane A. * 1977; MD, 1966, Temple University; insulin requiring diabetes complicating pregnancy, genital herpes complicating pregnancy.

Clifton, Donald K. 1981; PhD, 1979, University of California (Los Angeles); reproductive physiology.

Eschenbach, David A. 1976; MD, 1968, University of Wisconsin; gynecology and infectious disease.

Greer, Benjamin E. 1980; MD, 1966, University of Pennsylvania; gynecologic oncology.

Knopp, Robert H. * 1974, (Adjunct); MD, 1964, Cornell University; metabolism and endocrinology.

Merriam, George R. 1991, (Adjunct); MD, 1976, Harvard University; metabolism and endocrinology.

Patton, Dorothy L. 1981; PhD, 1981, University of Washington; infectious disease.

Shy, Kirkwood K. * 1979; MD, 1973, Wayne State University; epidemiologic applications to problems in obstetrics and gynecology.

Soules, Michael R. 1980; MD, 1972, University of California (Los Angeles); reproductive endocrinology.

Spadoni, Leon R. 1963, (Emeritus); MD, 1957, University of Washington; reproductive endocrinology.

Steiner, Robert A. * 1977; PhD, 1975, University of Oregon; neuroendocrinology, neuroscience, endocrinology.

Stenchever, Morton A. 1977, (Emeritus); MD, 1956, State University of New York (Buffalo); gynecology, reproductive genetics, medical education.

Tamimi, Hisham K. 1977; MD, 1969, Cairo University (Egypt); gynecologic oncology.

Vontver, Louis A. 1977, (Emeritus); MD, 1960, University of Minnesota, MEd, 1970, University of Washington; medical education, gynecology.

Walker, Edward A. 1983; MD, 1983, University of Washington; consultation-liaison psychiatry, medically unexplained physical symptoms.

Associate Professors

Cheng, Edith Y. 1995; MS, 1979, Sarah Lawrence College, MD, 1987, University of Washington; genetics, perinatal medicine.

Dubinsky, Theodore J. 1997, (Adjunct); MD, 1983, University of Maryland; ultrasound, computed tomography, body imaging.

Easterling, Thomas R. 1985; MD, 1981, University of North Carolina; perinatal medicine, hypertension during pregnancy.

Goff, Barbara A. 1993; MD, 1986, University of Pennsylvania; gynecologic oncology.

Klein, Nancy A. 1993; MD, 1985, Vanderbilt University; reproductive aging in women, assisted reproductive technology.

Koh, Wui-Jin 1984, (Adjunct); MD, 1984, Loma Linda University; therapeutic radiology.

Lentz, Gretchen M. 1992; MD, 1986, University of Washington; urogynecology.

Moore, Donald E. 1977; MD, 1967, Case Western Reserve University; reproductive endocrinology.

Prince, C. Edward 1977, (Emeritus); MD, 1955, University of Washington.

Shields, Laurence E. 1993; MD, 1987, University of Texas (San Antonio); perinatal medicine.

Wasser, Samuel K. * 1982, (Adjunct Research); PhD, 1981, University of Washington; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

Assistant Professors

Atkinson, M. Wendy 1997; MD, 1988, Baylor University; perinatal medicine, prevention of preterm birth and treatment of preterm labor.

Eckert, Linda O. 1992; MD, 1987, University of California (San Diego); gynecology.

Gardella, Carolyn M. 1999; MD, 1995, State University of New York (Stony Brook), MPH, 2001, University of Washington.

Hitti, Jane 1993; MD, 1989, University of Vermont, MPH, 1995, University of Washington; perinatal medicine, HIV and pregnancy.

Mendiratta, Vicki 1998; MD, 1994, Ohio State University.

Miller, Leslie R. 1994; MD, 1990, University of Washington; contraception, reproductive endocrinology, sexually transmitted disease.

Reed, Susan D. 1991; MS, 1979, Sarah Lawrence College, MD, 1986, Stanford University; gynecology, evidence-based medicine and clinical outcomes studies, hormone replacement therapy.

Swisher, Elizabeth M. 1996; MD, 1992, University of California (San Diego).

Van Blaricom, Amy Lee 1998; MD, 1994, University of Florida; general obstetrics and gynecology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsca/.

OB GYN 498 Undergraduate Thesis (*) *Vontver* By arrangement.

OB GYN 499 Undergraduate Research (*) *Vontver*

OB GYN 550 P-Voluntary Pregnancy Termination: An Overview of Medical and Social Issues (2) *Easterling, Miller* A flexible curriculum which allows the medical student to observe in an abortion clinic, read articles and a textbook on abortion. Can be used by medical student as elective credit.

OB GYN 579 P-Obstetric and Gynecologic Investigation (*) *Vontver* The investigation may cover any one of the following fields: normal and complicated pregnancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology, genetics. By arrangement.

OB GYN 665 P-Introduction to Obstetrics and Gynecology, UH-HMC (*, max. 12) *Vontver* Introductory clerkship providing comprehensive medical care and counseling to female patients. Includes management and delivery of obstetrical patients, diagnosis and management of gynecologic diseases, hospital rounds, outpatient clinics, seminars, tutorial, and community health-care agencies for women. Rotations occur at UWMC and Harborview Medical Center. Prerequisite: HUBIO 565. (Six weeks. Limit: six students.)

OB GYN 666 P-Introduction to Obstetrics and Gynecology, Boise (*, max. 12) *Vontver* Clerkship equivalent to 665 offered at Boise, Idaho (WWAMI). Includes experience in several private physician offices. Prerequisite: HUBIO 565. (Six weeks. Limit: two students. Not offered summer quarter.)

OB GYN 667 P-Introduction to Obstetrics and Gynecology, Madigan (*, max. 12) *Vontver* Clerkship equivalent to 665 offered at Madigan Army Medical Center, Tacoma. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.)

OB GYN 668 P-Introduction to Obstetrics and Gynecology, Spokane (12) *Vontver* Clerkship equivalent to 665 offered at Spokane (WWAMI). Includes experience in several private physicians' offices.

Prerequisite: HUBIO 565. (Six weeks. Limit: three students.)

OB GYN 669 P-Introduction to Obstetrics and Gynecology, Swedish (12) *Vontver* Clerkship equivalent to 665 offered at Swedish Hospital Medical Center. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.) Not offered summer quarter.

OB GYN 670 P-Introduction to Obstetrics and Gynecology, GH-Central (12) *Vontver* Clerkship equivalent to 665 offered at the Central facility of Group Health Cooperative of Puget Sound in Seattle. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.)

OB GYN 671 P-Introduction to Obstetrics and Gynecology, Anchorage (12) *Vontver* Clerkship equivalent to 665 offered at Anchorage, Alaska (WWAMI). Includes experience in several private physicians' offices as well as Providence Hospital. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.)

OB GYN 672 P-Introduction to Obstetrics and Gynecology, GH-East (12) *Vontver* Clerkship equivalent to 665 offered at the Eastside facility of Group Health Cooperative of Puget Sound in Redmond. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.)

OB GYN 673 P-Introduction to Obstetrics and Gynecology, Military, Madigan (12) *Vontver* Clerkship equivalent to 665 offered at Madigan Army Medical Center. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.)

OB GYN 675 P-Introduction to Obstetrics and Gynecology, Highline (12) Clerkship equivalent to 665 offered at Highline Community Hospital. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.)

OB GYN 676 P-Introduction to Obstetrics and Gynecology, Missoula (12) Clerkship equivalent to 665 offered in Missoula, Montana. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.)

OB GYN 677 P-Introduction to Obstetrics and Gynecology, Rock Springs (12) Equivalent of OB GYN 665, offered in Rock Springs, Wyoming. Student rotates among outpatient clinic, labor and delivery, operating suites, and medical/surgical inpatient areas. (Limit: two students.) Offered: AWPSP.

OB GYN 681 P-Gynecological Oncology Subspecialty (8) *Vontver* Experience in reproductive tract malignancy, chemotherapy, and radiation therapy. Student follows selected patients through primary surgery, recovery, and initial adjuvant treatment, as well as continuing treatment in both clinic and inpatient settings. Prerequisite: basic OB GYN Clerkship. (Limit: two students each four weeks.)

OB GYN 682 P-Antenatal High-Risk Obstetrics (8) *Vontver* Four weeks on high-risk antenatal obstetrics ward and clinic. Students responsible for initial workups, daily laboratory evaluations, continuing care of high-risk antepartum patients. Weekly conference with obstetrics attending; presentation of one or more topics per rotation. Excellent coordination with resident and attending staff required to maintain patient-care continuity. (Limit: two students each four weeks.)

OB GYN 684 P-Endocrinology of Reproduction (*, max. 12) *Vontver* 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 and assisted reproductive technology. (Limit: one student each four weeks.)

OB GYN 685 P-Obstetrics/Gynecology Preceptorship (*, max. 8) *Vontver* Close working relationship with physician in private practice of obstetrics and gynecology, including: hospital rounds, surgery, deliveries, and office and business aspects of private practice as individually arranged. Forty hours minimum can be arranged to fit schedule not to exceed 8 credits. Prerequisite: OB GYN 665 or equivalent and permission of instructor. (Limit: two students.)

OB GYN 697 P-Obstetrics and Gynecology Special Electives (*, max. 24) *Vontver* By arrangement, for qualified students, special clerkship or research opportunities can sometimes be made available at other institutions. Students wishing this course should obtain special assignment form one month before preregistration. Department evaluates student performance. Prerequisite: permission of instructor.

OB GYN 698 P-Introduction to Obstetrics and Gynecology, Away (*, max. 12) *Vontver* Clerkship equivalent to 665 at sites being evaluated as permanent WWAMI sites (currently includes Silverdale, Tacoma (St. Joseph), Evergreen, Lewiston, Cheyenne, and Billings). By arrangement. Subject to Dean's Office approval. Department evaluates student performance. Prerequisite: HUBIO 565; permission of instructor.

OB GYN 699 P-WWAMI Obstetrics and Gynecology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located outside the WWAMI region. A special assignment form must be obtained one month in advance of preregistration. Prerequisite: permission of department.

Ophthalmology

RR801 University of Washington Medical Center



General Catalog Web page:

www.washington.edu/students/gencat/academic/Ophthalmology.html



Department Web page:

depts.washington.edu/ophthweb/

The Department of Ophthalmology is responsible for the instructional and research programs in diseases of the eye and its adnexae as well as the visual system.

Medical-student instruction is provided, including multiple electives in the clinical years. Graduate physicians are provided with three years of residency training at the affiliated hospitals. An optional internship is available in ophthalmology. A two-year ophthalmic plastics and orbit fellowship, a one-year refractive surgery/cornea fellowship, a one-year pediatric and strabismus fellowship, and a two-year surgical retina fellowship are offered. Patient care is provided under the supervision of full- and part-time faculty physicians at the University of Washington Medical Center, Harborview Medical Center, Veterans Affairs Medical Center, and Children's Hospital and Regional Medical Center.

Clinical research programs relate to eye diseases. Laboratory research encompasses neurophysiology of vision, morphology of the retina and visual system,

corneal wound healing, biochemistry of ocular tissues, and anatomy/physiology of the orbit. Postdoctoral training is offered in all these disciplines.

For more information on residencies and fellowships, contact Lynn DeJessa at lsd1@u.washington.edu. For more information on medical student clerkships, contact Dorrie Quirante at dorrieq@u.washington.edu.

Faculty

Chair

Steven E. Wilson

Professors

Clark, John I. * 1982, (Adjunct); PhD, 1974, University of Washington; development and maintenance of lens transparency.

Hendrickson, Anita E. * 1969, (Adjunct); PhD, 1964, University of Washington; neuroanatomy, morphology and development of primate visual system.

Kalina, Robert E. 1967; MD, 1960, University of Minnesota; vitreoretinal diseases.

Kinyoun, James L. 1978; MD, 1971, University of Nebraska; vitreoretinal diseases.

Milam, Ann H. 1971, (Emeritus); PhD, 1967, University of Texas (Southwestern); electron microscopy, ophthalmic pathology, retinitis pigmentosa, retinal cell biology.

Orcutt, James C. 1982; PhD, 1976, MD, 1977, University of Colorado (Denver); orbit, oculoplastics, neuro-ophthalmology.

Pagon, Roberta A. 1979, (Adjunct); MD, 1972, Harvard University; medical genetics.

Palczewski, Krzysztof * 1992; MS, 1980, PhD, 1986, Technical University of Wroclaw (Poland); visual transduction.

Patton, Dorothy L. 1981, (Adjunct); PhD, 1981, University of Washington; infectious disease.

Reh, Thomas A. * 1989, (Adjunct); PhD, 1981, University of Wisconsin; regeneration and development of central nervous system.

Rodieck, Robert W. 1978, (Emeritus); PhD, 1964, University of Sydney (Australia); neurobiology of the retina.

Saari, John C. * 1974; PhD, 1970, University of Washington; retinal biochemistry.

Wilson, Steven E. 1998; MD, 1984, University of California (San Diego); wound healing, apoptosis, growth factors, receptors.

Associate Professors

Chen, Philip P. 1996; MD, 1991, Yale University; glaucoma.

Chuang, Elaine L. 1993; MD, 1979, University of Texas (San Antonio); vitreoretinal diseases, ocular inflammation.

Fritsche, Thomas R. * 1981, (Adjunct); MD, 1981, PhD, 1984, University of Minnesota; systematics and ecology of animal parasites, medical microbiology.

Greenwald, Mark J. 2001; MD, 1976, Harvard University; pediatric ophthalmology, strabismus.

Sires, Bryan S. 1995; PhD, 1986, MD, 1990, Northwestern University; plastic and reconstructive surgery.

Weiss, Avery H. 1991; MD, 1974, Miami University (Ohio); pediatric ophthalmology, strabismus.

Assistant Professors

Bhandari, Anuja 1996; MD, 1986, Madras University (India); glaucoma.

Gordon, Sharona E. * 1993; PhD, 1994, Brown University; molecular mechanisms of ion channel gating in visual and olfactory transduction.

Harrison, Devin A. 1997; MD, 1989, St Louis University; cornea and external disease.

Kim, Jeehee 1997; MD, 1992, University of Chicago; cornea and external disease.

Mudumbai, Raghu 2000; MD, 1994, State University of New York (Brooklyn); neuro-ophthalmology, glaucoma.

Pham, Tony A. 2000, (Adjunct); PhD, 1993, MD, 1993, Baylor University; development and plasticity of neural connections in the mammalian forebrain.

Rausch, Michael W. 1997; MD, 1997, University of Colorado (Denver); cataracts.

Rieke, Frederick Martin * 1997, (Adjunct); PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Saperstein, David A. 2000; MD, 1987, Pennsylvania State University; vitreoretinal diseases, macular degeneration.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

OPHTH 498 Undergraduate Thesis (*) *Kinyoun (University of Washington Medical Center)* Thesis-based research in vision and ophthalmology. Elective. Offered: AWPSP.

OPHTH 499 Undergraduate Research (*) *Kinyoun (University of Washington Medical Center)* Laboratory or clinical research in morphology, biochemistry, immunology, experimental pathology, or clinical studies of the eye and visual system. Offered: AWPSP.

OPHTH 501 P-Ophthalmology Preceptorship (1) *Kinyoun* Individualized experiences with one or more of the full-time faculty members of the department covering research, teaching, and patient care. Student observes activities in the clinic, hospital ward, operating room, and research laboratories. Prerequisite: first- and second-year medical student standing and permission of instructor. Offered: AWPSP.

OPHTH 681 P-Ophthalmology Clerkship (4) *Sires (Harborview Medical Center)* Students gain experience in the diagnosis and treatment of common ocular disorders. Basic examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWPSP.

OPHTH 683 P-Pediatric Ophthalmology Clerkship (4) *Weiss (Children's Hospital and Regional Medical Center)* Student examines and observes treatment of children with ocular diseases and learns to differentiate trivial from potentially blinding disorders. Programmed text in general ophthalmology furnished. Prerequisite: University of Washington stu-

dent and completion of human biology series. (Two weeks, full-time. Limit: one student.) Offered: WS.

OPHTH 685 P-Ophthalmology Clerkship (4) *Orcutt (VA. Puget Sound Health Care System)* Participation in diagnosis and treatment of medical and surgical ocular disease. Outpatient examinations, inpatient surgery, as well as neuro-ophthalmologic, retinal, and glaucoma consultations. Basic techniques involved in tonometry, ophthalmoscopy, and biomicroscopy of eye. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWPSP.

OPHTH 686 P-Ophthalmology Clerkship (4) *Gorman (Group Health Central)* Diagnosis and treatment of ocular diseases in outpatients. Weekly assignment to Group Health ophthalmologist responsible for the care of walk-in and urgent patients, which may demonstrate findings pertinent to the future practice of primary-care physicians. Examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWPSP.

OPHTH 687 P-Ophthalmology Clerkship (4) *Kinyoun (University of Washington Medical Center)* Diagnosis and management of commonly seen eye diseases. Subspecialty clinics include cornea, retina, neuro-ophthalmology, glaucoma, contact lenses, and strabismus. Student attends regularly scheduled conferences in ophthalmic basic and clinical science. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWPSP.

OPHTH 688 P-Ophthalmology Clerkship (8) *Kinyoun, Werner* Four-week externship at Alaska Native Medical Center in Anchorage. Opportunity to learn and practice common eye examination techniques, including slit-lamp biomicroscopy, tonometry, and funduscopy. Patients seen three days a week; two days spent in the operating room. Prerequisite: completion of human biology series, MED 665, and SURG 665; fourth-year medical students only. Offered: AWPSP.

OPHTH 697 P-Ophthalmology Special Electives (*, max. 24) *Kinyoun* By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions or clinics other than the UW. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. Offered: AWPSP.

OPHTH 699 P-WWAMI Ophthalmology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department. Offered: AWPSP.

Orthopaedics

BB1043 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/gencat/academic/Orthopaedics.html



Department Web page:
www.orthop.washington.edu

The Department of Orthopaedics is actively involved in quality patient care, teaching, and research concerning bone and joint problems. Special areas of expertise include foot and ankle, hand and microvascular, hip and knee, arthritis, sports medicine, pedi-

atric orthopaedics, shoulder and elbow, spine, trauma, and tumors.

In addition to providing instruction for medical students, the department provides education at the graduate, residency, and post-residency levels. Selected medical students may elect research experience in the department. A fully approved residency offers opportunities to carry out fundamental and clinical research. 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.

Faculty

Chair

Frederick A. Matsen III

Professors

Benirschke, Stephen K. 1985; MD, 1979, Case Western Reserve University; traumatology.

Berryman, Jack W. * 1975, (Adjunct); MS, 1971, MA, 1974, University of Massachusetts, PhD, 1976, University of Maryland; history of exercise, sports medicine, and health behavior/philosophy.

Chesnut, Charles * 1974, (Adjunct); MD, 1966, University of Florida; nuclear medicine.

Conrad, Ernest U. 1986; MD, 1979, University of Virginia; orthopaedics, tumors and bone transplantation.

Eyre, David R. * 1985; PhD, 1969, University of Leeds (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism.

Hanel, Douglas Paul 1992; MD, 1977, St Louis University; orthopaedics, hand/microvascular surgery.

Hansen, Sigvard T. 1968; MD, 1961, University of Washington; orthopaedics, foot, ankle and amputations.

Mann, Frederick A. 1993, (Adjunct); MD, 1975, Indiana University; emergency and trauma radiology.

Matsen, Frederick A., III * 1973; MD, 1968, Baylor University; orthopaedics, bone and joint research, robotics.

Newell, David W. 1982, (Adjunct); MD, 1982, Case Western Reserve University; clinical neurosurgery and neurovascular mechanizing of cerebral ischemia.

Olerud, John E. 1975; MD, 1971, University of Washington; dermatology.

Richardson, Michael L. 1984, (Adjunct); MD, 1975, Baylor University; bone and joint radiology and musculoskeletal radiology.

Sangeorzan, Bruce J. 1986; MD, 1981, Wayne State University; orthopaedics, trauma, and foot and ankle deformity.

Schoene, Robert B. 1981, (Adjunct); MD, 1972, Columbia University; respiratory diseases.

Sidles, John Arthur 1984; PhD, 1983, University of Washington; seeing molecules (i.e., quantum-coherent instrumentation); regenerating cartilage.

Simkin, Peter A. 1969, (Adjunct); MD, 1961, University of Pennsylvania; rheumatology.

Smith, Nathan J. * 1965, (Emeritus); MD, 1945, University of Wisconsin; sports medicine.

Staheli, Lynn T. 1975, (Emeritus); MD, 1959, University of Utah; pediatric orthopaedics.

Teitz, Carol Claire 1974; MD, 1974, Yale University; orthopaedics, arthroscopy, sports medicine.

Tencer, Allan Fred * 1988; PhD, 1981, McGill University (Canada); biomechanics of joints, orthopaedic trauma implants.

Trumble, Thomas E. 1989; MD, 1979, Yale University; orthopaedics, hand and microvascular surgery.

Wilson, Anthony J. 1994, (Adjunct); MBBCh, 1972, Otago University (New Zealand); orthopaedic trauma imaging, teleradiology, digital radiography, MRI/CT.

Associate Professors

Belza, Basia * 1991, (Adjunct); MN, 1982, University of Virginia, PhD, 1991, University of California (San Francisco); chronic illness, gerontology, fatigue prevention and management in rheumatic diseases.

Bruckner, James 1990; MD, 1984, Creighton University; orthopaedics, tumors and bone transplantation.

Chapman, Jens R. 1990; MD, 1983, Technical University of Munich (Germany); orthopaedics, spine trauma/reconstruction.

Ching, Randal Preston * 1992; PhD, 1992, University of Washington; orthopaedic biomechanisms related to injury prevention, injury mechanisms and injury repair.

Clark, John M, Jr. 1982; PhD, 1975, MD, 1976, University of Chicago; orthopaedics, hip and knee arthritis.

Gardner, Gregory C. 1989, (Adjunct); MD, 1984, Baylor University; rheumatology.

Gillespy, Thurman 1990, (Adjunct); MD, 1980, Thomas Jefferson University; musculoskeletal radiology, orthopaedics.

Graney, Daniel O. * 1966, (Adjunct); PhD, 1965, University of California (San Francisco); gross anatomy, electron microscopy, intestinal absorption.

Greenlee, Theodore K. 1971; MD, 1959, Northwestern University; general orthopaedics.

Gross, Ted S. 2000; PhD, 1993, State University of New York (Stony Brook); biomechanics.

Henley, Michael Bradford 1988; MD, 1979, University of Washington; orthopaedics, trauma, post-traumatic reconstruction, spinal trauma.

Hunter, John C. 1992, (Adjunct); MD, 1970, University of Illinois; musculoskeletal, radiology, MRI.

Larson, Roger V. 1982; MD, 1973, University of Utah; orthopaedics, arthroscopy, sports medicine and knee ligament reconstruction.

Mirza, Sohail K. 1989; MD, 1989, University of Colorado (Denver); spinal surgery/spine biomechanics.

Mosca, Vincent S. 1985; MD, 1978, University of Rochester; pediatric orthopaedics, the child's foot, limb length discrepancies.

Ott, Susan M. 1980, (Adjunct); MD, 1974, University of Washington; nephrology.

Raskind, Wendy H. 1982, (Adjunct); PhD, 1977, MD, 1978, University of Washington; medical genetics.

Roult, Milton L. 1988; MD, 1983, University of Texas (Galveston); orthopaedics, traumatology.

Shaffrey, Christopher I. 1999, (Adjunct); MD, 1986, University of Virginia; spinal disorders including fractures, tumors, spinal deformity, and degenerative conditions.

Simonian, Peter Todd 1992; MD, 1991, University of Southern California; orthopaedics, general, sports medicine.

Smith, Douglas G. 1989; MD, 1984, University of Chicago; orthopaedics, traumatology, foot, ankle, amputations.

Song, Kit M. 1995; MD, 1985, University of Iowa; pediatric orthopaedics, spinal deformities of children.

Vedder, Nicholas 1990; MD, 1981, Case Western Reserve University; case history, plastic and reconstructive surgery.

Assistant Professors

Allan, Christopher H. 1998; MD, 1992, Northwestern University; hand and microvascular surgery.

Barei, David P. 1999; MD, 1991, University of Ottawa (Canada); traumatology.

Bellabarba, Carlo 1999; MD, 1992, McGill University (Canada); spine trauma and reconstruction, orthopaedic trauma.

Chansky, Howard Alan 1992; MD, 1987, University of Pennsylvania; orthopaedics, general.

Diab, Mohammad 1990; MD, 1990, Stanford University; pediatric orthopaedics.

Escobedo, Eva M. 1992, (Adjunct); MD, 1985, Stanford University; musculoskeletal trauma radiology.

Kadel, Nancy J. 1999; MD, 1988, University of Washington; orthopedic surgery, foot/ankle.

Mills, William J. 1998; MS, 1985, University of Minnesota, MD, 1989, University of Colorado (Denver); traumatology, knee ligament injury.

Nork, Sean E. 1997; MD, 1992, University of California (San Diego); traumatology.

O'Kane, John 1993; MD, 1993, University of Vermont; family medicine, sports medicine, team care.

Schmale, Gregory A. 2000; MEd, 1994, MD, 1994, University of Washington.

Smith, Kevin L. 1995; MD, 1990, Southern Illinois University; shoulder and elbow orthopaedics.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat.

ORTHOP 498 Undergraduate Thesis (*) *Eyre* 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 for recognition. Offered: AWPpS.

ORTHOP 499 Undergraduate Research (*) *Eyre* Investigation of pertinent musculoskeletal problems in the orthopaedic laboratories as part of the research group. Offered: AWPpS.

ORTHOP 505 P-Preceptorship in Orthopaedic Surgery (1) Opportunity for first- and second-year medical students to gain experience with clinical fac-

ulty members in the community. Students observe general aspects of private practice from a longitudinal perspective. Prerequisite: permission of department. Offered: AWPpS.

ORTHOP 585 P-Sports Medicine (2) *O'Kane* Lectures, patient problem presentations, and seminar discussions to explore impact of exercise and sport participation on various body systems. Includes nutritional concerns, biomechanics of certain sports injuries and cardiovascular, pulmonary, and musculoskeletal concerns. Prerequisite: second-year medical student standing. Offered: Sp.

ORTHOP 675 P-Preceptorship in Orthopaedics (*, max. 4) *Simonian* Student spends full time with the preceptor during all his or her working day in order to gain a better understanding of the diagnosis and the management of problems of the musculoskeletal system as seen in the private orthopaedic practice. Prerequisite: SURG 665 or HUBIO 553 and permission of department. (Two weeks, full-time.) Offered: AWPpS.

ORTHOP 676 P-Pediatric Orthopaedics (*, max. 8) *Diab, Mosca, Song* Acquaints students with all aspects of musculoskeletal problems in childhood. Didactic conferences and seminars, and opportunities for active participation in both inpatient and outpatient care at Children's Hospital and Medical Center, and correlative anatomy and pathology. Prerequisite: SURG 665 or HUBIO 553. (Four weeks, full-time.) Offered: AWPpS.

ORTHOP 677 P-Musculoskeletal Trauma (*, max. 8) *Benirschke, Chapman, Hanel, Hansen, Henley, Mills, Mirza, Nork, Roult, Sangeorzan, Smith* Harborview Medical Center. Emergency room, wards, operating room, and outpatient clinics. Instruction in general and special clinics, including hand, hip, foot, and fracture, with emphasis placed on physical examination of the patient. Students take correlative anatomy and pathology. Prerequisite: SURG 665, HUBIO 553. (Four weeks, full-time.) Offered: AWPpS.

ORTHOP 678 P-Musculoskeletal Oncology (8/12) *Conrad* In-depth experience on musculoskeletal oncology service with primary involvement in initial evaluation, staging, treatment, and postoperative follow-up of patients with various musculoskeletal malignancies. Elective involves experience in surgical, oncologic, radiologic, and pathologic principles of managing sarcomas. Prerequisite: basic orthopaedic elective or permission of instructor. Offered: AWPpS.

ORTHOP 680 P-General Orthopaedic Clerkship (*, max. 8) *Chansky* Veteran's Administration Hospital: structured to provide a basic education in the fundamentals of the musculoskeletal system. Heavy emphasis is placed on the reconstructive alternatives in the treatment of degenerative joint diseases. Prerequisite: completion of HUBIO series; third- and fourth-year students. Enrollment limited to three. Offered: AWPpS.

ORTHOP 681 P-University of Washington Medical Center Orthopaedics (8) *Allan, Bigos, Bruckner, Clark, Conrad, Larson, Matsen, Mirza, Simonian, Smith, Teitz, Trumble* Orthopaedic subspecialty clerkship at University of Washington Medical Center. Preceptor-based outpatient, inpatient, emergency, or operative orthopaedic care. Students work primarily in one subspecialty area and in one general orthopaedic clinic. For students who plan careers in orthopaedic surgery. Prerequisite: completion of HUBIO series, third- and fourth-year medical students. Offered: AWPpS.

ORTHOP 682 P-Outpatient Orthopaedics (8) Outpatient orthopaedic experience at University of Washington Medical Center. Emphasis on physical exam, diagnosis, radiographic evaluation, and non-operative treatment. Rotation through general

orthopaedics as well as all subspecialty areas. For students who plan careers in primary care. Prerequisite: completion of HUBIO series. Offered: AWPoS.

ORTHP 697 P-Orthopaedic External Elective (*, max. 12) *Simonian* 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. Prerequisite: HUBIO 553 and permission of department. Offered: AWPoS.

ORTHP 699 P-WWAMI Orthopedics Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Otolaryngology— Head and Neck Surgery

BB1165 University of Washington Medical Center



General Catalog Web page:
[www.washington.edu/students/gencat/
academic/Otolaryngology.html](http://www.washington.edu/students/gencat/academic/Otolaryngology.html)



Department Web page:
depts.washington.edu/otoweb/

The Department of Otolaryngology—Head and Neck Surgery provides clinical care for patients with a broad spectrum of disorders affecting the head and neck region, including the ears, nose, and throat. A major portion of departmental effort is directed toward basic research in the areas of sensorineural hearing disorders, physiology of the larynx, and cancer treatment and rehabilitation. The department supports a number of research fellows and advanced degree candidates, and is responsible for a four-year residency program and for the training of medical students in subjects relevant to the specialty.

Faculty

Chair

Ernest A. Weymuller, Jr.

Professors

Coltrera, Marc Dante 1986; MD, 1981, Yale University; otolaryngology/head and neck surgery.

Donaldson, James A. 1965, (Emeritus); MD, 1954, University of Minnesota; otology.

Duckert, Larry Gene 1978; MD, 1972, PhD, 1977, University of Minnesota; otology/neurotology.

Epstein, Joel B. 1983, (Adjunct); DMD, 1976, University of Saskatchewan (Canada), MSD, 1979, University of Washington.

Fuchs, Albert F. * 1969, (Adjunct); PhD, 1966, Johns Hopkins University; oculomotor physiology, vision.

Gates, George A. 1993; MD, 1959, University of Michigan; otology/neurotology, cochlear implantation.

Hillel, Allen D. * 1983; MD, 1976, Stanford University; peripheral nerve physiology after injury, swallowing disorders in neuromuscular disease.

Kuhl, Patricia K. * 1976, (Adjunct); MA, 1971, PhD, 1973, University of Minnesota; speech perception.

Manning, Scott C. 1995; MD, 1980, Tulane University; pediatric otolaryngology/head and neck surgery.

Norton, Susan J. * 1991; PhD, 1982, University of Washington; normal and non-normal hearing, specifically cochlear mechanics, in humans and animals.

Orcutt, James C. 1982, (Adjunct); PhD, 1976, MD, 1977, University of Colorado (Denver); orbit, oculoplastics, neuro-ophthalmology.

Robinson, Lawrence R. * 1989, (Adjunct); MD, 1982, Baylor University; psychiatry.

Rubel, Edwin W. * 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Snyder, Jack 1969, (Emeritus); MA, 1956, PhD, 1971, University of Washington; audiology.

Stanley, Robert B. 1993; MD, 1976, Duke University; otolaryngology/head and neck surgery, trauma, maxillofacial surgery.

Tempel, Bruce L. 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

Weymuller, Ernest A, Jr. 1978; MD, 1966, Harvard University; otolaryngology/head and neck surgery.

Associate Professors

Calderon, Rosemary 1987, (Adjunct); PhD, 1988, University of Washington; mental health and deafness, childhood psychopathology, early intervention.

Futran, Neal David 1995; DMD, 1982, University of Pennsylvania, MD, 1987, State University of New York (Downstate Medical Center); oral maxillofacial surgery.

Inglis, Andrew F, Jr. 1983; MD, 1981, Medical College of Pennsylvania; pediatric otolaryngology/head and neck surgery.

Makielski, Kathleen H. 1985; MD, 1978, University of Michigan; otolaryngology/head and neck surgery.

Rees, Thomas 1971; MA, 1969, University of Redlands, PhD, 1972, University of Washington; audiology.

Schubert, Mark M. * 1974, (Adjunct); DDS, 1974, MSD, 1981, University of Washington; oral medicine/oral oncology.

Sie, Kathleen C. Y. 1984; MD, 1984, University of Michigan; pediatric otolaryngology/head and neck surgery.

Sires, Bryan S. 1995, (Adjunct); PhD, 1986, MD, 1990, Northwestern University; plastic and reconstructive surgery.

Tempel, Bruce L. 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

Werner, Lynne A. * 1986, (Adjunct); PhD, 1980, Loyola University (Chicago); auditory development, infant psychoacoustics.

Assistant Professors

Farwell, Donald Gregory 1995; MD, 1994, Washington University (St. Louis); trauma.

Maronian, Nicole 1998; MD, 1991, University of Rochester; laryngology, sleep apnea.

Perkel, David J. 2000; PhD, 1992, University of California (San Francisco); neural mechanisms of learning; focus on vocal learning in songbirds.

Perkins, Jonathan A. 1994; DO, 1987, Osteopathic Medicine and Surgery (Iowa); pediatric otolaryngology head and neck surgery.

Weaver, Edward M. 1998; MD, 1993, Yale University; otolaryngology/head and neck surgery, sleep apnea, snoring.

Yueh, Bevan 1997; MD, 1989, Stanford University; clinical epidemiology of hearing loss and head and neck cancer.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsca/.

OTOHN 498 Undergraduate Thesis (*) *Rubel, Weymuller* 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. Offered: AWPoS.

OTOHN 499 Undergraduate Research (*) *Rubel, Weymuller* Research opportunities offered under direction in the area of otolaryngology. (Twelve weeks.) Offered: AWPoS.

OTOHN 501 P-Preceptorship in Otolaryngology—Head and Neck Surgery (1) *Hillel* One morning a week for a total of 30 hours per quarter spent observing patient care in either inpatient or outpatient settings at the University of Washington Medical Center; associated readings. Prerequisite: first- or second-year medical student standing. Coordinator: OTOHNS office. Offered: AWPoS.

OTOHN 680 P-Introduction to Clinical Otolaryngology—Head and Neck Surgery (4/8, max. 24) *Hillel, Makielski, Manning, Weymuller* Introduction to surgical subspecialty of otolaryngology—head and neck surgery. Structured to allow broad introduction to breadth of specialty. Students see patients in clinic, join inpatient rounds, have opportunity to go to operating room. Rotations at UWMC, VAH, HMC, CHMC, Swedish. Prerequisite: human biology series; recommended: MED 665 or SURG 665. Offered: AWPoS.

OTOHN 683 P-Otolaryngology—Head and Neck Surgery Externship (*, max. 8) *(Madigan Army Medical Center)* Individual externship training at outpatient clinic, where visits average twelve hundred per month, supplemented by inpatient assignments. Students may reside at the hospital during externship, using facilities of bachelor officer quarters and hospital mess. Prerequisite: completion of human biology series. (Two or four weeks, full-time.); recommended: MED or SURG 665. Offered: AWPoS.

OTOHN 686 P-Otolaryngology—Head and Neck Surgery: Medical and Surgical Aspects (*, max. 12) *Weymuller* Clinical in-depth study for the student whose interest lies in pathology of the head and neck. Reasonable flexibility to arrange course content that provides exposure to all aspects of patient care. Prerequisite: permission of chairman; recommended: MED 665 or SURG 665. Offered: AWPoS.

OTOHN 697 P-Otolaryngology—Head and Neck Surgery Special Electives (*, max. 24) *Weymuller* By specific arrangement. Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of

Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of chairman. Offered: AWSpS.

OTOHN 699 P-WWAMI Otolaryngology—Head and Neck Surgery Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Pathology

C516 Health Sciences



General Catalog Web page:
www.washington.edu/students/gencat/academic/Pathology.html



Department Web page:
www.pathology.washington.edu

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. The principal aim of the pathologist is to understand disease manifestations and processes in whatever terms are required. Therefore, the techniques of the pathologist range from those of the physicist and physical chemist through those of the physiologist to the realm of the epidemiologist. Present emphasis in the department is on cellular and molecular pathology, environmental pathology, and analysis of disease by methods of cell and molecular biology, recombinant DNA techniques, light and electron microscopy, histochemistry and cytochemistry, analytical biochemistry, cell and organ culture, and the establishment and analysis of animal models of disease.

Graduate Program

Graduate Program Coordinator
C516 Health Sciences, Box 357470
206-616-7551

The Department of Pathology offers graduate training in experimental pathology, with an emphasis on the cellular and molecular biological basis of disease, leading to the Doctor of Philosophy degree in cellular and molecular pathology. The aim of the graduate program is to train individuals for a career in the scientific investigation of basic disease mechanisms. The program encompasses students and faculty members with diverse interests, which range from investigation of specific disease conditions to the molecular basis of alterations in cell function and of gene expression. Faculty members' interests include the normal and pathological aspects of cardiovascular biology, tumor biology, environmental effects on normal processes, biology of aging, neurobiology, immune response, inflammation and repair, immunopathology and biology of extracellular matrix, as well as fundamental processes that underlie disease, such as regulation of gene expression and protein synthesis, structure and function of oncogenes, viral and nonviral transformation, chromatin structure, mutagenesis and DNA repair, and genetic recombination. The department's graduate faculty comprises 40 members, who are located at the Health Sciences Center, Veterans Affairs Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, and Fred Hutchinson Cancer Research Center. Approximately 30 full-time students are pursuing the Ph.D. degree.

Students in the program are expected to fulfill coursework requirements during the first two years. In line with the diversity of faculty members' interests within the department, course requirements are kept to a minimum to provide students with maximum flexibility.

The Ph.D. program in experimental pathology is designed to prepare students for careers as practicing scientists in biomedical research. The emphasis of the program is on development of skills in hypothesis generation and testing, including the design, accomplishment and critical interpretation of experiments. Experimental pathology uses the full range of biomedical research techniques (including biochemistry, molecular biology, cell biology, animal modeling) to attempt to elucidate the mechanisms underlying human disease. Graduates of the program usually continue research careers at biotechnology companies or universities/research institutes.

Special Requirements

Prospective candidates are expected to have had undergraduate experience in biology, physics, chemistry, and mathematics, and acceptable scores on the Graduate Record Examination, including advanced biology or chemistry. Those wishing to matriculate toward both the M.D. and Ph.D. degrees must gain admission to both the Graduate School and the School of Medicine.

Financial Aid

Funding for students is provided from departmental and University funds, training grants, a variety of institutional fellowships, and research grants of individual faculty members.

Research Facilities

The department emphasizes the cellular and molecular approach to the investigation of the pathogenesis of disease in mammalian species. Special facilities exist for training in electron microscopy; cell, tissue, and organ culture; recombinant DNA techniques; histochemistry and cytochemistry; analytical biochemistry; immunology; and molecular and cell biology.

Residency Training Program

The department supervises a residency-training program in anatomic pathology and, jointly with the Department of Laboratory Medicine, in clinical pathology for qualified medical doctors. Subspecialty training is also available through clinical fellowships. Persons who complete the residency program are eligible for certification by the American Board of Pathology. For additional information, contact the Resident Program Director, Department of Pathology, Box 356100.

Faculty

Chair

Nelson Fausto

Professors

Albers, John J. * 1971, (Adjunct Research); MS, 1967, PhD, 1969, University of Illinois; lipoprotein metabolism and pathophysiology.

Alpers, Charles E. 1986; MD, 1978, University of Rochester; clinical/experimental glomerular disease, AIDS in man and experimental simian AIDS, vascular biology.

Alvord, Ellsworth C. * 1960; MD, 1946, Cornell University; neuropathology, experimental allergic encephalitis.

Argenyi, Zsolt B. 2001; MD, 1978, Semmelweis Medical University (Hungary); dermatopathology.

Bowen-Pope, Daniel * 1979; PhD, 1979, University of California (Berkeley); gene regulation, growth factors and receptors.

Byers, Peter H. * 1976; MD, 1969, Case Western Reserve University; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics.

Chi, Emil Y. * 1972, (Research); PhD, 1971, University of California (Santa Barbara); lung structures and function, mast cell secretion and inflammation.

Clowes, Alexander W. * 1980, (Adjunct); MD, 1972, Harvard University; vascular smooth muscle cell growth control arterial injury and repair.

Collins, Steven J. * 1982, (Adjunct); MD, 1973, Columbia University; retinoic acid receptors and the pathogenesis of malignancy.

Disteche, Christine M. * 1980; PhD, 1976, University of Liege (Belgium); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics.

Eary, Janet F. 1980, (Adjunct); MD, 1980, Michigan State University; nuclear medicine.

Eisen, Harvey * 1986, (Affiliate); PhD, 1967, University of Toronto (Canada); host-parasite interactions, generation of genetic diversity.

Fausto, Nelson * 1994; MD, 1960, Sao Paulo State University (Brazil); liver regeneration, tumor biology, carcinogenesis, growth factors.

Galloway, Denise A. * 1982, (Adjunct Research); PhD, 1976, City University of New York; viral pathogenesis and neoplasia.

Gelinas, Richard * 1985, (Affiliate); PhD, 1974, Harvard University.

Grodine, Mark * 1982, (Adjunct); MD, 1975, PhD, 1976, University of Pennsylvania; chromatin structure and gene activity.

Harlan, John M. * 1978, (Adjunct); MD, 1973, University of Chicago; vascular biology with emphasis on leukocyte-endothelial adhesion.

Hellstrom, Ingegerd * 1966, (Affiliate); DrMed, 1966, Karolinska Institute (Sweden); tumor immunology.

Kiviat, Nancy C. * 1979; MA, 1970, MD, 1975, University of Washington; epidemiologic and molecular biologic studies of the relationship between HPV, HIV, and neoplasia.

Loeb, Lawrence A. * 1978; MD, 1961, New York University, PhD, 1967, University of California (Berkeley); DNA replication, cancer and AIDS.

Martin, George * 1957; MD, 1953, University of Washington; somatic cell genetics, pathobiology of aging, neurodegenerative disorders.

McDougall, James K. * 1982; PhD, 1971, University of Birmingham (UK); cell cycle, genetic instability and neoplasia.

Miller, Arthur D. * 1987, (Affiliate); PhD, 1982, Stanford University; virology, gene therapy.

Monnat, Raymond J, Jr. * 1982; MD, 1976, University of Chicago; somatic mutation, somatic cell molecular genetics, human genetic disease.

Mottet, N. Karle * 1959, (Emeritus); MD, 1952, Yale University; effects of trace elements, especially methylmercury and arsenic, on growth and development.

Narayanan, A. Sampath * 1971, (Research); PhD, 1967, University of Madras (India); connective tissue, periodontal disease, regulation of fibroblast growth, matrix synthesis.

Neiman, Paul E. * 1971, (Adjunct); MD, 1964, University of Washington; oncology.

Nicosia, Roberto F. 1999; MD, 1976, University of Rome (Italy), PhD, 1984, Medical College of Pennsylvania; vascular and renal pathology.

Norwood, Thomas H. * 1973; MD, 1968, University of Maryland; somatic cell genetics, pathobiology of aging, mitotic cell cycle regulation.

Page, Roy C. * 1967; DDS, 1957, University of Maryland, PhD, 1967, University of Washington; connective-tissue pathology, chronic inflammation, immunopathology, periodontal disease.

Rabinovitch, Peter S. * 1980; MD, 1979, University of Washington, PhD, 1980, University of Washington; cellular aging, preneoplastic disease, cell cycle abnormalities, DNA change.

Raines, Elaine W. * 1975, (Research); MS, 1975, University of California (San Francisco); molecular mechanisms responsible for vascular cell migration.

Reay, Donald T. 1982, (Emeritus); MD, 1963, University of Utah, MPA, 1978, Seattle University; forensic medicine.

Reichenbach, Dennis D. 1966, (Emeritus); MD, 1958, University of Washington; cardiovascular pathology, myocardial cell injury.

Reidy, Michael A. * 1980; PhD, 1976, Cambridge University (UK); identification of migration specific genes, expression of matrix metalloproteinases.

Rohrschneider, Larry R. * 1982, (Affiliate); PhD, 1973, University of Wisconsin; control of growth, differentiation, transformation by the c-fms proto-oncogene.

Rosenfeld, Michael E. * 1992, (Adjunct); PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.

Sale, George E. 1977; MD, 1968, Stanford University; immunopathology of bone marrow transplantation, graft-versus-host.

Schwartz, Stephen Mark * 1974; MD, 1967, Boston University, PhD, 1973, University of Washington; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics.

Shaw, Cheng-Mei * 1963, (Emeritus); MD, 1950, National Taiwan University; neuropathology, immunopathology, trace metal neurotoxicology.

Shulman, Howard M. 1982; MD, 1971, University of California (Los Angeles); graft-versus-host disease; venoocclusive disease of the liver.

Smith, Gerald R. * 1983, (Affiliate); PhD, 1970, Massachusetts Institute of Technology; molecular biology of genetic recombination and regulation of gene expression.

Spence, Alexander M. 1974; MD, 1965, University of Chicago; neurology, neuro-oncology.

Stamatoyannopoulos, George 1964, (Adjunct); MD, 1958, DrMedS, 1960, University of Athens (Greece); medical genetics.

Sumi, Shuzo Mark 1966, (Emeritus); MD, 1956, University of Toronto (Canada); neuropathology, neuromuscular disease, neurodegenerative diseases.

Swanson, Paul E. 2001; MD, 1984, Oregon Health Science University; surgical pathology, immunocytochemistry, soft tissue and GI pathology.

Todaro, George J. * 1983, (Adjunct); MD, 1963, New York University; growth regulation in normal/tumor cells, growth factors and their receptors, novel cell therapies.

Vessella, Robert L. 1989, (Adjunct); PhD, 1974, University of Mississippi; tumor markers and immunology.

Wight, Thomas * 1978, (Affiliate); PhD, 1972, University of New Hampshire; connective tissue biology and pathology, proteoglycans metabolism, atherosclerosis.

Wolf, Norman S. * 1968; DVM, 1953, Kansas State University, PhD, 1960, Northwestern University; hematopoietic stem cell dynamics and transplantation in radiation biology.

Associate Professors

Bornfeldt, Karin E. * 1991; PhD, 1991, Linköping University (Sweden); cardiovascular disease in diabetes, focusing on vascular muscle cells.

Bronner, Mary P. 1993; MD, 1989, University of Pennsylvania; gastrointestinal and hepatic pathology, neoplastic progression and transplantation pathology.

Fligner, Corinne L. 1983; MD, 1976, University of New Mexico; autopsy and forensic pathology, fetal and perinatal pathology, forensic toxicology.

Giachelli, Cecilia * 1982, (Adjunct); PhD, 1987, University of Washington; adhesion molecules and vascular biology processes.

Hackman, Robert C. 1982; MD, 1971, Stanford University; infectious and pulmonary complications in immunocompromised patients.

Horwitz, Marshall S. * 1983, (Adjunct); PhD, 1988, MD, 1990, University of Washington; inherited white blood cell disorders, including leukemia.

Kapur, Raj P. * 1988; MD, 1988, University of Southern California; normal and abnormal development of the enteric nervous system.

Murry, Charles E. * 1989; PhD, 1989, MD, 1989, Duke University; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation.

Myerson, David * 1985; PhD, 1979, Albert Einstein College of Medicine; the pathology of viral disease in humans.

Oshima, Junko * 1996, (Research); PhD, 1992, Boston University; pathobiology of aging.

Ott, Susan M. 1980, (Adjunct); MD, 1974, University of Washington; nephrology.

Patterson, Kathleen 1992; MD, 1976, University of Iowa; pediatric pathology.

Porter, Peggy L. * 1987; MD, 1987, University of New Mexico; identifying/understanding the molecular events associated with the initiation/progression of cancer.

Schmidt, Rodney 1984; PhD, 1984, MD, 1984, University of Washington; surgical pathology, pulmonary pathology, sarcomas, image analysis, electron microscopy.

Siebert, Joseph Robert 1986, (Research); PhD, 1985, University of Washington; pediatric pathology.

Silbergeld, Daniel L. 1984, (Adjunct); MD, 1984, University of Cincinnati; brain tumors, epilepsy.

Stephens, Karen G. * 1989, (Adjunct Research); PhD, 1982, Indiana University; neurofibromatosis, tumorigenesis, gene mapping and regulation, human genetics.

Swishhelm, Karen * 1980; PhD, 1989, University of Washington; molecular biology of senescence and tumor suppression in breast cancer.

Tait, Jonathan F. * 1985, (Adjunct); PhD, 1983, MD, 1983, Washington University; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders.

Tapscott, Stephen J. * 1986, (Adjunct); PhD, 1982, MD, 1982, University of Pennsylvania; molecular and developmental biology.

Thorning, David R. 1982; MD, 1965, University of Kansas; anatomic pathology, pulmonary pathology, tissue biology, electron microscopy.

True, Lawrence D. * 1990; MD, 1971, Tulane University; urologic pathology, nuclear aspects of tumor differentiation.

Vincent, Inez J. * 1998, (Research); PhD, 1987, Indiana University; pathogenesis of Alzheimer's disease.

Yeung, Raymond S. 1997, (Adjunct); MD, 1982, University of Toronto (Canada); general and surgical oncology.

Zarbl, Helmut * 1996, (Affiliate); PhD, 1983, McGill University (Canada).

Assistant Professors

Born, Donald E. 1987; PhD, 1986, MD, 1987, University of Virginia; family medicine, sports medicine, team care.

Brentnall, Teresa A. 1991; MD, 1987, University of Washington; gastroenterology.

Clurman, Bruce E. * 1991, (Adjunct); PhD, 1988, MD, 1989, Cornell University.

Finn, Laura S. 1998; MD, 1989, Pennsylvania State University; pediatric pathology.

Franklin, Christopher C. 1997, (Research); PhD, 1989, University of Missouri; signal transduction pathways in mammalian cells.

Garcia, Rochelle 1988; MD, 1989, University of Washington; cytology, gynecologic pathology.

Hevner, Robert F. 2000; PhD, 1992, MD, 1992, Medical College of Wisconsin; development of cerebral cortex.

Jin, Lee-Way 1996; MD, 1985, National Taiwan University, PhD, 1993, University of California (San Diego); molecular analysis and animal modeling of Alzheimer's disease.

Kemp, Christopher James * 1996, (Affiliate); PhD, 1989, University of Wisconsin; genetic and environmental influence on multistage cancer in the mouse.

Kuechle, Melanie K. 1995, (Adjunct); MD, 1989, Baylor University; dermatology.

Lawton, Thomas J. 1999; MD, 1990, University of Michigan; clinicopathologic research in breast cancer with particular interest in lobular carcinoma.

Mulvihill, Eileen R. 1999, (Research); PhD, 1982, Université Louis Pasteur (France); Marfan's syndrome.

Nelson, Peter S. * 1993, (Adjunct); MD, 1986, University of Kansas; the study of human carcinogenesis using tools of genomics and bioinformatics.

Rubin, Brian Paul 2000; PhD, 1995, MD, 1995, Cornell University; bone and soft tissue tumors.

Schwarze, Ulrike 1993; MD, 1989, Medical Academy of Dresden (Germany); inherited disorders of connective tissue.

Tkachuk, Douglas C. 1995; MD, 1982, University of Manitoba (Canada); pathogenesis of acute leukemia.

Virgin, Jeffrey B. 1988; PhD, 1986, MD, 1986, Case Western Reserve University; surgical pathology, cytopathology, autopsy pathology.

Senior Lecturer

Nochlin, David 1988; MD, 1972, Faculty of Medicine (Mexico); neuropathology.

Lecturer

Pendergrass, William R. 1980; PhD, 1977, University of Washington; DNA replication, caloric restriction, gerontology, invitro senescence.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsca/.

PATH 410 Introduction to Pathology (3) *Narayanan* Basic pathologic processes, including cell and tissue involvement in degenerative processes, cell death, inflammation and repair, immunopathologies, cell cycle events, carcinogenesis, and responses to alterations in hormone and growth factor levels. Illustrative disease conditions are reviewed. Required for physical therapy students. Others with suitable biology background by permission of instructor. Offered: A.

PATH 444- General and Systemic Pathology ([2-3]-, max. 5) *Narayanan* Basic pathologic processes that underlie disease, including cell alterations, genetic and developmental pathology, environmental pathology, neoplasia, immunopathology, inflammation, infection, and systemic diseases. Correlates gross, functional, and biochemical alterations. For first-year dental students and graduate students. Requires reasonable grounding in biological and chemical sciences. Prerequisite for nondental students: permission of instructor.

PATH 450 Cell Biology of Aging (3) *Martin, Rabinovitch, Wolf* Pathophysiology of aging at cell and tissue levels (cell replication limits, telomere shortening, accrual of oxidative damage, caloric restriction effects, loss of postreplicative cells, longevity assurance genes). Proseminar based on student participation. Undergraduate honors students, graduate students with biology, zoology, genetics or medical sciences back grounds. Prerequisite: permission of instructor. Offered: W.

PATH 498 Undergraduate Thesis (*) Elective.

PATH 499 Undergraduate Research (*) Elective.

PATH 500 Molecular Basis of Disease (3) *Parks* Designed for first and second year graduate students to introduce the concepts of general pathology at the cellular and molecular levels.

PATH 501 Pathology Proseminars (1) Small group discussions and presentations by students based on critical reading of original papers, or on concurrent seminars, in many areas of experimental pathology

and medicine. Topic varies by quarter. Prerequisite: permission of instructor. Offered: A/WSpS.

PATH 507 Introduction to Pathology Research (2) *Bornfeldt, Swisshelm* Current developments and approaches to investigation of the molecular and cellular basis of disease. Members of the Pathology faculty present and discuss their own research projects. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

PATH 510 Introduction to Pathology Methods (3) *Bowen-Pope* Laboratory course designed to introduce graduate students to the fundamentals of image analysis, histology, histopathology, post mortem evaluation, surgical pathology, and other methods used to investigate disease etiology, progression, and manifestation in humans and in animal models. Prerequisite: permission of instructor. Offered: Sp.

PATH 511 Topics in Experimental Pathology (1-2, max. 10) *Bornfeldt* Focus on areas of research relevant to experimental pathology. Prerequisite: permission of instructor. Offered: A/WSpS.

C MED 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) See Comparative Medicine courses.

C MED 514 Comparative Pathology Conference (1, max. 6) See Comparative Medicine courses.

PATH 520 Experimental Pathology Seminar (1) Review of current research in various areas of experimental pathology by members of the department and visiting scientists. Credit/no credit only.

CONJ 520 Anatomy and Autopsy (1/2) *Fligner* See Conjoint Courses.

PATH 522 Hematopathology Seminar (2) *Sabath* Identification of normal lymphocyte and bone marrow subpopulations, diagnosis of leukemias, lymphomas, and benign conditions that resemble them. Emphasis on histopathology, cytochemical, immunological, and molecular markers. Clinicopathologic correlation. Offered: jointly with LAB M 522; even years.

PATH 530 Human Cytogenetics (*, max. 4) *Disteche* Sources and methods of preparation and identification of human chromosomes. Molecular structure and mapping of chromosomes. Human cytogenetic pathology: karyotype-phenotype interactions, chromosome breakage, and cancer cytogenetics. Prerequisite: permission of instructor. Offered: even years.

PATH 551 Experimental and Molecular Pathology (2-5, max. 20) Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, dental) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes at the cellular and molecular levels in the study of disease is emphasized. Prerequisite: permission of instructor.

PATH 552 Contemporary Anatomic Pathology (2-5, max. 30) *Schwartz* 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. Credit/no credit only. Prerequisite: permission of instructor.

PATH 555 Environmental Pathology (3) *Monnat, Rhim* Modern morphologic, cell biological, and molecular approaches to environmental disease associated with exposure/predisposition. Lectures, seminar discussion, and student presentations. Prerequisite: PATH 410 or PATH 444 or HUBIO 520; recommended: ENV H 514 and ENV H 515. Offered: alternate years.

CONJ 560, 561 Tumor Biology (3, 2) See Conjoint Courses.

PATH 563 Neuropathology (*) *Alvord, Shaw, Sumi* Course consists of ten parts. Conferences on gross neuropathology (brain cutting and clinicopathologic correlations) held at six hospitals. Weekly neurology or surgical neuropathology conferences, neuropathology slide show, and neuropathology laboratory case studies. Prerequisite: permission of instructor.

PATH 564 Neuropathology Brain Modeling (4) *Alvord* Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain).

PATH 571 Neuroanatomic Pathology (*) *Alvord, Shaw, Sumi* The particular diseases occurring in specific parts of the nervous system are considered in terms of the segmental, intersegmental, and suprasegmental components. Clinicopathologic correlations are emphasized. Prerequisite: permission of instructor; recommended as concurrent course: 563.

PATH 572 Neuropathologic Reactions (*) *Alvord, Shaw, Sumi* The reactions of the nervous system, considered in terms of congenital malformations, inflammations, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous system as a whole. Clinicopathologic correlations are emphasized. Prerequisite: permission of instructor; recommended as concurrent course: PATH 563.

PATH 584 Neuropathology Brain Modeling Laboratory (4) *Alvord* Clinically important, functional neuroanatomic study based on embryologic motor, sensory, and association cells and simple reflexes, followed by the more elaborate suprasegmental elements (cerebellum, colliculi, forebrain). Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, can best be obtained in constructing a brain model. Prerequisite: PATH 564, which may be taken concurrently.

PATH 600 Independent Study or Research (*) Credit/no credit only.

PATH 679 P-Pathology Summer Clerkship (*, max. 24) Dissection, writeup, and literature review of autopsy. Emphasis on etiology and pathogenesis of disease as a biological process. Designed for students who have not completed organ systems as covered in Human Biology courses. Prerequisite: HUBIO 520 and completion of first year of medical school.

PATH 680 P-Diagnostic Pathology Clerkship—University of Washington Medical Center (*, max. 24) *Swanson* Medical student participation in dissection and study of autopsy and surgical pathology cases. Cases worked up under senior staff, including dissection, microscopic examination, and literature review. Attendance at pathology conferences and seminars expected. Prerequisite: third- or fourth-year student standing.

PATH 681 P-Diagnostic Pathology Clerkship—Harborview Medical Center (*, max. 24) *Deubner*

PATH 682 P-Diagnostic Pathology Clerkship—Veterans Administration Hospital (*, max. 24) *Thorning*

PATH 683 P-Diagnostic Pathology Clerkship—Medical Examiner's Office (*, max. 24) *Raven*

PATH 685 P-Diagnostic Pathology Clerkship—Sacred Heart Hospital, Spokane (*, max. 24) *Williamson*

PATH 687 P-Diagnostic Pathology Clerkship—Children's Hospital and Medical Center (*, max. 24)
Patterson

PATH 688 P-Diagnostic Pathology Clerkship—Madigan Army Medical Center (*, max. 24)

PATH 689 P-Diagnostic Pathology Clerkship—Valley Medical Center (*, max. 24)

PATH 690 P-Diagnostic Pathology Clerkship—Northwest Medical Center (*, max. 24)
Patton

PATH 691 P-Diagnostic Pathology Clerkship—General Hospital of Everett (*, max. 24)

PATH 692 P-Diagnostic Pathology Clerkship—Group Health Cooperative (*, max. 24)

PATH 697 P-Pathology Special Electives (*, max. 24) By specific arrangement, students can have clerkships, externships, or research opportunities at institutions other than the University of Washington. Students who wish to elect this course should obtain Special Assignment forms from the Dean's office at least one month before advance registration. Prerequisite: permission of instructor.

PATH 699 P-WWAMI Pathology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

PATH 700 Master's Thesis (*)

PATH 800 Doctoral Dissertation (*)

Pediatrics

RR314 Health Sciences



General Catalog Web page:
www.washington.edu/students/genocat/academic/Pediatrics.html



Department Web page:
www.peds.washington.edu

Pediatrics involves the study of physical and behavioral development of humans, in health and disease, from conception to adulthood.

Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives. Faculty members participate in teaching the basic curriculum and offer 24 electives, including the general pediatrics clerkship at multiple WWAMI sites. A residency program is offered with a wide variety of electives in addition to traditional hospital-inpatient and clinic experience. Postdoctoral fellowship training is available in many subspecialty areas of pediatrics. The major teaching hospitals in Seattle are Children's Hospital and Regional Medical Center, University of Washington Medical Center, and Harborview Medical Center.

Faculty

Chair

F. Bruder Stapleton

Professors

Bennett, Forrest C. 1977; MD, 1970, University of Minnesota; child development and handicapped children.

Bergman, Abraham 1964; MD, 1958, Case Western Reserve University; ambulatory pediatrics.

Bernstein, Irwin D. 1980; MD, 1967, New York University; hematology, oncology.

Chance, Phillip F. 1998; MD, 1978, University of Tennessee; pediatric neurology and genetics.

Christie, Dennis L. 1979; MD, 1968, Northwestern University; gastroenterology.

Clarren, Sterling K. 1978; MD, 1973, University of Minnesota; congenital defects.

Connell, Frederick A. * 1978, (Adjunct); MD, 1972, New York University; child health, child health services research, Medicaid, community health assessment.

Coombs, John B. 1983; MD, 1972, Cornell University; health care outcomes, rural health policy, healthcare workforce issues and applied nutrition.

Corey, Lawrence * 1977, (Adjunct); MD, 1971, University of Michigan; DX, therapy and pathogenesis of viral infections, AIDS/herpes viruses.

Deisher, Robert W. 1949, (Emeritus); MD, 1944, Washington University; adolescent medicine.

Eddy, Allison A. 1997; MD, 1975, McMaster University (Canada); nephrology.

Emanuel, Irvin * 1966, (Emeritus); MA, 1956, University of Arizona, MD, 1960, University of Rochester, MS, 1966, University of Washington; epidemiology of maternal and child health problems, growth and development.

Fantel, Alan G. * 1973; PhD, 1974, University of Washington; embryology, teratology.

French, James W. 1984; MD, 1963, University of Michigan; pediatric cardiology.

Gleason, Christine A. 1997; MD, 1979, University of Rochester; neonatology.

Grossman, David C. 1988; MD, 1982, University of California (Los Angeles), MPH, 1990, University of Washington; injury control, Native American health, and pediatric health services research.

Guntheroth, Warren G. 1958; MD, 1952, Harvard University; pediatric cardiology.

Guralnick, Michael J. 1986; MS, 1964, PhD, 1967, Lehigh University; developmental disabilities, peer relations, social and language development, evaluation systems.

Hayden, Patricia 1969, (Emeritus); MD, 1953, University of Rochester; congenital defects.

Hays, Ross M. * 1983, (Adjunct); MD, 1978, University of Washington; pediatric rehabilitation, medical ethics, neuromuscular diseases, congenital defects.

Hodson, W. Alan 1966; MD, 1959, University of Manitoba (Canada), MMSc, 1964, Ohio State University; neonatal and respiratory diseases.

Jaffe, Kenneth M. * 1981, (Adjunct); MD, 1975, Harvard University; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects.

Lemire, Ronald J. 1968; MD, 1962, University of Washington; teratology.

Lynn, Anne 1981, (Adjunct); MD, 1975, Stanford University; pediatric anesthesiology.

Mackler, Bruce 1957, (Emeritus); MD, 1943, Temple University; developmental biology.

Marcuse, Edgar K. 1971; MD, 1967, Stanford University, MPH, 1973, University of Washington; general pediatrics.

McLaughlin, John F. 1977; MD, 1970, Northwestern University; congenital defects.

Neff, John 1982; MD, 1960, Harvard University; children with special health care needs.

Novack, Alvin H. 1979, (Emeritus); MD, 1958, Temple University; general pediatrics.

Ochs, Hans D. 1969; MD, 1962, University of Freiburg (Germany); immunology.

Pagon, Roberta A. 1979; MD, 1972, Harvard University; medical genetics.

Quan, Linda 1977; MS, 1969, Dartmouth College, MD, 1971, University of Washington; pediatric emergency medicine.

Ramsey, Bonnie W. 1978; MD, 1976, Harvard University; cystic fibrosis, pulmonary.

Redding, Gregory J. 1980; MD, 1974, Stanford University; pediatric pulmonary medicine.

Richards, Gail E. 2000; MD, 1970, MM, 1993, Northwestern University; endocrinology.

Rivara, Frederick P. * 1984; MD, 1974, University of Pennsylvania; pediatric epidemiology and injury prevention and research.

Robertson, William O. 1963, (Emeritus); MD, 1949, University of Rochester; general pediatrics, toxicology.

Rubens, Craig E. * 1984; PhD, 1978, Medical University of South Carolina, MD, 1982, University of Washington; infectious diseases/pathogenesis of gram(+) bacterial infections.

Sanders, Jean E. 1975; MD, 1970, University of Iowa; hematology, oncology.

Scott, C. Ronald * 1965; MD, 1959, University of Washington; diagnosis and nutritional management of genetic disorders of children.

Smith, Nathan J. * 1965, (Emeritus); MD, 1945, University of Wisconsin; sports medicine.

Stapleton, F. Bruder 1996; MD, 1972, University of Kansas; nephrology.

Stevenson, James G. 1976; MD, 1970, Baylor University; pediatric cardiology.

Tarr, Phillip I. 1983; MD, 1980, Yale University; gastroenterology/infectious diseases.

Watkins, Sandra L. 1981; MD, 1981, University of Texas (Houston); nephrology.

Wedgwood, Ralph J. 1962, (Emeritus); MD, 1947, Harvard University; rheumatology.

Weinberger, Edward 1979, (Adjunct); MD, 1979, Harvard University; pediatric radiology.

Wilson, Christopher B. * 1980; MD, 1972, University of California (Los Angeles); immunology, infectious diseases.

Woodrum, David E. 1971; MD, 1965, University of Illinois; neonatology.

Zimmerman, Jerry J. 1998; PhD, 1975, MD, 1979, University of Wisconsin; critical-care medicine.

Associate Professors

Andrews, Robert G. 1979; MD, 1976, University of Minnesota; hematology/oncology.

- Astley, Susan J. * 1980, (Adjunct); PhD, 1990, University of Washington; chronic childhood diseases.
- Brewer, David K. 1978, (Adjunct); MD, 1972, Harvard University; pediatric radiology, angiography, computed tomography.
- Brownstein, Dena R. 1986; MD, 1982, University of Washington; pediatric emergency medicine.
- Burns, Jane L. 1982; MD, 1978, University of Washington; infectious diseases.
- Cunningham, Michael L. * 1988; MD, 1988, University of California (San Diego), MPH, 1993, University of Washington; molecular, development, craniofacial, malformation, human, mouse, craniosynostosis, birth defects.
- Davis, Robert L. * 1991; MD, 1983, University of California (San Diego), MPH, 1993, University of Washington; childhood immunization, including adverse events perinatal and pediatric epidemiology.
- Del Beccaro, Mark A. 1985; MD, 1985, University of Washington; pediatric emergency medicine.
- Diekema, Douglas S. 1990; MD, 1985, University of North Carolina, MPH, 1993, University of Washington; pediatric emergency medicine.
- Frenkel, Lisa M. 1994; MD, 1987, University of Kansas; infectious diseases.
- Geyer, Jeffrey R. 1984; MD, 1977, Wayne State University; hematology/oncology.
- Gibson, Ronald L, Jr. 1982; PhD, 1982, MD, 1982, Washington University; pulmonology.
- Glass, Ian 2000; MD, 1991, University of Otago (New Zealand); genetics.
- Graham, Elinor A. 1982; MD, 1970, University of Rochester, MPH, 1993, Johns Hopkins University; general pediatrics.
- Herndon, S. Paul 1973; MD, 1970, George Washington University; pediatric cardiology.
- Holm, Vanja A. 1962, (Emeritus); MD, 1954, Karolinska Institute (Sweden); child development.
- Jackson, J. Craig 1979; MD, 1979, Vanderbilt University; neonatal and respiratory diseases.
- Jardine, David 1987; MD, 1980, Johns Hopkins University; pediatric anesthesiology.
- Jones, Thomas K. 1983; MD, 1978, Jefferson Medical College; pediatric cardiology.
- Kapur, Raj P. * 1988, (Adjunct); MD, 1988, University of Southern California; normal and abnormal development of the enteric nervous system.
- Kawabori, Isamu 1973; MD, 1966, University of Washington; pediatric cardiology.
- Kletter, Gad B. 1995; MD, 1982, Sackler School of Medicine (Israel); pediatric endocrinology.
- Marshall, Susan G. 1979; MD, 1980, University of California (Los Angeles); neonatal and respiratory diseases.
- Martin, Lynn D. 1994, (Adjunct); MD, 1982, University of Washington; pediatric anesthesiology.
- Massagli, Teresa L. * 1985, (Adjunct); MD, 1982, Yale University; pediatric psychiatry.
- Matthews, Dana C. 1984; MD, 1981, University of Washington; hematology/oncology.
- Mayock, Dennis Edward 1985; MD, 1975, Ohio State University; neonatology and respiratory diseases.
- McDonald, Ruth A. 1987; MD, 1987, University of Minnesota; nephrology.
- Melzer, Sanford M. 1990; MD, 1982, Mt Sinai School of Medicine; general pediatrics.
- Milstein, Jerrold M. 1980; MD, 1964, University of Minnesota; pediatric neurology.
- Moseley, Stephen L. * 1985, (Adjunct); PhD, 1981, University of Washington; molecular basis of pathogenesis in *E. coli* diarrhea.
- Murphy, Janet Haworth 1974; MBChB, 1967, Victoria University (UK); neonatal biology and respiratory disease.
- Pendergrass, Thomas W. 1978; MD, 1971, University of Tennessee, MPH, 1979, University of Washington; hematology, oncology.
- Pihoker, Catherine 1997; MD, 1987, Albany Me; endocrinology.
- Portman, Michael A. 1992; MD, 1980, University of Cincinnati; pediatric cardiology.
- Rawlings, David J. * 2001; MD, 1984, University of North Carolina; immunology and rheumatology.
- Rosenbaum, David M. 1983, (Adjunct); MD, 1977, Albert Einstein College of Medicine; pediatric radiology.
- Sherry, David Dan 1984; MD, 1977, Texas Technological University; immunology/rheumatology.
- Shugerman, Richard P. 1984; MD, 1984, University of Alabama; general pediatrics.
- Smith, Mark S. 1977; MD, 1969, University of Virginia; adolescent medicine.
- Stout, James W. * 1986; MAT, 1981, Duke University, MD, 1986, Wake Forest University; childhood asthma, health services and epidemiology.
- Strandjord, Thomas P. 1983; MD, 1983, Johns Hopkins University; neonatal biology and respiratory diseases.
- Sulzbacher, Stephen 1976; MA, 1964, Hollins College (Virginia), PhD, 1971, University of Washington; psychiatry and behavioral sciences.
- Tarczy-Hornoch, Peter 1992; MD, 1989, Stanford University; bioinformatics and clinical informatics: clinical systems and integrating genetic databases.
- Taylor, James A., Jr. 1987; MD, 1980, University of North Carolina; general pediatrics.
- Walker, William O., Jr. 1993; MD, 1979, Tulane University; developmental pediatrics.
- Wallace, Carol A. 1983; MD, 1973, University of Michigan; immunology/rheumatology.
- Weiss, Avery H. 1991, (Adjunct); MD, 1974, Miami University (Ohio); pediatric ophthalmology, strabismus.
- Wright, Jeffrey A. 1988; MD, 1978, University of Missouri; general pediatrics.
- Assistant Professors**
- Beitz, Laurie O. 2000; MD, 1990, University of North Carolina; rheumatology, lymphocyte signal transduction.
- Bender, Michael A. 1989; MD, 1980, PhD, 1989, University of Washington; nematology/oncology.
- Breuner, Cora C. 1991; MD, 1982, Jefferson Medical College, MPH, 1998, University of Washington; adolescent medicine.
- Carpenter, Paul A. 1995; MBBS, 1988, University of Sydney (Australia); oncology.
- Christakis, Dimitri A. 1993; MD, 1993, University of Pennsylvania, MPH, 1998, University of Washington; general pediatrics.
- Dichek, Helen 2001; MD, 1980, Universite de Louvain (Belgium); endocrinology.
- Dyamenahalli, Umesh 2000; MD, 1985, Bangalore University (India); pediatric cardiology.
- Friedman, Debra L. 1998; MD, 1991, University of Medicine and Dentistry of New Jersey; hematology/oncology.
- Gunther, Daniel F. 1998; MD, 1992, University of California (Davis); pediatric endocrinology.
- Hawkins, Douglas S. 1990; MD, 1990, Harvard University; hematology/oncology.
- Hornung, Robin L. 1999; MD, 1990, Yale University, MPH, 1996, University of North Carolina; dermatology.
- Johnston, Brian D. 1997; MD, 1990, University of California (San Diego), MPH, 1999, University of Washington; general pediatrics, childhood injuries.
- Klein, Eileen J. 1988; MD, 1988, Johns Hopkins University; pediatric emergency medicine.
- Kuratani, John D. 1999, (Adjunct); MD, 1990, Tulane University; pediatric epilepsy, EEG.
- Lewin, Mark 2001; MD, 1991, University of Southern California; pediatric cardiology.
- Lewis, Charlotte W. 1998; MD, 1994, University of California (San Francisco), MPH, 2000, University of Washington; general pediatrics, oral health for children, craniofacial.
- Liu, Lenna L. 1995; MD, 1992, University of Pennsylvania; general pediatrics, type 2 diabetes.
- Lozano, Paula 1989; MD, 1989, Harvard University, MPH, 1994, University of Washington; general pediatrics, asthma, evidence-based medicine.
- Melvin, Ann Jorns 1987; MD, 1986, Tulane University; infectious diseases.
- Metinko, Andrew P. 1999; MD, 1985, University of Michigan; pediatric critical care.
- Murray, Karen F. 1990; MD, 1990, Johns Hopkins University; gastroenterology.
- Olson, James M. 1991; MD, 1991, University of Michigan; hematology, oncology.
- Paris, Carolyn A. 1995; MD, 1991, Cornell University; pediatric emergency medicine.
- Park, Julie R. 1988; MD, 1988, University of Vermont; hematology, oncology.
- Pinter, Joseph D. 1990, (Adjunct); MD, 1990, University of California (Los Angeles); pediatric neurology.
- Richardson, Laura P. 1998; MD, 1994, University of Michigan, MPH, 2001, University of Washington; adolescent medicine.
- Rosenthal, Geoffrey L. 1998; PhD, 1992, MD, 1992, University of Maryland; cardiology.
- Scharenberg, Andrew M. * 2000; MD, 1990, University of North Carolina; immunology.
- Schenkman, Kenneth A. 1990; MD, 1986, Indiana University; pediatric anesthesia.

Shah, Maully J. 2000; MBBS, 1988, University of Gujarat (India); pediatric cardiology.

Sievers, Eric L. 1988; MD, 1988, Brown University; hematology, oncology.

Smith, Kendra 2001; MD, 1988, University of Minnesota; neonatology.

Smith, Sherilyn 1994; MD, 1989, Baylor University; infectious diseases.

Sotero De Menezes, Marcio 1996; MD, 1984, Rio De Janeiro St. U. Med. Sch. (Brazil); pediatric neurology, epilepsy, EEG.

Symons, Jordan 1999; MD, 1992, Columbia University; nephrology.

Vavilala, Monica S. 1994; MD, 1991, University of Texas (Houston).

Woolfrey, Ann E. 1989; MD, 1984, University of Minnesota; pediatric hematology/oncology.

Zerr, Danielle M. 1993; MD, 1993, Temple University, MPH, 1998, University of Washington; infectious diseases.

Lecturers

Polifka, Janine E. 1988; PhD, 1985, University of Louisville; teratology.

Rees, Jane * 1973; MS, 1972, University of Washington; nutritional support of adolescent health, especially during pregnancy; eating disorders.

Trahms, Cristine M. * 1973; MS, 1972, University of Washington; growth and development of young children: metabolic disorders, special health care needs.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

PEDS 498 Undergraduate Thesis (*) *Bennett* For medical students. Offered: AWPpS.

PEDS 499 Undergraduate Research (*) *Bennett* Participation in various clinical or basic research programs in progress, specifically: child development, developmental biology, human embryology and teratology, medical genetics, infectious diseases, neonatology, neuroembryology, cardiology, endocrinology and metabolism, immunology, respiratory disease. Offered: AWPpS.

PEDS 505 P-Preceptorship in Pediatrics (1) *Bennett* To provide opportunity for first- and second-year medical students to gain personal experience with medical practice situations for pediatricians by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of instructor. Enrollment limited. Coordinator: Department of Pediatrics. Offered: AWPpS.

PEDS 506 Interdisciplinary Seminars in Adolescent Health (1) Focus on interviewing adolescents, health problems, public health issues, and health care policy. Prerequisite: graduate or professional student status.

PEDS 512 P-Seminars in Human Embryology and Teratology (3) *Chance, Mirkes* Presents in depth discussions of human embryonic-fetal development and malformations that arise, correlations with experimental studies and molecular embryology are included.

A laboratory experience is optional. Prerequisite: permission of instructor. Offered: AWPpS.

PEDS 530 P-Adolescent Seminar (1) *Deisher, Smith* Clinic-based setting for seminar and interview practice with Pioneer Square adolescents; students learn how to deal with special health problems and other related problems of "street kids" through interviews and observations. Credit/no credit only. Offered: W.

PEDS 551 P-Pediatric Electrocardiography (2) *Guntheroth* Brief review of the physiology and physics pertinent to clinical electrocardiography is followed by a presentation of terminology and methods in clinical use. Normal electrocardiograms are studied, followed by abnormal tracings, with emphasis on pediatric material, but including adult material such as myocardial infarction. Prerequisite: HUBIO 540. Offered: W.

PEDS 611 City Doc FREE-TEEN Clinic (*, max. 24) *Breuner, Giesel* Participation in a free clinic for out-of-home youth, either Monday or Tuesday evenings. Clinical services include general medical care, with a focus on reproductive health, STD evaluations/treatment, and the impact of a homeless lifestyle on general health. Offered: AWPpS.

PEDS 630 P-WRITE Pediatrics Clinical Clerkship (*, max. 24) Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

PEDS 661 P-Pediatric General Clerkship, Anchorage (*, max. 24) *Lyon* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 662 P-Pediatric General Clerkship (*, max. 24) *Newman* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Location preferences are considered. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 663 P-Pediatric General Clerkship (*, max. 24) *Schweich* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Location preferences are considered. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 664 P-Pediatric General Clerkship (*, max. 24) *Bradford* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 665 P-Pediatric General Clerkship (*, max. 24) *Bennett* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department or clinic. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 666 P-Pediatric General Clerkship (*, max. 24) *Marron* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 667 P-Pediatric General Clerkship (*, max. 24) *Newman* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 668 P-Pediatric General Clerkship (*, max. 24) *Stucky* General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 669 P-Neonatal Pediatrics-Clerkship (*, max. 24) *Gleason* Participation in the activities in the newborn and premature divisions; ward rounds, seminars, conferences, and familiarization with certain laboratory techniques, particularly those relating to acid-base balance. Prerequisite: PEDS 665. (Limit: two students.) Offered: AWPpS.

PEDS 670 P-Pediatric Infectious Diseases (*, max. 24) *Rubens* Students see and work up clinic consultations and present in detail to attending physician. Daily rounds include problem-solving discussions and didactic presentations in broad category of infectious diseases. Opportunity for experience in clinical research and laboratory techniques. Prerequisite: PEDS 665 or permission; third- or fourth-year medical student standing. (Limit: one student.) Offered: AWPpS.

PEDS 673 P-Office Practice (*, max. 12) *Bennett* 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: PEDS 665. Offered: AWPpS.

PEDS 676 P-Pediatric Clerkship with the Mentally Handicapped (*, max. 12) *Dahl (Fircrest School), Ruvalcaba (Rainier School)* Total care involvement with mentally handicapped patients, incorporating general pediatric knowledge of mental retardation and neurology, plus other specialties related to mental deficiencies. Prerequisite: PEDS 665. (Four or six weeks, full-time.) Offered: AWPpS.

CONJ 677 P-Clinical Allergy and Immunology (*, max. 12) See Conjoint Courses.

PEDS 679 P-Clinical Problems in Developmental Disabilities (*, max. 12) *Bennett* Experience in multidisciplinary evaluation and management of the handicapped child. Student performs pediatric evaluations, obtains appropriate consultations, observes additional professional assessments (e.g., psychological testing), and plans rehabilitation program. Opportunity to provide parent counseling. Prerequisite: PEDS 665. (Limit: one student.) Offered: AWPpS.

PEDS 680 P-Pediatric Clinics (*, max. 24) *Bennett* One to ten half-day sessions may be elected each week for four weeks 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. Enrollment limited. Prerequisite: PEDS 665.

PEDS 681 P-Pediatric Genetics (*, max. 24) *Pagon* Clinical focus on evaluation and management of children with genetic disorders. Exposure to genetic counseling, the evaluation of children with hereditary structural defects, and diagnosis and management of children with inborn errors of metabolism. Emphasis on genetic mechanisms that cause human disease. Prerequisite: PEDS 665. (Two, four, six, or twelve weeks. Limit: one student.) Offered: AWPpS.

PEDS 682 P-Congenital Defects-Clinical Experience (*, max. 24) *Chance, Davis* Advanced course in pediatrics providing experience in the clinical diagnosis and management of structural and metabolic congenital defects. Prerequisite: permission of instructor. (Limit: one student.) Offered: AWSpS.

PEDS 683 P-Pediatric Nephrology (8) *Eddy* Four-week elective clerkship at Children's Hospital and Medical Center. Students participate in nephrology and transplant rounds, consult with renal fellows and attendings, and work up patients in renal clinics. Participation in seminars; special course in fluid balance. Prerequisite: third- or fourth-year medical student, PEDS 665, and MED 665 or equivalent. (Limit: two students.) Offered: AWSpS.

PEDS 684 P-Pediatric Pulmonary Medicine (8) *Redding* Respiratory disorders, diagnostic techniques and treatments unique to children in the inpatient, intensive care, and outpatient settings. Application of principles of pulmonary physiology to clinical problems. Students conduct consultations under the supervision of the attending and present a topic of choice. Inpatient rounds and clinics. Prerequisite: PEDS 665, fourth-year medical student standing. (Limit: one student.) Offered: AWSpS.

PEDS 685 P-Pediatric Hematology and Oncology (*, max. 24) *Bernstein* One-on-one teaching plus four weekly didactic sessions. Specific training in techniques and interpretation of bone marrow aspirations, intravenous chemotherapy, transfusions, and laboratory techniques of hematologic evaluation. Self-learning programs available. Prerequisite: PEDS 665. (Two, four, six, or twelve weeks, full-time.) (Limit: one student.) Offered: AWSpS.

PEDS 686 P-Pediatric Cardiology (*, max. 24) *Guntheroth, Kawabori* Emphasis on physical diagnosis and electrocardiography and on clinical knowledge of diagnostic techniques and surgical possibilities for inpatients and outpatients with cardiovascular problems. Opportunity to observe catheterizations and cardiovascular operations. Weekly clinics and twice-daily inpatient rounds. Prerequisite: PEDS 665. (Limit: one student.) Offered: AWSpS.

PEDS 691 P-Advanced Pediatric Clerkship (*, max. 24) *Bennett* Inpatient and/or outpatient experience with responsibilities comparable to intern for patient workup, diagnosis, and care. Available at any one, or combination, of affiliated hospitals, including WWAMI units in Alaska, Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. Prerequisite: PEDS 665. (Limit: two students.) Offered: AWSpS.

PEDS 697 P-Pediatric Special Electives (*, max. 24) *Benett* By specific arrangement, for qualified students, special clerkship externship or research opportunities at institutions other than University of Washington. The faculty can advise of possible opportunities. Obtain special assignment form from Dean's office at least one month before preregistration. Prerequisite: permission of instructor at away site. Offered: AWSpS.

PEDS 699 P-WWAMI Pediatrics Special Electives (*, max. 24) *Bennett* By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department at away site.

Pharmacology

E401 Health Sciences



General Catalog Web page:
www.washington.edu/students/genecat/academic/Pharmacology.html



Department Web page:
depts.washington.edu/phcol/

Pharmacology is the science that deals with the nature of interactions between drugs and biological systems, and with the applications of such interactions to the treatment of disease. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

Graduate Program

Graduate Program Coordinator
J-681F Health Sciences, Box 357280
206-543-9280
phcoladm@u.washington.edu

The Department of Pharmacology offers the Doctor of Philosophy degree. The Master of Science degree may be elected by the student or requested by the department.

Master of Science and Doctor of Philosophy

Admission Requirement: A baccalaureate degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology. Students are selected from the applicant pool based on several criteria, including academic records, recommendations, and previous research experience.

Master of Science

Graduation Requirements: PHCOL 511, 512, and 513 (4 credits each) with a grade of 2.7 or above for each class. PHCOL 519 (laboratory rotations) during the autumn, winter, and spring quarters of the first year. Two advanced pharmacology classes. PHCOL 507 (pharmacology seminar) throughout graduate school. PHCOL 514 (current topics in pharmacology) while enrolled in the pharmacology program or for 3 years, whichever is less. 9 credits of graded, graduate-level courses in other disciplines including physiology, biochemistry, molecular biology, cell biology, immunology. Creditable passage of a comprehensive written exam on general pharmacology.

Students are required to **write and successfully defend a Master's thesis** based on laboratory research work performed while in residence. The amount of research accomplished necessary to obtain the degree will be determined by the Master's thesis committee, to be formed by the student.

Doctor of Philosophy

Graduation Requirements:

PHCOL 511, 512, and 513 (4 credits each) with a grade of 2.7 or above for each class. Enrollment in PHCOL 507 throughout graduate school. PHCOL 514 in the first, second, and third years of graduate study.

PHCOL 519 (laboratory rotations) for autumn, winter, and spring quarters of the first year with the purpose of acquainting the student with various areas of pharmacology and research under investigation within the department. During each quarter, the student carries out a research project in the laboratory of a faculty member. At the end of the quarter, the student gives a presentation on the rotation research project that is

evaluated by the faculty, using the criteria of scientific content, delivery, knowledge of the subject, and organization of material. The student receives a grade and academic credit for PHCOL 519. Students entering into the Ph.D. program with an M.S. degree or equivalent may petition to be allowed to enroll in only one quarter of PHCOL 519 before selecting a lab. Rotations may occur outside the department by special permission only.

Four advanced 2-3 credit graded elective courses in pharmacology (at 500 level) in addition to the 511-513 series are required. Nine graded credits (non-seminar) in physiology, biochemistry, molecular biology, immunology, cell biology or other relevant areas are required. The courses should strengthen the foundation of the student's thesis proposal and must be at the approved 500 level.

Creditable passage of a comprehensive written exam on general pharmacology, to be taken during the summer quarter of the second year, is required. During the first quarter of the third year of study, students take the oral General Exam. This examination is given by the Supervisory Committee. The examination is based in part on an evaluation of the student's proposed research for the dissertation and on his or her knowledge of the major disciplines important to the research. As a result of the examination, the Committee may recommend termination, further work and subsequent reexamination, or approval of the student's performance and candidacy for the Ph.D. degree.

After successful completion of the General Exam, the student devotes most of his or her time to thesis research in the third and subsequent years of study.

The research project for the Ph.D. dissertation is chosen by the candidate and faculty sponsor and approved by the candidate's Supervisory Committee. The research must represent a worthy and fundamental contribution showing originality in concept and implementation.

When the candidate has concluded the research project and prepared a complete copy of the dissertation, the sponsor will obtain approval of the Graduate School and set a date for the Final Examination. The Final Examination is concerned principally with the subject matter of the dissertation, but may include the background and origins of the dissertation problem as well as its practical applications and extrapolations.

Financial Aid

Financial support is offered to students who maintain satisfactory academic progress. Tuition and stipends are provided by National Institutes of Health training grants, University of Washington teaching assistantships, individual research grants, and fellowships from private sources.

Faculty

Chair

William A. Catterall

Professors

Beavo, Joseph A. * 1977; PhD, 1970, Vanderbilt University; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function.

Bomsztyk, Karol 1983, (Adjunct); MD, 1977, University of Rochester; role of cytokine-induced protein kinases in the regulation of gene expression.

Catterall, William A. * 1977; PhD, 1972, Johns Hopkins University; molecular biology of ion channels, molecular pharmacology and neurobiology.

Chavkin, Charles * 1984; PhD, 1982, Stanford University; cell and molecular mechanisms of psychoactive opiate drugs to understand normal and pathophysiology.

Hol, Wilhelmus G. J. * 1992, (Adjunct); PhD, 1971, University of Groningen (Netherlands); protein crystallography, drug design, vaccine development, and protein engineering.

Horita, Akira *, (Emeritus); PhD, 1954, University of Washington; neuropsychopharmacology.

Krebs, Edwin G. * 1977, (Emeritus); MD, 1943, Washington University; intracellular signaling mechanisms involving protein phosphorylation.

McKnight, G. Stanley * 1979; PhD, 1976, Stanford University; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches.

Moon, Randall T. * 1985; PhD, 1982, University of Washington; embryonic development; signal transduction; cancer biology.

Nathanson, Neil M. * 1979; PhD, 1975, Brandeis University; neurobiology; molecular analysis of neural signal transduction by muscarinic and neurokinin receptors.

Palczewski, Krzysztof * 1992, (Adjunct); MS, 1980, PhD, 1986, Technical University of Wrocław (Poland); visual transduction.

Storm, Daniel R. * 1978; PhD, 1971, University of California (Berkeley); molecular basis of neuroplasticity; cAMP and Ca²⁺ signal transduction systems in the CNS.

Tempel, Bruce L. 1988; PhD, 1983, Princeton University; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function.

Vincenzi, Frank F. * 1967; PhD, 1965, University of Washington; membrane transport, autonomic and cardiovascular pharmacology.

Watson, Eileen L. * 1972, (Adjunct); PhD, 1970, University of Utah; salivary gland physiology and regulation.

Associate Professors

Halpern, Lawrence M. * 1965; PhD, 1961, Albert Einstein College of Medicine; neuropharmacology.

Hamblin, Mark W. 1990, (Adjunct); PhD, 1982, MD, 1982, University of California (San Diego); molecular and cell biology of serotonin receptors, geriatric psychiatry.

Assistant Professors

Bajjalieh, Sandra M. * 1995; PhD, 1989, University of Wisconsin; molecular neurobiology.

Cook, David G. * 1998, (Adjunct Research); PhD, 1991, Yale University; molecular mechanisms of Alzheimer's disease.

Muchowski, Paul J. 2001; PhD, 1998, University of Washington; molecular chaperones, neurodegeneration.

Stella, Nephi * 1999; PhD, 1995, Ecole Polytechnique Federale De Lausanne; microglia cells activation: involvement of endogenous cannabinoid ligands and their allied receptors.

Wang, Edith H. * 1996; PhD, 1991, Columbia University; regulation of genes that control cellular proliferation and differentiation.

Xia, Zhengui * 1987, (Adjunct); MS, 1985, Wuhan University (China), PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

PHCOL 401 General Pharmacology I (2-4, max. 4)
Wang Principles governing drug-receptor interactions, dose-effect relationships, drug absorption, distribution, metabolism, and excretion. Drug toxicity, tolerance, allergy, and drug-induced mutagenesis and carcinogenesis. Drugs utilized as antimicrobial agents and cancer chemotherapeutic agents and anti-viral agents. Principles of gene therapy. Offered: A.

PHCOL 402 General Pharmacology II (3/4)
Bajjalieh, Storm General pharmacology of drugs affecting the autonomic and central nervous systems. Prerequisite: PHCOL 401. Offered: W.

PHCOL 403 General Pharmacology III (3/4)
McKnight General pharmacology of drugs affecting the endocrine and cardiovascular systems. For pharmacy students and other undergraduates. Prerequisite: PHCOL 402. Offered: Sp.

PHCOL 434 General Pharmacology (2)
Halpern, Watson Lectures 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. Offered: A.

PHCOL 435 General Pharmacology (2)
Halpern, Watson Lectures 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. Offered: W.

PHCOL 498 Undergraduate Thesis (*) Offered: A.

PHCOL 499 Undergraduate Research (*)
Participation in departmental research projects. Offered: AWSpS.

PHCOL 507 Pharmacology Seminar (1)
Presentation of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on results of completed research. Prerequisite: permission of instructor. Offered: AWSp.

PHCOL 511 General Pharmacology I (1-5, max. 5)
Wang Consideration of principles governing drug-receptor interactions, dose-effect relationships, drug absorption, distribution, metabolism, and excretion. Introduction to drug toxicity, tolerance, allergy, and drug-induced mutagenesis and carcinogenesis. Drugs utilized as antimicrobial agents and cancer chemotherapeutic agents. For graduate students. Prerequisite: organic chemistry, biochemistry, and introductory anatomy and physiology. Offered: A.

PHCOL 512 General Pharmacology II (1-5, max. 5)
Bajjalieh, Storm General pharmacology of drugs affecting the autonomic and central nervous systems with an emphasis on current research approaches to understanding the basic mechanisms of drug action. For graduate students. Prerequisite: PHCOL 511 or permission of instructor. Offered: W.

PHCOL 513 General Pharmacology III (1-5, max. 5)
McKnight General pharmacology of drugs affecting the endocrine and cardiovascular systems. For graduate students. Prerequisite: PHCOL 511, PHCOL 512, or permission of instructor. Offered: Sp.

PHCOL 514 Current Topics in Pharmacology (1)
McKnight Current research related to the mechanisms of drug action presented in a seminar format. Presentations include relevant background material as well as detailed experimental results taken from current research articles. Prerequisite: permission of instructor. Offered: AWSp.

PHCOL 515 General Pharmacology Laboratory (*, max. 9)
Laboratory course for professional and graduate students who wish to do independent laboratory research under the direction of a specific faculty member. Prerequisite: permission of instructor. Offered: AWSp.

PHCOL 519 Introduction to Laboratory Research in Pharmacology (4)
Storm On a rotation basis students carry out individual research projects in the laboratories of different faculty members. At the end of each quarter students make formal presentations of their work. For first-year graduate students in pharmacology. Offered: AWSpS.

PHCOL 527 Drug Metabolism (3)
Rettie Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Open to medical and graduate students. Prerequisite: one year graduate, medical, or dental biochemistry, or permission of instructor. Offered: jointly with MEDCH 527; odd years; W.

PHCOL 529 Ion Channel Pharmacology (2)
Catterall, Tempel Current topics in ion channel structure, function, genetics, and pharmacology, including consideration of role in electrical signaling in cell membranes and information transfer and processing in nervous system, inherited diseases of ion channels, and sites and mechanisms of action of drugs and toxins. Prerequisite: CONJ 532 and CONJ 536 or permission of instructor. Offered: odd years; A.

PHCOL 530 Neuronal Signaling Pathways (2)
Beavo, Pham, Storm, Xia Advanced consideration of the molecular events between drug or hormone binding to receptors and the resulting responses. Emphasizes roles played by signal transduction pathways in regulation of synaptic plasticity, memory formation, neuronal apoptosis and developmental neurobiology. Prerequisite: UCONJ 532 or permission of instructor. Offered: even years; W.

PHCOL 531 Genetic Analysis of Signaling Systems (3)
McKnight, Moon Current topics involving signal transduction are discussed with an emphasis on genetic analysis of multicellular systems and creative experimental design. Prerequisite: 9 credits of graduate-level courses in molecular and cellular biology, biochemistry, or genetics, or permission of instructor. Offered: odd years; Sp.

PHCOL 534 Molecular Basis of Addictive Drug Action (2)
Chavkin, Mackie, Stella Advanced consideration and discussion of current literature addressing the basis of opiate, psychostimulant, and cannabinoid effects on signal transduction events, electrical activity of neurons, and drip-motivated behaviors in animal models of human drug abuse. Prerequisite: PHCOL 512 or permission of instructor. Offered: even years; A.

PHCOL 535 Transcriptional Control in Human Disease (2)
Bomsztyk, Wang Advanced consideration and discussion of the mechanisms regulating transcription/gene expression and of aberrant transcription factors which disrupt this process found in cancer and other human diseases. Prerequisite: PHCOL 512 or permission of instructor. Offered: even years; Sp.

PHCOL 536 Free Radicals in Health and Disease: A Pharmacological Perspective (2) *Hinds, Vincenzi* Exploration of chemistry and properties of free radicals and related reactive-oxygen and nitrogen species. Review of biological effects of free radicals and reactive oxygen and nitrogen species with a view toward pharmacological intervention. Analysis of literature implicating free radicals in disease processes. Prerequisite: permission of instructor. Offered: odd years; Sp.

PHCOL 550 An Overview of Faculty Research (1) *Wang* Reviews research topics currently being studied in pharmacology. Student reads articles published on each topic. Credit/no credit only. Prerequisite: first-year student standing in pharmacology. Offered: A.

PHCOL 560 Regulation of Cell Function by Cyclic Nucleotide Phosphodiesterases (1) *Beavo* Discussion of research strategies, methodologies, and literature relating to regulation of cyclic nucleotide levels in the cell. Emphasis on practical problem solving, data analysis, and presentation of methods important to understanding published data and designing new experiments in this area of research. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 561 Molecular Properties of Ion Channels (1) *Catterall* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of sodium and calcium channels and the mechanism of action of drugs on them. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 562 Regulation of Synaptic Physiology (1) *Chavkin* Discussion of research strategies and methodologies involved in the regulation of signal transduction and synaptic physiology. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 563 Signal Transduction Mechanisms in Neuroplasticity and Neuron Growth (1) *Storm* Discussion of research strategies, methodologies, and literature relating to signal transduction mechanisms important for neuroplasticity and regulation of neuron growth in the central nervous system. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 564 Cellular Regulation by Protein Kinases (1) *McKnight* Analysis of research problems, techniques, and emerging concepts in the study of the function of protein kinases. Emphasis on critical evaluation of research and development of presentation skills. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 565 Intercellular Signaling in Development (1) *Moon* Molecular genetic approaches to dissecting the roles and mechanisms of intracellular signaling during development. Emphasis on vertebrate genes related to *Drosophila* segment polarity genes. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 566 Molecular Pharmacology of Neurotransmitter and Neurokinin Receptors (1) *Nathanson* Discussion of research strategies and methodologies in the areas of molecular neurobiology and signal transduction of muscarinic receptors, G-proteins, and neurokinin receptors. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work.

Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 567 Mechanisms of Carcinogenesis (3) *Xia* Lectures/presentations of biochemical and molecular basis of carcinogenesis induced by environmental agents, including approaches to identification of carcinogens. Role of cell proliferation and cell death (apoptosis) in cancer formation and cancer treatment. Molecular mechanisms that regulate proliferation and apoptosis. Prerequisite: ENV H 516, ENV H 405, or permission of instructor. Offered: jointly with ENV H 567; A.

PHCOL 568 Pharmacology of Free Radicals (1) *Vincenzi* Advanced considerations of current literature and experimental design, implementation and interpretation of research dealing with the effects of reactive oxygen species and free radicals on cell membranes and cells. Discussion of the relationships of such phenomena to human disease and the effects of drugs thereon. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 569 Molecular Genetics of Potassium Channel Function (1) *Tempel* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of potassium channel genes and their role in behavior as studied in mutant mice. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 571 Molecular Mechanisms of Neurosecretion (1) *Bajjalieh* Discussion of research strategies, methodologies, and literature relating to regulation of cyclic nucleotide levels in the cell. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor.

PHCOL 572 Transcriptional Regulation of Growth Control Genes (1) *Wang* Discussion of research strategies, methodologies, and literature relating to proliferative growth control, cellular differentiation, and gene expression. Emphasis on practical problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor.

PHCOL 573 Signaling Systems Linked to Neuroinflammation (1) *Stella* Discussion of research strategies, methodologies and literature related to neuroinflammation, microglial cell activation, and the cannabinoid signaling pathway. Emphasis on solving practical problem, data analysis, and presentation. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 574 Molecular and Cellular Basis of Chaperone Function and Protein Misfolding Diseases (1) *Muchowski* Analysis of research problems, techniques and emerging concepts in the study of the molecular chaperones and protein misfolding diseases. Emphasizes experimental problem solving, data analysis, and development of presentation skills. Prerequisite: permission of instructor. Offered: AWSpS.

PHCOL 600 Independent Study or Research (*) Pharmacology graduate students only. Offered: AWSpS.

PHCOL 700 Master's Thesis (*) Pharmacology graduate students only. Offered: AWSpS.

PHCOL 800 Doctoral Dissertation (*) Pharmacology graduate students only. Offered: AWSpS.

Physiology and Biophysics

G424 Health Sciences



General Catalog Web page:
www.washington.edu/students/genca/academic/Physiology_Biophys.html



Department Web page:
depts.washington.edu/pbiopage/

Physiology deals with the processes, activities, and phenomena incidental to, and characteristic of, life and living organisms. Based upon physics, chemistry, and mathematics, physiology interlocks closely with the other basic medical sciences—anatomy, molecular biology, immunology, biochemistry, pharmacology, and pathology—and with psychology. Research in physiology is accomplished by analyzing the molecular, cellular, and integrative properties of the system under study. 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.

Graduate Program

Graduate Program Coordinator
G424 Health Sciences, Box 357290
206-685-0519
pbiou@u.washington.edu

The Department of Physiology and Biophysics offers advanced instruction and training leading to both the Master of Science and Doctor of Philosophy degrees. Students aspiring only to the M.S. degree are rarely accepted. Students pursuing a Ph.D. degree in physiology and biophysics may emphasize molecular and cellular physiology, biophysics, neurobiology, respiratory physiology, or endocrinology. Studies leading to the doctoral degree require five to six years to complete. The first year is spent acquiring a broad knowledge of physiology via a sequence of courses and laboratory rotations. After selection of a special area of study, the second year is spent taking advanced seminars in the area of specialization and developing a thesis proposal. After admission to candidacy, the latter years are spent pursuing the area in depth and completing an original-research project.

Individuals with graduate degrees in physiology and biophysics often pursue careers in teaching and research in colleges and universities and in biotech industries. With additional training, graduates have been successful in medicine, law, creative writing, and high-level computer programming.

The department participates in interdisciplinary Ph.D. degree programs in Neurobiology and Behavior, and in Molecular and Cellular Biology.

Special Requirements

Admission to the physiology program normally requires a baccalaureate degree in biochemistry, biology, chemistry, engineering, genetics, mathematics, molecular biology, neuroscience, physics, or psychology.

Graduate Record Examination scores are required as part of the application. No subject tests are required.

Students are normally admitted to the graduate program in the autumn quarter. Applications and all relevant material should be submitted by January 15.

Research Facilities

The department is well equipped to provide instruction and research training in cellular and molecular physiology, neurobiology, membrane biophysics, respiratory physiology, muscle biophysics, endocrinology, reproduction, and physiological psychology. The facilities of the Regional Primate Research Center, adjacent to the department, are available to qualified trainees who need to use primates in their research.

Faculty

Chair

Stanley C. Froehner

Professors

Anderson, Marjorie E. * 1971; PhD, 1969, University of Washington; physiology of basal ganglia and thalamus; neural control of movement.

Berger, Albert J. * 1978; MA, 1965, PhD, 1967, Princeton University, PhD, 1976, University of California (San Francisco); neural and chemical control of respiration, neurobiology, synaptic transmission.

Binder, Marc D. * 1978; PhD, 1974, University of Southern California; organization of spinal reflexes.

Blinks, John R. * 1990; MD, 1955, Harvard University; muscle calcium, properties of calcium-regulated photoproteins.

Bothwell, Mark A. * 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology.

Brengelmann, George L. * 1966, (Emeritus); PhD, 1967, University of Washington.

Carlson, Steven S. * 1985; PhD, 1975, University of California (Berkeley); molecular and cellular physiology of synaptic transmission.

Conley, Kevin E. * 1988; PhD, 1983, University of Wisconsin; muscle metabolism and energetics in vivo.

Crill, Wayne E. * 1967; MD, 1962, University of Washington; properties of spinal and cortical neurons, mechanisms of repetitive firing of CNS neurons.

Detwiler, Peter B. * 1977; PhD, 1970, Georgetown University; physiology of photoreceptors.

Feigl, Eric O. * 1969; MD, 1958, University of Minnesota; cardiovascular physiology, coronary and cerebral circulation.

Fetz, Eberhard * 1975; PhD, 1966, Massachusetts Institute of Technology; cortical regulation of movement.

Froehner, Stanley C. 2000; PhD, 1973, California Institute of Technology; molecular mechanisms of synapse formation and muscle disease.

Fuchs, Albert F. * 1969; PhD, 1966, Johns Hopkins University; oculomotor physiology, vision.

Gordon, Albert M. * 1964, (Emeritus); PhD, 1961, Cornell University; skeletal and cardiac muscle physiology/biophysics.

Hildebrandt, Jacob * 1966; PhD, 1966, University of Washington; respiratory physiology.

Hille, Bertil * 1968; PhD, 1967, Rockefeller University; receptors and ion channels of excitable membranes; cell signaling; intracellular calcium dynamics.

Hornbein, Thomas F. * 1963; MD, 1956, Washington University; physiology, biophysics.

Kennedy, Thelma T. * 1958, (Emeritus); PhD, 1955, University of Chicago.

Kushmerick, Martin J. * 1988; MD, 1963, PhD, 1966, University of Pennsylvania; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy.

Mackie, Kenneth P. * 1987, (Adjunct); MD, 1984, Yale University; molecular and cell biological studies of cannabinoid receptor signaling.

Patton, Harry D. 1947, (Emeritus); PhD, 1943, MD, 1946, Yale University.

Powers, Randall K. 1988; PhD, 1982, University of Washington; spinal cord neurophysiology.

Ransom, Bruce Robert * 1995, (Adjunct); PhD, 1972, MD, 1972, Washington University; neurology, neuroscience research.

Rowell, Loring B. * 1963, (Emeritus); PhD, 1962, University of Minnesota.

Rubel, Edwin W. * 1986; PhD, 1969, Michigan State University; developmental neurobiology, with special emphasis on vertebrate auditory system development.

Scher, Allen M. * 1950, (Emeritus); PhD, 1951, Yale University.

Schwandt, Peter C. * 1974, (Emeritus); PhD, 1972, University of Washington.

Smith, Orville A. * 1958, (Emeritus); PhD, 1953, Michigan State University.

Stahl, William L. * 1975; PhD, 1963, University of Pittsburgh; neurochemistry of brain ATPase systems.

Steiner, Robert A. * 1977; PhD, 1975, University of Oregon; neuroendocrinology, neuroscience, endocrinology.

Stirling, Charles E. * 1968, (Emeritus); PhD, 1966, State University of New York (Upstate Medical Center).

Teller, Davida Y. * 1965; PhD, 1965, University of California (Berkeley); vision, psychophysics, development of vision.

Towe, Arnold L. * 1953, (Emeritus); PhD, 1953, University of Washington.

Van Citters, Robert L. * 1962, (Emeritus); MD, 1953, University of Kansas; cardiovascular physiology.

Winn, H. Richard * 1983, (Adjunct); MD, 1968, University of Pennsylvania; physiology of cerebral blood flow regulation.

Winn, Robert K. 1984; PhD, 1974, University of Washington; pulmonary physiology, neutrophil immigration and monoclonal antibody.

Zagotta, William N. * 1993; PhD, 1989, Stanford University; molecular mechanisms of ion channel function.

Associate Professors

Babcock, Donner 1986; PhD, 1971, Oregon State University; ion channels of sperm cells.

Cunningham, Susanna L. * 1978, (Adjunct); MN, 1969, PhD, 1978, University of Washington; risk factors for atherosclerotic cardiovascular disease.

Giniger, Edward Scott * 1994; PhD, 1988, Harvard University; neural development, mechanism of axon guidance, genetic specification of brain structure.

Glenny, Robb * 1987; MD, 1984, University of Virginia; determinants of regional pulmonary blood flow and ventilation distribution.

Gorman, Mark 1997; PhD, 1979, University of Michigan; control of coronary blood flow.

Landau, Barbara R. 1962, (Emeritus); MS, 1949, PhD, 1956, University of Wisconsin.

Modell, Harold I. 1981, (Affiliate); PhD, 1971, University of Mississippi.

Shadlen, Michael N. * 1995; PhD, 1985, University of California (Berkeley), MD, 1988, Brown University; neurobiology of vision and cognition.

Spain, William * 1981; MD, 1977, Columbia University; signal transduction in the central nervous system.

Wordeman, Linda * 1994; PhD, 1988, University of California (Berkeley); mitosis and myofibril formation.

Assistant Professors

Gordon, Sharona E. * 1993; PhD, 1994, Brown University; molecular mechanisms of ion channel gating in visual and olfactory transduction.

Jagadeesh, Bharathi * 1999; PhD, 1993, Northwestern University; neural basis of visual learning and memory.

Koh, Duk-Su 1995, (Research); PhD, 1992, University of Leipzig (Germany); regulation of exocytosis.

Perlmutter, Steve I. 1991, (Research); PhD, 1991, Northwestern University; neural control of movement.

Rieke, Frederick Martin * 1997; PhD, 1991, University of California (Berkeley); sensory signal processing and computation.

Santana, Luis F. * 2001; PhD, 1996, University of Maryland; molecular basis of heart failure via mouse genetic model.

Senior Lecturer

Linder, Thomas M. 1982; PhD, 1971, University of Washington.

Lecturer

Melby, Anna 1996; PhD, 1995, University of Oregon.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CONJ 401, 402, 403 Human Anatomy and Physiology (4, 4, 4) Linder, Melby See Conjoint Courses.

P BIO 405- Human Physiology (4-) Wordeman Intensive coverage of physiology through lectures, conference. Autumn Quarter: excitable tissue, skeletal muscle; spinal reflex; cardiovascular, respiratory physiology; acid base balance; autonomic nervous system; temperature regulation. Winter Quarter: renal, body fluids; neuroendocrinology; reproductive, gastrointestinal, neurophysiology. Required for dental, graduate nursing, and bioengineering students. Also offered for graduate students. Offered: A.

P BIO -406 Human Physiology (-4) Hlastala Intensive coverage of physiology through lectures,

conference. Autumn Quarter: excitable tissue, skeletal muscle; spinal reflex; cardiovascular, respiratory physiology; acid base balance; autonomic nervous system; temperature regulation. Winter Quarter: renal, body fluids; neuroendocrinology; reproductive, gastrointestinal, neurophysiology. Required for dental, graduate nursing, and bioengineering students. Also offered for graduate students. Offered: W.

P BIO 424 Vision and Its Physiological Basis (5) NW Teller Behavioral neurobiology of human vision: color vision, acuity and spatial vision, light and dark adaptation, visual development. Correlation of visual functioning with known optical, biochemical, physiological, and anatomical substrates. Prerequisite: either PSYCH 101, PSYCH 102, BIOL 202, or ZOOL 301. Offered: jointly with PSYCH 424; W.

P BIO 498 Undergraduate Thesis (*) Offered: A/WSpS.

P BIO 499 Undergraduate Research (*) Offered: A/WSpS.

P BIO 505 Topics in Physiology (0.5) Topics include excitation-contraction coupling, muscle structure, and molecular basis of contraction, regulation of contraction, muscle mechanisms, energetics, and adaptation. Emphasis on skeletal muscle with some discussion of cardiac and smooth muscle. Series of six lecture discussions. Prerequisite: first-year P BIO graduate student. Offered: A.

P BIO 507 Cardiovascular and Respiratory Physiology (3) Cardiovascular physiology: the heart, microcirculation, hemodynamics, regional circulation, and reflex integration. Respiratory physiology: the lung, pulmonary circulation, alveolar ventilation, gas exchange, control of breathing, acid-base regulation, exercise. Offered: W.

P BIO 508 Introduction to Laboratory Research in Physiology (2-5) Students participate in the performance of ongoing projects in designated research laboratories. Emphasis is on experimental design, methodology and techniques. For first- and second-year graduate students in physiology and biophysics to provide a basis for future independent research. Offered: A/WSpS.

P BIO 509 Neuroendocrinology (3) Steiner Emphasizes the cellular and molecular aspects of several topics in neuroendocrinology, including neuropeptide genes, reproduction, steroid hormone regulation of gene expression, mechanisms of hormone action, endocrine rhythms, and neural oscillations. Prerequisite: either BIOL 201, BIOL 202, and BIOL 203, or BIOL 180, BIOL 200, and BIOL 220; BIOC 440, BIOC 441, BIOC 442 or permission of instructor. Offered: jointly with NEUBEH 541; W.

P BIO 510 Physiology Survey (2) Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: A.

P BIO 511 Physiology Survey (2) Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: W.

P BIO 512 Physiology Survey (2) Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: Sp.

P BIO 513 Practicum in Teaching Physiology and Biophysics (4) Students undertake instructional material development, presentation of materials and develop problem-solving techniques. Credit/no credit only. Offered: AW.

P BIO 516 Physiological Proseminar (7) Hlastala Guided survey of the experimental literature in cardiovascular and respiratory physiology. Course conducted as seminar with oral analysis of assigned papers and topics. Prerequisite: permission of instructor. Offered: A.

P BIO 518 Research Topics in Cardiovascular Physiology (1) Feigl Graduate students and faculty members present and discuss current literature and research. Prerequisite: permission of instructor.

P BIO 519 Membrane and Muscle Biophysics Seminar (1) Hille Lectures on current research topics in cell membrane function and muscle contraction. Credit/no credit only. Prerequisite: permission of instructor. Offered: Sp.

P BIO 520 Physiology Seminar (*) Selected topics in physiology. Prerequisite: permission of instructor.

P BIO 521 Biophysics Seminar (*) Selected topics in biophysics. Prerequisite: permission of instructor.

P BIO 522 Selected Topics in Respiratory Physiology (1-3, max. 3) Hildebrandt Advanced seminar on selected topics, including pulmonary mechanics, gas exchange, lung fluid balance, regulation of breathing, pulmonary circulation, respiration in the neonate, liquid breathing, airway dynamics, lung structure and development, cardiopulmonary interactions, exercise physiology. Prerequisite: permission of instructor. Offered: A/WSpS.

P BIO 523 Heat Transfer and Temperature Regulation (2-5, max. 5) Brengelmann Thermal exchange between the body surface and the environment. Heat production and distribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite: permission of instructor.

P BIO 525 Readings in Advanced Physiology and Biophysics (*) 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. Prerequisite: permission of instructor. Offered: A.

P BIO 526 Readings in Advanced Physiology and Biophysics (*) 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. Prerequisite: permission of instructor. Offered: W.

P BIO 527 Readings in Advanced Physiology and Biophysics (*) 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. Prerequisite: permission of instructor. Offered: SpS.

CONJ 531 Signaling Mechanisms in Excitable Cells (1.5) See Conjoint Courses.

P BIO 541 Motor Systems I: Peripheral, Spinal, and Cortical Mechanisms (3) Binder, Fetz Discussion of research papers on the physiology of the motor unit and the spinal and cortical neurons that control motor unit activity. Prerequisite: NEUBEH 501-503 or permission of instructor.

P BIO 542 Motor Systems II: Brainstem Mechanisms (3) Anderson, Fuchs Critical discussion of research papers and resulting concepts regarding the roles of various brainstem systems in controlling somatic and ocular movements. Each student is responsible for leading the discussion of one topic. Prerequisite: NEUBEH 502 and NEUBEH 503 or equivalent and permission of instructor.

P BIO 547 Readings in Cell Physiology (2/3, max. 15) Hille Reading and discussion of research literature on excitable cells. Emphasis on membrane excitability, transport, contractility, growth factors, and extracellular matrix. Topics vary. Prerequisite: CONJ 501 or equivalent. Offered: W.

P BIO 560 Muscle and Cell Motility (*) Selected topics in muscle contraction and cell motility. Reading of original papers. Presentations by students and faculty. Topics vary. Prerequisite: permission of instructor.

P BIO 594 Neurological Study Unit (0.5) Faculty and student discussion of neurological topics illustrated with clinical cases or demonstrations include the following: physiology, neuroanatomy, neurology, neuropathology, neurosurgery, and psychiatry. Credit/no credit only. Prerequisite for medical students: HUBIO 532. Offered: W.

P BIO 600 Independent Study or Research (*) Offered: A/WSpS.

P BIO 700 Master's Thesis (*) Offered: A/WSpS.

P BIO 800 Doctoral Dissertation (*) Offered: A/WSpS.

Psychiatry and Behavioral Sciences

BB1644 Health Sciences

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/Psychiatry.html

 *Department Web page:*
depts.washington.edu/psychweb/

pbsci@u.washington.edu

The department offers course work, clinical training, and research opportunities for undergraduate students, medical students, graduate physicians, and graduate students in allied health programs such as psychology, social work, and psychiatric nursing.

A biobehavioral approach is emphasized, which incorporates intrapersonal, interpersonal, and sociocultural factors. Intrapersonal factors include emotion, perception, cognition, psychodynamics, neurochemistry, neuroanatomy, neurophysiology, genetics, and the developmental and aging processes. Interpersonal factors focus upon dyadic, familial, and group interactions. Sociocultural factors include the cultural, social, institutional, and community systems as well as the environment and epidemiology of health and disease.

Graduate Program

The medical school curriculum is divided into a core (basic) curriculum and an elective curriculum. Within its core curriculum the Department of Psychiatry and Behavioral Sciences offers material covering learning theory, cognition, memory, perception, neuropharmacology, social growth and development, epidemiology of health and disease, psychopathology, psychotherapy, and neuropsychiatry and behavioral medicine, as well as training in interviewing skills

and assessment techniques. Its elective program includes a variety of clinical experiences and advanced didactics and seminars designed to further the knowledge and skills developed within the basic curriculum. In addition, the department encourages research and other scholarly pursuits by students in areas of interest to them. Stipends are available for research studies.

Residency Training in Psychiatry

Contact: Deborah Cowley

A four-year residency for medical school graduates and a three-year post-internship residency prepares physicians for Specialty Board Certification in Psychiatry. Clinical rotations on inpatient, outpatient, emergency, and consultation/liaison services are augmented by individual supervision and didactic lectures. With the program's integrative orientation, residents become proficient in psychotherapy, psychopharmacology, and community liaison with patients of all ages. Fellowships in child, geriatric, addiction, community, forensic and consultation-liaison psychiatry, and psychiatric neuroscience are available.

Clinical Psychology Internship Program

Contact: Alexander Troster

A one-year internship in clinical psychology accredited by the American Psychological Association is offered as an interdepartmental program. This internship is open to candidates for the doctorate in clinical psychology from graduate programs accredited by the American Psychological Association.

Postdoctoral Fellowship Training

Contact: Richard Veith

Postdoctoral fellowships for advanced clinical and research training in behavioral medicine, broadly construed, are also offered.

Faculty

Chair

Richard C. Veith

Professors

Avery, David H. 1980; MD, 1972, Washington University; treatment of depression, seasonal affective disorder, transcranial magnetic stimulation.

Aylward, Elizabeth H. 1997, (Adjunct); MA, 1976, University of Connecticut, PhD, 1982, Cornell University; structural and functional neuroimaging in neuropsychiatric disorders, developmental psychology.

Becker, Joseph * 1965, (Emeritus); PhD, 1958, Duke University; psychosocial aspects of depression.

Bird, Thomas D. 1976, (Adjunct); MD, 1968, Cornell University; neurology, neurogenetics.

Borson, Soo 1972; MD, 1969, Stanford University; geriatric psychiatry.

Bowden, Douglas M. 1969; MD, 1965, Stanford University; neural substrates of learning and memory.

Breitner, John 2002; MD, 1970, University of Pennsylvania, MPH, 1979, Johns Hopkins University; geriatric psychiatry.

Buchwald, Dedra S. 1987, (Adjunct); MD, 1981, University of California (San Diego); internal medicine.

Calsyn, Donald 1981; PhD, 1979, University of Washington; drug abuse treatment, AIDS prevention.

Carr, John E. * 1963, (Emeritus); PhD, 1963, Syracuse University; phobic disorders, patient therapist matching and therapy outcome, cross-cultural psychopathology.

Cowley, Deborah S. 1982; MD, 1980, University of Pennsylvania; anxiety disorders, psychiatric disorders during pregnancy and postpartum.

Dager, Stephen R. * 1979; MD, 1978, University of Nebraska; application of functional brain imaging techniques to investigate neuropsychiatric disorders.

Dikmen, Sureyya S. * 1974, (Adjunct); PhD, 1973, University of Washington; clinical neuropsychology, traumatic brain injury.

Doerr, Hans O. * 1967, (Emeritus); PhD, 1965, Florida State University; psychophysiology of central and autonomic nervous systems, neuropsychology.

Donovan, Dennis 1981; MA, 1972, Western Washington University, PhD, 1980, University of Washington; cognitive-behavioral factors in substance abuse and addictive behaviors.

Dunner, David L. 1978; MD, 1965, Washington University; diagnosis and treatment of depression.

Heiman, Julia R. * 1980; PhD, 1975, State University of New York (Stony Brook); sexuality and sexual relationships, prevention and treatment of family abuse.

Horita, Akira * 1950, (Emeritus); PhD, 1954, University of Washington; neuropsychopharmacology.

Hunt, D. Daniel 1977; MD, 1973, Cornell University, MBA, 1977, University of Pennsylvania; medical education, career choice.

Johnson, Merlin 1982, (Emeritus); MD, 1947, University of Iowa.

Katon, Wayne J. * 1976; MD, 1976, University of Oregon; depression, panic disorder, somatization, adherence.

Linehan, Marsha M. * 1977, (Adjunct); PhD, 1971, Loyola University (Chicago); behavioral assessment and therapy, suicide and parasuicide, borderline personality disorders.

McCann, Barbara S. * 1986; MS, 1982, PhD, 1984, Rutgers University; behavior change, health, nutrition, psychological stress, cardiovascular disease, diabetes, obesity.

McCauley, Elizabeth 1979; PhD, 1973, State University of New York (Buffalo); developmental psychopathology focused on affective disorders, behavioral genetics.

Meltzoff, Andrew N. * 1977, (Adjunct); PhD, 1976, Oxford University (UK); perceptual, cognitive and social development in infants.

Peskind, Elaine R. 1986; MD, 1986, University of Washington; neuroendocrinology of aging, Alzheimer's and PTSD, neurobiology of noncognitive behavioral problems.

Raskind, Murray 1970; MD, 1968, Columbia University; aging and Alzheimer's disease.

Ries, Richard K. 1975; MD, 1975, Northwestern University; severe mental illness treatment, addictions, health services outcomes.

Robinson, Nancy M. * 1969, (Emeritus); PhD, 1958, Stanford University; psychology.

Roy-Byrne, Peter 1986; MD, 1978, Tufts University; diagnosis and psychopharmacology of anxiety, depression, and ADHD in adults.

Speltz, Matthew L. 1981; MA, 1975, Western Washington University, PhD, 1980, University of Missouri; developmental psychotherapy, family therapy, pediatric behavioral medicine.

Streissguth, Ann P. 1972; MA, 1959, University of California (Berkeley), PhD, 1964, University of Washington; psychology and behavioral teratology.

Teri, Linda * 1984, (Adjunct); PhD, 1980, University of Vermont; controlled clinical trials of caregiving training for patients with Alzheimer's.

Townes, Brenda D. * 1961, (Emeritus); PhD, 1970, University of Washington; psychology.

Trupin, Eric W. 1973; MA, 1973, PhD, 1974, University of Wyoming; psychology.

Tucker, Gary J. 1985, (Emeritus); MD, 1960, Case Western Reserve University; neuropsychiatry.

Turner, Judith A. 1980; MA, 1975, PhD, 1979, University of California (Los Angeles); psychology.

Veith, Richard 1977; MD, 1973, University of Washington; gerontology.

Vitaliano, Peter P. * 1978; PhD, 1975, Syracuse University; psychiatric methodology (epidemiology, design, psychometrics), behavioral medicine.

Vitiello, Michael V. * 1982; PhD, 1980, University of Washington; sleep, sleep disorders, circadian rhythms, aging, behavioral medicine.

Walker, Edward A. 1983; MD, 1983, University of Washington; consultation-liaison psychiatry, medically unexplained physical symptoms.

Ward, Nicholas G. 1975; MD, 1973, Cornell University; treatment resistant mood disorders, psychopharmacology.

Associate Professors

Armstrong, Hubert E. 1966, (Emeritus); PhD, 1963, Syracuse University; clinical psychology.

Barnes, Robert 1977; MD, 1973, University of Utah.

Calderon, Rosemary 1987; PhD, 1988, University of Washington; mental health and deafness, childhood psychopathology, early intervention.

Carlin, Albert S. 1964, (Emeritus); MA, 1961, PhD, 1964, Syracuse University; clinical psychology.

Chaney, Edmund 1977; PhD, 1976, University of Washington; clinical psychology.

Craft, Suzanne * 1994; PhD, 1985, University of Texas (Austin); neuropsychology of attention and memory in development and aging.

Dubach, Mark F. 1978; PhD, 1983, University of Washington; anthropology.

Erickson, Richard C. 1991; PhD, 1969, University of Washington; clinical psychology.

Hamblin, Mark W. 1990; PhD, 1982, MD, 1982, University of California (San Diego); molecular and cell biology of serotonin receptors, geriatric psychiatry.

Kivlahan, Daniel R. * 1983; PhD, 1983, University of Missouri; evaluating assessment, prevention, and treatment approaches for addictive behaviors.

Lampe, Thomas H. 1982; MD, 1977, Indiana University; Alzheimer's disease, post-traumatic stress disorder, neuroendocrinology.

Logsdon, Rebecca G. * 1986, (Adjunct Research); PhD, 1986, Oklahoma State University; geriatric psychology, Alzheimer's disease, caregiving.

376 SCHOOL OF MEDICINE / PSYCHIATRY AND BEHAVIORAL SCIENCES

Maiuro, Roland D. 1978; PhD, 1978, Washington University; clinical psychology.

Maxim, Peter E. 1976; MD, 1966, PhD, 1971, Stanford University; in-patient care.

McClellan, Jon M. 1984; MD, 1984, University of Michigan; child psychiatry.

McFall, Miles E. 1982; MA, 1979, PhD, 1981, University of Montana; clinical psychology.

McCurry, Susan Melancon * 1991, (Adjunct Research); MS, 1977, MS, 1984, PhD, 1991, University of Nevada; dementia, aging, older adults, depression, sleep, psychotherapy intervention research.

Moe, Karen E. 1990, (Research); PhD, 1981, University of Washington; sleep, hormones and cognition in aging; estrogen effects on sleep and circadian rhythms

Murburg, Michele 1982; MD, 1978, Albert Einstein College of Medicine; neurobiology of PTSD, PTSD in special populations, psychiatric consequences of workplace harassment.

Myers, Kathleen M. 1980; MD, 1979, MPH, 1979, University of Hawaii; child and adolescent psychiatry.

Neumaier, John F. 1983; PhD, 1989, MD, 1990, University of Washington; neurobiology of stress and depression; regulation of serotonin receptors.

Pascualy, O. Marcella 1984; MD, 1982, Universidad Javeriana (Colombia); geriatric psychiatry.

Pepping, Mary * 1994, (Adjunct); PhD, 1981, Washington State University; psychosocial outcome after TBI and mild TBI; neuropsychological features of dementia and mild TBI.

Petrie, Eric C. 1990; MS, 1981, University of Virginia, MD, 1985, University of Washington; psychopharmacology, schizophrenia, post-traumatic stress disorder.

Radant, Allen D. 1985; MD, 1985, University of California (Davis).

Raskind, Wendy H. 1982, (Adjunct); PhD, 1977, MD, 1978, University of Washington; medical genetics.

Romano, Joan 1982; MS, 1974, PhD, 1982, University of Pittsburgh; clinical psychology.

Russo, Joan E. 1982, (Research); PhD, 1989, University of Washington; psychiatric outcomes.

Saxon, Andrew J. 1982; MD, 1977, Tufts University; addiction psychiatry.

Scher, Maryonda 1961, (Emeritus); MD, 1954, University of Washington; dissociative disorders/PTSD.

Scott, David T. 1993; PhD, 1978, Yale University; natural history of premature infants, efficacy of early intervention for premature infants.

Simon, Gregory E. 1988, (Research); MD, 1982, University of North Carolina (Chapel Hill), MPH, 1990, University of Washington; mental health services research; primary care.

Sullivan, Mark D. 1985; PhD, 1982, MD, 1984, Vanderbilt University; depression and chronic medical illness, chronic pain, ethics, quality of life.

Sulzbacher, Stephen 1976; MA, 1964, Hollins College (Virginia), PhD, 1971, University of Washington; psychiatry and behavioral sciences.

Syrjala, Karen L. 1985; PhD, 1983, MA, 1983, Boston University; oncology, pain.

Troster, Alexander I. 2000; PhD, 1991, University of California (San Diego), San Diego State University; neuropsychology of movement disorders, cognitive and quality of life outcomes.

Unis, Alan S. * 1987; MD, 1976, University of Pittsburgh; researching the role of dopamine.

Varley, Christopher K. 1974; MD, 1973, University of Washington; attention deficit hyperactivity disorder, pediatric psychopharmacology.

Verhulst, Johan 1977; MD, 1964, Catholic University of Louvain (Belgium); clinical psychiatry, marital therapy.

Villacres, Enrique C. 1981; MD, 1981, Medical College of Wisconsin; signal transduction and role of cAMP cascade proteory and learning.

Wilkinson, Charles W. 1984, (Research); PhD, 1977, University of California (Santa Barbara); neuroendocrine concomitants of aging; Alzheimer's disease, depression.

Wilson, Lawrence G. 1978; MD, 1966, University of Kansas; cultural influences on manifestation of symptoms of psychiatric illness and psychological distress.

Womack, William M. 1969; MD, 1961, University of Virginia; behavioral medicine, pediatric headache, stress/anxiety disorders, juvenile offenders.

Assistant Professors

Comtois, Katherine Ann 1991; PhD, 1992, University of Maryland; services research, borderline personality disorder, women, dual diagnosis.

Dobie, Dorcas J. 1984; MD, 1984, University of Michigan; geriatric psychiatry.

Elliott, Andrew J. 1992; MD, 1992, University of Nevada; HIV/AIDS, psychotic disorders, dialectical behavior therapy.

Fann, Jesse R. 1990; MD, 1989, Northwestern University, MPH, 1995, University of Washington; neuropsychiatry, psycho-oncology, epidemiology, health services research, depression, delirium.

Felker, Bradford 1997; MD, 1987, University of Virginia (Charlottesville).

Grant, Therese M. 1984, (Research); PhD, 1999, University of Washington; fetal alcohol syndrome.

Harris, Victoria L. 1990; MD, 1989, University of British Columbia (Canada); subspecialty ABPN certification in forensic psychiatry.

Iwamoto, Satori 1993, (Adjunct); MD, 1989, Harvard University; dermatology.

Larimer, Mary E. * 1995; PhD, 1992, University of Washington; prevention of alcohol problems among college students.

Leverenz, James B. 1992; MD, 1985, University of Washington; neurology, psychiatry and behavioral sciences, Alzheimer's.

Pham, Tony A. 2000; PhD, 1993, MD, 1993, Baylor University; development and plasticity of neural connections in the mammalian forebrain.

Reoux, Joseph P. 1995; MD, 1985, University of Texas (Houston); addiction psychiatry, substance withdrawal syndromes, pharmacotherapy, clinical guidelines.

Richards, Henry J. 1999, (Research); PhD, 1987, Loyola University; mental health in the criminal justice system.

Rippeth, Julie D. 2001; PhD, 1997, San Diego State University/University of California (San Diego); neuropsychology.

Shores, Molly M. 1989; MD, 1987, University of Washington; geriatric psychiatry.

Simpson, Tracy L. 1997; PhD, 1999, University of New Mexico; post-traumatic stress disorder, addictions.

Sloan, Kevin L. 1992; MD, 1986, University of Chicago; dual disorders/addictions.

Snowden, Mark B. 1990; MD, 1990, University of Washington.

Srebnik, Debra S. 1992; PhD, 1992, University of Vermont; public mental health services research, program and policy evaluation, community psychology.

Stella, Nephi * 1999; PhD, 1995, Ecole Polytechnique Federale De Lausanne; microglia cells activation: involvement of endogenous cannabinoid ligands and their allied receptors.

Szot, Patricia 1987, (Research); PhD, 1987, Oregon State University.

Tsuang, Debby W. 1992; MD, 1988, University of Iowa; genetics of schizophrenia and late-life dementia.

Uldall, Karina K. 1987; MD, 1987, University of Missouri; HIV/AIDS, health services.

Vanderstoep, Ann 1994; PhD, 1997, University of Washington.

Wagner, Amy W. 2000; PhD, 1995, University of Washington.

Whitsett, Stan F. 2001; PhD, 1982, University of Tennessee; child adolescent psychology.

Wingerson, Dane K. 1987; MD, 1987, University of Washington; antipsychotic medications and pharmaco-economic issues.

Zatzick, Douglas F. 2000; MD, 1989, University of California (San Diego); traumatic life events, post-traumatic behavioral and emotional disturbances.

Senior Lecturers

Carmichael Olson, Heather 1986; PhD, 1986, University of Washington.

Dagadakis, Christos S. 1976; MD, 1974, MPH, 1975, University of Washington; emergency psychiatry, mental health managed care, psychiatric disability, stress management.

Lecturer

Kohen, Ruth 1988; MD, 1986, University of Aachen (Germany).

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

CONJ 475 Alcoholism: A Course for Medical Students in the Allied Health Sciences (2) See Conjoint Courses.

PBSCI 498 Undergraduate Thesis (*) Opportunity to complete work on psychiatric research projects or to pursue a specific psychiatric topic in depth, for instance, through library research.

PBSCI 499 Undergraduate Research (*, max. 15)

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.

PBSCI 525 P-Psychiatry and the Law (3)

Goldenberg Concentration on major issues in psychiatry and law. Outside speakers from legal, judicial, and psychiatric communities. Lectures on assessment in forensic settings, competence to stand trial, and criminal responsibility. Discussions on personality disorders and correctional environments. For psychiatric residents and graduate psychology, psychosocial nursing, social work, and law students.

PBSCI 530 P-Developmental Psychoanalytic Psychotherapy (2)

Schimmelbusch Examines how failures of psychological development lead to disorders of regulation of affects and cognition, and how psychoanalytic treatment reinstates normal development. Treatment process viewed from a psychoanalytic and psychobiological perspective. Clinical case discussion integrates theoretical concepts.

PBSCI 535 Modern Concepts of Psychoanalysis (2)

Schimmelbusch Examines childhood developmental stages in light of inborn and environmental determinants. Correlates developmental phases with adult personality functioning. Views emotional development from a psychoanalytic and psychobiological point of view. Clinical case discussion integrates theoretical concepts.

PBSCI 546 Psychosocial Epidemiology (3)

Vander Stoep Application of epidemiological methods to the study of mental illnesses. Topics include occurrence and distribution of mental illness, classification of psychiatric disorders; treatment-based vs. community-based studies; epidemiology of depression and schizophrenia; familial transmission; developmental epidemiology; mental illness and violence. Prerequisite: one course in epidemiology or permission of instructor. Offered: jointly with EPI 546; Sp.

PBSCI 548 P-Aging and Adult Development (1-3, max. 3)

Aging in Western technologically advanced societies frequently involves losses in status, stamina, and economic and social supports. Consideration given to losses among the aged. Students select projects in the area of aging and work at their own levels of expertise and sophistication. Seminar format with guided reading.

PBSCI 591 P-Seminars and Conferences in Psychiatry: Seminar in Clinical Neuropsychology (*)

Introduction to neuropsychological studies of brain-behavior relationships. Exposure to neuropsychological assessment procedures and manifestation of neurocognitive deficits in selected mental and medical disorders, e.g., epilepsy, AIDS, sleep disorders, trauma, toxin exposure, vascular disorders, psychiatric disorders. Develop knowledge of neuropsychological assessment procedures and applications to diverse medical conditions. Prerequisite: psychological assessment experience.

PBSCI 665 P-Basic Clinical Clerkship (12)

Dagadakis, McCreery, Mehta Inpatient clerkship in psychiatry. Students have primary responsibility under the direction of attending psychiatrists and residents for diagnosis and care of patients at University of Washington Medical Center, Harborview Medical Center, or Veterans Administration Hospital. Emergency room, crisis intervention, consultation to patients with psychiatric dysfunction. Familiarity with psychopharmacology and short-term hospitalization emphasized. (Six weeks, full-time.)

PBSCI 666 P-WWAMI Psychiatry and Behavioral Sciences Clerkship (12)

Kletti Rotation aims to increase student's skills in basic psychiatry, social psychiatry, transcultural psychiatry, and community

psychiatry. Orientation is around the diagnosis, treatment, and clinical management of White, Aleut, Indian, and Eskimo children and adults in outpatient, inpatient, and community settings. Third-, fourth-year medical students. Prerequisite: HUBIO 563. (Limit: three students.)

PBSCI 667 P-Basic Psychiatry Clerkship, Boise (12)

Hines Basic psychiatry clerkship at Veterans Administration Medical Center in Boise, Idaho. Fulfills graduation requirement for clerkship in Psychiatry.

PBSCI 668 P-Psychiatry Clerkship, Spokane (12)

Bakker Students work on adult, geriatric, and adolescent inpatient psychiatric units of Sacred Heart Medical Center, following patients after transfer to partial hospitalization or outpatient clinic. Didactics include basic psychiatric diagnosis, treatment, and pharmacotherapy. Prerequisite: completion of HUBIO series; third and fourth-year medical students.

PBSCI 670 P-Clerkship in Consultation/Liaison Psychiatry UWMC (*, max. 24)

Walker Assessment of patients with major psychosocial problems associated with physical disease, including: problems stemming from the way the illness is perceived and experienced, liaison with other clinical disciplines on complex diagnosis and treatment of problems. (Limit: one student; four weeks.) Prerequisite: HUBIO 563; either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

PBSCI 671 P-Clerkship in Consultation/Liaison Psychiatry HMC (*, max. 24)

Elliott Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Limit: two students.)

PBSCI 672 P-Elective Clerkship in Primary Care Psychiatry at Boise VAMC (8/12)

Blackburn, Leone, Marsh Assessment and treatment of patients with acute psychiatric problems in a primary care/rural setting. Consultation work on general medicine and surgery; assessment and dealing with outpatient psychiatric problems as they initially present. Evaluations, crisis intervention strategies, and brief therapies stressed. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks; UW students only.)

PBSCI 673 P-Outpatient Psychiatry Elective (*, max. 24)

Foster Offered at Harborview Outpatient Center. Students function as subinterns, conducting diagnostic interviews, initiating and managing pharmacotherapeutic treatment regimens, and providing crisis intervention, under the supervision of the full-time attending at Psychopharmacology Clinic. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.)

PBSCI 676 P-Inpatient Clerkship in Psychiatry at American Lake VA (8/12)

Chandran For medical students with a defined interest in psychiatry who wish to develop their knowledge and skills in the evaluation, management, and treatment of a wide range of acute and chronic psychiatric conditions requiring inpatient hospital treatment. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.)

PBSCI 677 P-Alcohol and Drug Treatment Clerkship at American Lake VA (8/12)

Lim Student assists in every phase of the substance-abuse treatment, including admission interviews, patient evaluation, problem identification, group and individual psychotherapy, assertiveness training, anger control, human sexuality, medical evaluation and treatment, couples therapy, discharge and aftercare planning. Experience primarily clinical. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.)

PBSCI 678 P-Clerkship in Psychiatric Long-Term Care and Rehabilitation (*, max. 12)

Chandran Two- to six-week clerkship provides learning experiences

in rehabilitation of long-term psychiatric patients with medical illness. Multidisciplinary team approach, working with homeless mentally ill. Diagnostic skills emphasized. Spectrum of diseases (cardiovascular, Huntington's, organic brain syndrome) is such that physical rehabilitation is not an emphasis. Prerequisite: HUBIO 563; either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

PBSCI 680 P-Clerkship in Emergency Psychiatry (*, max. 24)

Gardiner Emphasis on clinical evaluation, acute management, and treatment planning for individual patients. Experience in coordinating these activities with other emergency room personnel, and various hospital and community resources. Emphasis on skills useful to physicians in any specialty. Third- and fourth-year medical students only. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four or six weeks, full-time.)

PBSCI 685 P-Geriatric Psychiatry Clerkship (*, max. 12)

Pascualy Two- to six-week elective (four weeks highly recommended). Participation in the evaluation and care of older persons with psychopathology, such as intellectual impairment and depression, in a variety of settings. Emphasis on improving clinical skills regarding diagnosis and treatment of common behavioral problems in the elderly. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

PBSCI 688 P-Subinternship in General Psychiatry (*, max. 16)

Students function as interns under the supervision of house staff and attending psychiatrists. Further development of their diagnostic and therapeutic skills emphasized. Special areas of interest, such as family intervention, substance abuse, psychoses, neuropsychiatry, community psychiatry, administration, research pursued. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668; permission of instructor. (Four or six weeks, full-time.)

PBSCI 696 P-Advanced Clerkship in Child Psychiatry (*, max. 24)

Varley Provides students an opportunity to participate in evaluation and treatment. Experiences in specialized clinics are also available. It is suggested that the student contact the instructor prior to enrollment. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four or six weeks, full-time. Limit: two students.)

PBSCI 697 P-Psychiatry Special Electives (*, max. 24)

By special arrangement, clerkships, externships, and research opportunities can be made available at the University and other institutions. Students obtain permission from Dr. Hunt before obtaining a special assignment form from the Dean's office one month before advance registration. Students contact affiliating institutions. Does not fulfill the requirement for a basic clerkship in psychiatry.

PBSCI 699 P-WWAMI Psychiatry and Behavioral Sciences Special Electives (*, max. 24)

By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Radiation Oncology

NN106 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/gencat/academic/Radiation_Oncology.html



Department Web page:
www.radonc.washington.edu/

Radiation oncology is the branch of clinical medicine that utilizes high-energy radiation to treat disease, usually cancer. The department consists of three divisions: clinical radiation oncology, medical radiation physics, and experimental cancer biology. Training programs are offered in all three divisions. Research programs in the Department of Radiation Oncology are aimed at the physical and biological mechanisms of interactions between ionizing radiations, and normal and malignant tissues, with particular emphasis on high linear energy transfer (LET) radiation effects. The department is actively involved in radiation treatment planning work particularly in regard to intensity modulated radiation therapy (IMRT). Other programs involve the application of positron emission tomography (PET) to elucidate differences between cancers and normal tissues, and the development of specialized radiopharmaceuticals.

Faculty

Chair

George E. Larramore

Professors

Groudine, Mark * 1982; MD, 1975, PhD, 1976, University of Pennsylvania; chromatin structure and gene activity.

Krohn, Kenneth A. * 1981; PhD, 1971, University of California (Davis); chemistry, radiation oncology.

Laramore, George E. 1976; MS, 1966, PhD, 1969, University of Illinois, MD, 1976, University of Miami (Florida); therapeutic radiology.

Russell, Kenneth J. 1985; MD, 1979, Harvard University; therapeutic radiology.

Wootton, Peter 1964, (Emeritus); HonBSc, 1944, University of Birmingham (UK); medical radiation physics.

Associate Professors

Austin-Seymour, Mary M. 1988; MD, 1978, University of Chicago; therapeutic radiology.

Cho, Paul S. 1990; PhD, 1989, University of California (Los Angeles); medical radiation physics.

Kalet, Ira J. * 1980; PhD, 1968, Princeton University; computer simulation of radiation therapy, artificial intelligence, computer graphics.

Koh, Wui-Jin 1984; MD, 1984, Loma Linda University; therapeutic radiology.

Lindsley, Skyler 1993; MD, 1985, Vanderbilt University; therapeutic radiology.

Phillips, Mark H. 1991; PhD, 1982, University of Wisconsin; medical radiation physics.

Schwartz, Jeffrey L. 1995; PhD, 1979, University of Texas (Dallas); radiation biology.

Wallner, Kent E. 1997; MD, 1981, Ohio State University; therapeutic radiology.

Wilbur, D. Scott 1986; PhD, 1978, University of California (Irvine); radiochemistry.

Assistant Professors

Diaz, Aidnag Z. 2000; MD, 1988, Columbia University.

Douglas, James G. 1988; MD, 1980, Case Western Reserve University.

Gu, Yansong * 2001; PhD, 1994, Thomas Jefferson University; DNA damage signaling and repair pathways.

Yao, Michelle S. 2000; MD, 1993, University of Michigan; radiation oncology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

R ONC 499 Undergraduate Research (*, max. 24)

Austin-Seymour, Cho, Douglas, Einck, Kalet, Koh, Laramore, Lindsley, Ling, Phillips, Rasey, Russell, Schwartz, Stelzer, Wilbur, Yas Opportunities in clinical or laboratory investigation in radiation oncology, radiation physics, or computer-related research. Student participation in ongoing or new projects. Open to students in the biological or physical sciences.

R ONC 695 P-Clinical Cancer Management (*, max. 8)

Koh Participation in the clinical management of patients with cancer, emphasizing a multi-modality approach. Includes clinical assessment, planning of radiation treatment, and follow-up evaluation of patients. Special procedures include three-dimensional treatment planning, implant brachytherapy and intraoperative radiation. Daily teaching conferences with faculty and residents. Prerequisite: MED 665 or permission of instructor.

R ONC 697 P-Radiation Oncology Special Elective (*, max. 24)

Koh By specific arrangement for qualified students, special clerkship, externship or research opportunities can be made at institutions other than the University of Washington. Students should obtain a "Special Assignment" form from the Dean's Office at least one month before advance registration. Prerequisite: permission of instructor.

R ONC 699 P-WWAMI Radiation Oncology Special Electives (*, max. 24)

By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Radiology

RR215 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/gencat/academic/Radiology.html



Department Web page:
www.rad.washington.edu

Diagnostic radiology is that branch of clinical medicine that specializes in the interpretation of various imaging modalities in order to detect, to characterize, and (with increasing frequency) to treat a wide variety of diseases. Historically, x-rays were the first energy source utilized for these purposes, and they

continue to be a mainstay of this discipline. More recently, the armamentarium has grown to include ultrasound, computed tomography, magnetic resonance, and positron-emission tomography. In nuclear medicine, one of radiology's major subspecialties, radionuclides are employed for both diagnostic and therapeutic purposes. Another subspecialty is interventional radiology, wherein aspirations and biopsies, as well as therapeutic procedures such as abscess drainage, tumor embolization, and vascular stents are performed percutaneously.

The Department of Radiology consists of two clinical divisions: diagnostic radiology and nuclear medicine. Both divisions are ably supported by technologists and faculty members in the field of radiation physics. Instruction in radiology is provided for medical students, residents, and fellows as well as for other physicians. The faculty and its teaching and research activities are represented in each of the hospitals affiliated with the University.

Faculty

Chair

Albert A. Moss

Professors

Aylward, Elizabeth H. 1997; MA, 1976, University of Connecticut, PhD, 1982, Cornell University; structural and functional neuroimaging in neuropsychiatric disorders, developmental psychology.

Bassingthwaighe, James * 1975, (Adjunct); MD, 1955, University of Toronto (Canada), PhD, 1964, Mayo Medical School/graduate School; computer analysis of transport mechanisms in blood and tissues.

Bush, William H. 1979; MD, 1967, Oregon Health Sciences University; genitourinary radiology.

Caldwell, James H. 1983, (Adjunct); MD, 1970, University of Missouri; positron emission tomography imaging of myocardial oxygenation, metabolism and sympathetic function.

Chesnut, Charles * 1974; MD, 1966, University of Florida; nuclear medicine.

Cohen, Wendy A. 1987; MD, 1975, Harvard University; neuroradiology.

Conley, Kevin E. * 1988; PhD, 1983, University of Wisconsin; muscle metabolism and energetics in vivo.

Dager, Stephen R. * 1979; MD, 1978, University of Nebraska; application of functional brain imaging techniques to investigate neuropsychiatric disorders.

Eary, Janet F. 1980; MD, 1980, Michigan State University; nuclear medicine.

Effmann, Eric L. 1991; MD, 1967, Indiana University; pediatric radiology.

Eskridge, Joseph M. 1987; MD, 1981, University of Louisville; neuroradiology.

Figley, Melvin M. 1958, (Emeritus); MD, 1944, Harvard University; thoracic and pulmonary radiology.

Godwin, J. David 1986; MD, 1971, Stanford University; pulmonary radiology.

Harley, John D. 1975; MD, 1966, Washington University; general radiology and angiography.

Hayes, Cecil E. 1991; PhD, 1973, Harvard University; physics, MRI.

Haynor, David R. * 1979; PhD, 1971, University of California (Berkeley), MD, 1979, Harvard University; medical image processing and segmentation; image deformation; functional MRI; expression arrays.

Kim, Yongmin * 1982, (Adjunct); MS, 1979, PhD, 1982, University of Wisconsin; computer architecture, imaging systems, medical imaging, computer graphics, multimedia.

Krohn, Kenneth A. * 1981; PhD, 1971, University of California (Davis); chemistry, radiation oncology.

Kushmerick, Martin J. * 1988; MD, 1963, PhD, 1966, University of Pennsylvania; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy.

Lewellen, Thomas * 1967; PhD, 1972, University of Washington; bioengineering, electrical engineering.

Lichtenstein, Joel E. 2000; MD, 1972, Ohio State University; gastrointestinal radiology, computed tomography.

Mann, Frederick A. 1993; MD, 1975, Indiana University; emergency and trauma radiology.

Maravilla, Kenneth R. 1986; MD, 1970, State University of New York (Brooklyn); neuroradiology and neurosurgery.

Minoshima, Satoshi 2000; MD, 1987, PhD, 1994, Chiba University (Japan); nuclear medicine.

Moss, Albert A. 1984; MD, 1967, State University of New York (Upstate Medical Center); gastrointestinal radiology, computed tomography.

Nelp, Wil B. 1962, (Emeritus); MD, 1955, Johns Hopkins University; nuclear medicine.

Nelson, James A. * 1986; MD, 1965, Harvard University; diagnostic radiology with basic research in related sciences.

O'Sullivan, S. Finbarr * 1987, (Affiliate); PhD, 1983, University of Wisconsin; nonparametric curve estimation, inverse problems, radiology.

Richards, Todd L. * 1985; PhD, 1984, University of California (Berkeley); nuclear magnetic resonance imaging, spectroscopy of the brain in demyelinating diseases.

Richardson, Michael L. 1984; MD, 1975, Baylor University; bone and joint radiology and musculoskeletal radiology.

Rohrmann, Charles A. 1975; MD, 1966, University of Washington; gastrointestinal radiology.

Schmiedl, Udo P. 1989; PhD, 1979, MD, 1982, University of Heidelberg (Germany); abdominal imaging, ultrasound, computed tomography.

Stern, Eric J. 1992; MD, 1985, University of Medicine and Dentistry of New Jersey; chest radiology.

Stewart, Brent K. * 1993; PhD, 1988, University of California (Los Angeles); biomedical physics, biomedical image processing, medical imaging, medical information systems.

Talner, Lee B. 1993; MD, 1963, Yale University; genitourinary radiology.

Weinberger, Edward 1979; MD, 1979, Harvard University; pediatric radiology.

Wilson, Anthony J. 1994; MBChB, 1972, Otago University (New Zealand); orthopaedic trauma imaging, teleradiology, digital radiography, MRI/CT.

Yuan, Chun 1991; PhD, 1988, University of Utah; magnetic resonance imaging in medical application.

Associate Professors

Brewer, David K. 1978; MD, 1972, Harvard University; pediatric radiology, angiography, computed tomography.

Dalley, Robert W. 1987; MD, 1982, University of Utah; neuroradiology.

Dubinsky, Theodore J. 1997; MD, 1983, University of Maryland; ultrasound, computed tomography, body imaging.

Gardner, Jill C. 1992, (Research); PhD, 1981, Dalhousie University (Canada); computed imaging processing and analysis.

Gillespy, Thurman 1990; MD, 1980, Thomas Jefferson University; musculoskeletal radiology, orthopaedics.

Glickerman, David J. 1990; MD, 1983, Albany Medical College; angiography, interventional radiology.

Griep, Robert J. 1982; MD, 1958, University of Texas (Galveston); internal medicine/radiology.

Hunter, John C. 1992; MD, 1970, University of Illinois; musculoskeletal, radiology, MRI.

Jarvik, Jeffrey G. 1993; MD, 1987, University of California (San Diego); neuroradiology, outcomes research.

Kimmy, Michael 1979, (Adjunct); MD, 1979, Washington University; gastroenterology/endoscopy.

Kinahan, Paul E. 2001; PhD, 1994, University of Pennsylvania; bioengineering.

Lehman, Constance D. 1990; PhD, 1990, MD, 1990, Yale University; mammography, women's breast imaging.

Lewis, David H. 1985; MD, 1985, Virginia Commonwealth University; nuclear medicine.

Link, Jeanne 1982; MS, 1982, PhD, 1998, University of Washington; radioanalytical chemistry.

Mankoff, David A. 1990; PhD, 1988, University of Pennsylvania, MD, 1988, University of Pennsylvania; high count rate PET imaging.

Marglin, Stephen I. 1980; MD, 1968, Yale University; chest and oncologic radiology.

Ott, Susan M. 1980, (Adjunct); MD, 1974, University of Washington; nephrology.

Parisi, Marguerite T. 2001; MD, 1977, State University of New York (Downstate Medical Center); pediatric radiology.

Phillips, Leon A. 1959, (Emeritus); MD, 1952, Yale University; general radiology, uroradiology.

Rosenbaum, David M. 1983; MD, 1977, Albert Einstein College of Medicine; pediatric radiology.

Schulte, Scott J. 1988; MD, 1979, University of Washington; gastrointestinal radiology.

Shaw, Dennis 1985; MD, 1983, University of Washington; neuroradiology, pediatric radiology.

Takasugi, Julie E. 1988; MD, 1982, University of California (Los Angeles); pulmonary radiology.

Wiseman, Robert W. * 1989, (Affiliate); PhD, 1988, Florida State University; cellular energetics, nmr spectroscopy, mitochondria, kinetics, gene expression, metabolism.

Assistant Professors

Anzai, Yoshimi 2000; MD, 1986, DSc, 1993, Chiba University (Japan); neuroradiology.

Blackmore, Christopher C. 1995; MD, 1990, University of Rochester, MPH, 1997, University of Washington; body imaging, teleradiology, digital radiology, MRI/CT.

Bloch, Robert D. 1998; PhD, 1991, MD, 1991, University of Health Sciences (Chicago); angiography, interventional radiology.

Borsa, John J. 1996; MD, 1991, University of Manitoba (Canada); angiography and interventional radiology.

Cordes, Dietmar 2001, (Research); PhD, 1989, University of Nevada (Reno); physics.

Dee, Katherine E. 1995; MD, 1994, Yale University; breast imaging.

Escobedo, Eva M. 1992; MD, 1985, Stanford University; musculoskeletal trauma radiology.

Eubank, William B. 1996; MPH, 1986, MD, 1986, Tulane University; body MR and GU imaging.

Friedman, Seth D. 2000, (Research); PhD, 1997, University of New Mexico; psychology.

Hallam, Danial K. 2000; MSc, 1988, Stanford University.

Hoffer, Eric K. 1997; MD, 1984, University of California (Los Angeles); minimally invasive therapy, stent grafts for aneurysms, uterine artery embolization, dialysis access.

Kerwin, William 2001, (Research); PhD, 1999, Johns Hopkins University; electrical and computer engineering.

Kim, Thomas A. 2001; MD, 1988, Washington University; neuroradiology.

Lalani, Tasneem A. 2000; MS, 1990, Harvard University, MD, 1993, University of Alberta (Canada); CT/US/MRI.

Langer, Steve G. 1996; PhD, 1994, Oakland University; medical physics.

Maki, Jeffrey H. 1998; MD, 1991, Duke University; MRI.

Marro, Kenneth I. 2001, (Research); PhD, 1995, University of Washington; bioengineering.

Miyaoka, Robert S. 2001, (Research); PhD, 1992, University of Washington; electrical engineering.

Paladin, Angelisa M. 1998; MD, 1999, Chicago Medical School; pediatric radiology.

Rajendran, Joseph 1994; MBBS, 1973, Madurai University (India), MD, 1980, Christian Medical College; nuclear medicine.

Shibata, Dean K. 2001; MD, 1989, Stanford University; neuroradiology.

Sidhu, Manrita K. 1995; MD, 1988, Medical College of Pennsylvania; pediatrics.

Sze, Raymond W. 2000; MD, 1990, University of Medicine and Dentistry of New Jersey; pediatrics.

Vesselle, Hubert J. 1997; PhD, 1990, MD, 1991, Case Western Reserve University; nuclear medicine.

Course Descriptions

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RADGY 498 Undergraduate Thesis (*) Supervised clinical and/or laboratory research in the broad field of medical imaging, culminating in a thesis. Offered: AWSpS.

RADGY 499 Undergraduate Research (*) Opportunity to gain research experience and direct participation in either clinical or basic sciences investigation in diagnostic and/or nuclear medicine. Offered: AWSpS.

RADGY 505- P-Preceptorship in Nuclear Medicine (1, max. 24) *Eary (University of Washington Medical Center)* Opportunity for first- and second-year medical students to gain experience with faculty in clinical and academic environments. Students observe general aspects of the Nuclear Medicine Division, including clinical problems, the different relationships in the clinic between physician and patient, and several research aspects of the division. Prerequisite: permission of instructor. Offered: AWSpS.

RADGY 508 Physical Aspects of Medical Imaging (4) *Stewart* Quantitative physical principles of medical imaging are presented for electromagnetic and sonic radiation. Methods of image formation and analysis are discussed for conventional film radiography, CT, DSA, PET, B-mode ultrasound and Doppler ultrasound. Offered: jointly with BIOEN 508/ENV H 528.

RADGY 550 Nuclear Magnetic Resonance in Biomedicine (2) *Hayes, Kushmerick, Richards, Yuan* Basic physics of nuclear magnetic resonance (NMR) imaging and spectroscopy are presented. Research applications of NMR in physiology and biochemistry are reviewed with emphasis on the brain. Grade based on written tests and small research paper. Prerequisite: permission of instructor. Offered: jointly with BIOEN 565; odd years; Sp.

RADGY 580 P-Nuclear Medicine Technique, Physics, and Instrumentation (2.5) *Lewellen* 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 of instructor. Offered: S.

RADGY 693 P-Introduction to Diagnostic Radiology (4) *Schulte* Half-time clerkship in the field of medical imaging. Lectures, case discussions, film reading, and independent study provide an overview of the subspecialty areas of diagnostic radiology and nuclear medicine. Emphasis on utilization and selection of imaging tests, radiologic anatomy, and interpretation of commonly encountered studies. Offered: AWSpS.

RADGY 694 P-Advanced Clinical Clerkship (8) *Schulte* Full-time clerkship provides a more in depth experience in diagnostic radiology and nuclear medicine. Required rotations in the subspecialty areas of radiology augment the basic lecture series and case discussions of Radiology 693. For those with a special interest in diagnostic radiology. Prerequisite: permission of instructor and departmental education coordinator. Offered: AWSpS.

RADGY 695 P-Radiology Sub-specialty Elective (*, max. 8) *Schulte* Clinical rotation in one of the subspecialty areas of radiology at the University of

Washington and affiliated hospitals. Requires special arrangements and permission from a preceptor and the education coordinator in Radiology. Two or four weeks. Offered: AWSpS.

RADGY 696 P-Nuclear Medicine Clerkship (*, max. 12) *Eary* Daily participation at University of Washington Medical Center nuclear medicine clinic emphasizing technical performance, diagnostic interpretation, and clinical relevance of nuclear imaging. Daily clinical teaching conferences of the division. Four- and six-week clerkships can be preplanned in areas such as pulmonary, cardiovascular, renal, bone, computer analysis. Prerequisite: permission of instructor. Offered: AWSpS.

RADGY 697 P-Radiology Special Electives (*, max. 24) *Schulte* Radiologic training in a nonaffiliated institution. Permission and arrangements must be made at the time of registration through direct communication between the student and the education coordinator in Radiology. A written outline from a preceptor at the intended site required. Prerequisite: permission of radiology education coordinator. Offered: AWSpS.

RADGY 699 P-WWAMI Radiology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Rehabilitation Medicine

BB919 Health Sciences



General Catalog Web page:
www.washington.edu/students/gencat/academic/Rehab_Medicine.html



Department Web page:
depts.washington.edu/rehab/

The Department of Rehabilitation Medicine provides education for medical students, interns, residents, and allied health students in occupational therapy, physical therapy, and prosthetics and orthotics in a comprehensive approach to rehabilitation problems. This includes special diagnostic and evaluative procedures; methods and rationale in the application of principles of occupational therapy, physical therapy, prosthetics and orthotics, and other health professions; and advanced investigation of special problems encountered in the field. In addition, the department conducts a residency training program for the specialty of physical medicine and rehabilitation.

The department offers graduate curricula leading to the following degrees: Master of Occupational Therapy, Master of Physical Therapy, and a Bachelor of Science in the field of prosthetics and orthotics. The department also offers a Master of Science degree in rehabilitation medicine with options for occupational therapists, physical therapists, and residents in physical medicine and rehabilitation who wish to pursue academic or research careers.

Occupational Therapy

Head

Elizabeth M. Kanny

Occupational therapists provide services related to occupational performance in everyday life in the areas of self-care, work and productive activities, and play/leisure. Occupational therapists work with peo-

ple who have physical illness or injury, social or emotional difficulties, congenital or developmental problems, or who are in need of preventive strategies that promote well being. They work with people in all age groups from diverse cultural and ethnic groups and socioeconomic levels.

Occupational therapists help people with impairments or limitations to live as productive a life as possible. They work with people to increase independent function in life activities, enhance development, and to minimize or prevent disability. They use a variety of therapeutic methods including training in self-care activities; design, fabrication, and application of splints; sensorimotor activities; therapeutic group activities; selection and use of adaptive equipment; adaptation of physical environments in the home, school, work, or community; activities to enhance functional performance in everyday life; and work evaluation, work hardening, and workplace adaptations.

Today's occupational therapists work in clinical and community practice, administration, education, and research. Work settings include rehabilitation centers and hospitals; public and private schools; home health agencies; mental health centers and psychiatric hospitals; private practice; vocational rehabilitation centers and industrial clinics; private industry, wellness and prevention programs; and hospices.

The curriculum is designed to link theoretical and technical knowledge in occupational therapy with professional values, attitudes, and skills. The education of each student is based on the philosophy that "occupational performance" (including self-care, work, and leisure/play) is central and provides a purpose and meaning to one's life. Professional standards of practice, ethics, and continued professional growth are emphasized throughout the program. Program requirements include seven quarters of professional course work and six months of full-time fieldwork training. Fieldwork training must be completed within 24 months after completion of professional course work. Completion of all program requirements leads to a Master of Occupational Therapy degree awarded by the School of Medicine, Department of Rehabilitation Medicine.

The Occupational Therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824-1220, phone 301-652-2682. Graduates of the program are eligible to sit for the national certification examination for the occupational therapist. The National Board for Certification in Occupational Therapy (NBCOT) is the certifying agency responsible for the development and implementation of this exam. Most states, including Washington, require state licensure in order to practice.

Admission Requirements: Applicants must have completed a bachelor's degree in any major and taken the Graduate Record Exam (GRE) within the past five years. In addition, there are eight prerequisite courses that must be completed prior to being admitted to the program. The admission process occurs once a year for entry to the program in autumn quarter of each year; applications are evaluated starting January 15 of each year.

Specific prerequisite courses at the UW include the following. For students who have attended schools outside of the UW, comparable courses must be taken:

Natural Sciences: Survey of Physiology (ZOOL 118), 5 credits; General Anatomy (B STR 301), 4 credits; Introduction to General Chemistry, (CHEM 120), 5 credits; General Physics (PHYS 114), 4 credits; General Physics Laboratory (PHYS 117), 1 credit; Basic Educational Statistics (EDPSY 490), 3 credits.

Social Sciences: Abnormal Psychology (PSYCH 305), 5 credits; Developmental Psychology (PSYCH 306), 5 credits; Survey of Sociology (SOC 110), 5 credits or Principles of Sociocultural Anthropology (ANTH 202), 5 credits.

To apply, students must have completed five of the prerequisite courses, with three courses in the natural sciences. They must have earned a minimum GPA of 3.0 in the prerequisite courses with no single course graded less than 2.0; and have a GPA of 3.0 on the most recent 60 semester or 90 quarter credits. Admission is based on academic ability, communication skills, and understanding and experience in occupational therapy. Detailed program requirements and selection process information may be obtained by calling 206-598-5392 or via the program's Web page (depts.washington.edu/rehab/education/ot.shtml).

Graduation Requirements: The following courses must be completed satisfactorily in the schedule sequence, beginning autumn quarter only, at the UW: REHAB 400, 401, 403, 414, 442, 444, 445, 448, 451, 452, 570, 571, 572, 574, 575, 576, 577, 578, 579, 580, 581, 582, 584, 585, 587, 591, 594, CONJ 480, and HUBIO 563.

Student Evaluation: The University grade-point system is used in student evaluation. A student must maintain a cumulative GPA of 3.0 in all required professional course work to maintain satisfactory standing and to graduate. Detailed scholastic requirements are available on the program's Web page (depts.washington.edu/rehab/education/ot.shtml).

If at any point the OT curriculum cumulative GPA falls below 3.0, the student is placed on academic probation and the student must raise it to 3.0 by the end of two subsequent quarters. If a student is unable to remove his/her probation status, he/she is subject to dismissal from the program.

The student must satisfactorily complete all academic course work before taking the two required Level II Fieldwork placements (REHAB 594). Both of the two required Level II Fieldwork placements must be satisfactorily completed within two years after the completion of the academic portion of the program in order to graduate from the program.

For more information on the Master of Occupational Therapy program, visit the department's Web site at depts.washington.edu/rehab/education/ot.shtml.

Physical Therapy

Head

Mark Guthrie

Physical therapy is a direct form of professional patient care that can be applied in most disciplines of medicine. The principal objective in physical therapy is to restore or improve motor function in individuals with musculoskeletal or neuromuscular problems.

Management of problems related to motor function is only part of the work of physical therapy. Equally important is a rebuilding of self-confidence and the creation of a desire to return to a normal, active life. Other primary objectives of physical therapy are prevention of disability and pain, and training in mobility skills for those who must adapt to permanent disability.

As a consequence of the scope of the profession, physical therapists function in a variety of settings, the most familiar being the hospital. Physical therapists also plan, provide, evaluate, and direct patient care in outpatient clinics, rehabilitation centers, health maintenance organizations, developmental centers, home-health agencies, schools, extended-care facilities, voluntary health programs, industry, and private

practices. The physical therapist may be found anywhere quality health care is needed. Increasingly, physical therapists are becoming involved in basic and clinical research, such as the academic community, either as full-time faculty members or as supervisors of clinical education, and as consultants in local, state, and federal health-planning activities.

Physical therapists function in compliance with the licensing laws and ethical principles that govern the practice of physical therapy. The steps to licensure as a physical therapist vary slightly from state to state, but all physical therapists graduate from an accredited curriculum of physical therapy that includes a specific period of clinical training. As physical therapy relates to the majority of medical specialties, the education program is broad in scope, including an emphasis on physical and social sciences. The physical therapist evaluates the patient's problem by testing such factors as range of joint motion, muscle strength, posture and gait, pulmonary function, sensation and sensory perception, orthotic and prosthetic fit, reflexes and muscle tone, and functional skills. Some of the procedures used may include ultrasound, superficial heat and cold, electrical stimulation, massage, traction, joint mobilization, biofeedback, therapeutic exercise, and training in the use of orthotic, prosthetic, and other assistive devices, such as crutches, canes, and wheelchairs.

As with all professionals in health fields, physical therapists are responsible for subscribing to a program of continuing education. Some therapists also develop the knowledge and skills of a specialist via continuing education and concentrated practice in one area, such as sports or pediatric therapy. A formalized mechanism for certifying specialists is implemented by the national professional association, the American Physical Therapy Association.

The University of Washington program in physical therapy is accredited by the American Physical Therapy Association Commission on Accreditation in Physical Therapy Education.

Master of Physical Therapy

Admission Requirements: Applicants are required to complete a bachelor's degree in another field prior to enrollment in the physical therapy curriculum. For current admission requirements, applicants should request detailed program information (which is updated annually and available after September 1 each year) from the Physical Therapy Curriculum Office, Box 356490, University of Washington, Seattle, Washington 98195-6490; 206-598-5333; or view the information online at depts.washington.edu/rehab/education/. Students are urged to request or check these materials early, since the deadline for receipt of applications is January 15. At the time of entrance to the program (autumn quarter), applicants must be U.S. citizens or permanent residents.

Prosthetics and Orthotics

Head

John Ferguson

Upon successful completion of the prosthetics and orthotics program, the student will have learned the skills necessary to function as an entry level resident in prosthetics-orthotics. The degree in prosthetics-orthotics gives the student eligibility to enter a one-year clinical residency for each discipline at a National Commission on Orthotics and Prosthetics Education (NCOPE) approved site. This residency requirement must be completed for eligibility to apply for the National Certification Boards administered by the American Board for Certification in Orthotics and Prosthetics, Inc.

The prosthetist-orthotist is a member of the rehabilitation health care team working together with disabled or physically challenged individuals to enhance their daily life and increase their functional abilities. The three groups of prosthetic-orthotic devices which can potentially enter into the rehabilitation of an individual are: (1) prosthetic devices, which replace or substitute for a missing limb or part of a limb; (2) orthotic devices, which help with the control of motion and the support of a weakened body segment; and (3) adaptive devices, which enable the person to perform specific activities. Practitioners design and fabricate the appropriate device and evaluate the fit and functional use for each patient. To evaluate function, the prosthetist-orthotist must have a detailed knowledge of anatomy and kinesiology, joint range of motion, muscle strength, and human locomotion.

Upon successful completion of the program, the student is awarded a Bachelor of Science degree by the University of Washington School of Medicine. The practitioner program is accredited through the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

For more information on the Prosthetics and Orthotics undergraduate program, see the undergraduate volume of the *General Catalog* or visit the *General Catalog* online at www.washington.edu/students/gencat/.

Post-Professional Programs

The Master of Science in Rehabilitation Medicine has three primary pathways: occupational therapy, physical therapy, and rehabilitation medicine. This program is designed for rehabilitation practitioners who want to pursue a program of coursework and research to enhance their professional growth. Additional information may be found at the program's Web site (depts.washington.edu/rehab/education/).

Master of Science, Rehabilitation Medicine (Occupational Therapy Pathway)

This degree program is designed to prepare occupational therapists to discuss rehabilitation science, models of disability, and/or theory and frames of reference relating to occupational therapy; to design and conduct research; to provide instruction, and to administer occupational therapy services or provide a higher level of clinical service. Independent-study options and electives offer flexibility, allowing the student to meet individual objectives. Completion of a data-based thesis is required. Full-time students generally complete the course work in four quarters. The additional time to complete the thesis requirement varies.

Admission Requirements: An applicant for admission must be a graduate of an approved occupational therapy program and must be certified to practice by the American Occupational Therapy Certification Board. A minimum of one year of professional experience is desirable. Detailed information about the program is available from the Division of Occupational Therapy Curriculum Office at 206-598-5392 or from the Web site (depts.washington.edu/rehab/education/ot.shtml).

Graduation Requirements: All students must satisfactorily complete: (1) a minimum of 36 credits, including specific core courses; (2) all Graduate School requirements for a master's degree; and (3) a data-based thesis contributing to the knowledge base in occupational therapy.

Master of Science, Rehabilitation Medicine (Physical Therapy Pathway)

This degree program is designed to prepare physical therapists to assume a career in teaching and administration within the field. The curriculum emphasizes preparation for research and contribution to the professional literature; therefore, a thesis is a requirement of this plan. Opportunities are provided to enhance specialized knowledge and skill in selected content areas of physical-therapy practice. Depending upon the student's educational goals and prior accomplishments, the program should require one to two calendar years for completion.

Admission Requirements: Selection for admission to the Master of Science degree program (physical-therapy pathway) is based on an assessment of intellectual capacity, basic professional competence, promise for future contributions to the field, and availability of the program (due to funding limitations, the program is not offered every year). Students must have completed a baccalaureate degree and an accredited physical-therapy program with a minimum cumulative GPA of 3.00, based on a four-point scale, in all college work. Detailed information on program and admission requirements is available from the Division of Physical Therapy Curriculum Office, 206-598-5333; or email gleep@u.washington.edu.

Graduation Requirements: All students must satisfactorily complete (1) a minimum of 36 credits, including specified core courses; (2) all Graduate School requirements for a master's degree; and (3) a data-based thesis contributing to the knowledge base in physical therapy.

Master of Science, Rehabilitation Medicine (Rehabilitation Medicine Pathway)

This degree program is designed to prepare physicians, specifically physiatrists, as academicians in the field of physical medicine and rehabilitation. In addition to core course work in relevant medical sciences, an emphasis is placed on developing skills toward the goal of conducting independent or collaborative research projects.

Admission Requirements: An applicant for admission must be a physician from an approved medical school and must be concurrently enrolled, or have completed, an approved residency program in physical medicine and rehabilitation.

Graduation Requirements: All students must complete (1) a minimum of 36 credits, including specific core courses; (2) all Graduate School requirements for a master's degree; and (3) a data-based thesis contributing to the knowledge base in physical medicine and rehabilitation.

Faculty

Chair

Lawrence R. Robinson

Professors

Anderson, Marjorie E. * 1971; PhD, 1969, University of Washington; physiology of basal ganglia and thalamus; neural control of movement.

Cardenas, Diana D. * 1981; MD, 1973, University of Texas (Dallas); urinary tract infections, spinal cord injury, chronic pain.

Deitz, Jean L. * 1979; PhD, 1976, University of Florida; occupational therapy, pediatrics, measurement.

Dikmen, Sureyya S. * 1974; PhD, 1973, University of Washington; clinical neuropsychology, traumatic brain injury.

Fordyce, Wilbert E. * 1956, (Emeritus); PhD, 1953, University of Washington; psychology.

Fraser, Robert T. 1976; PhD, 1976, University of Wisconsin; psychology.

Halar, Eugen M. * 1968, (Emeritus); MD, 1959, University of Zagreb (Yugoslavia); psychiatry.

Hays, Ross M. * 1983; MD, 1978, University of Washington; pediatric rehabilitation, medical ethics, neuromuscular diseases, congenital defects.

Hillel, Allen D. * 1983, (Adjunct); MD, 1976, Stanford University; peripheral nerve physiology after injury, swallowing disorders in neuromuscular disease.

Jaffe, Kenneth M. * 1981; MD, 1975, Harvard University; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects.

Jensen, Mark P. * 1987; PhD, 1989, Arizona State University; assessment and treatment of chronic pain, coping with medical illness, treatment outcome.

Kraft, George Howard * 1969; MD, 1963, Ohio State University; psychiatry.

Lehmann, Justus F. * 1956, (Emeritus); DrMed, 1945, Johann Wolfgang Goethe University (Germany); psychiatry.

Little, James Wendell * 1984; PhD, 1976, MD, 1977, University of Chicago; rehabilitation medicine, clinical neurophysiology, spinal cord injury.

Patrick, Donald L. * 1987, (Adjunct); MS, 1968, PhD, 1972, Columbia University; health status and quality of life, end of life, adolescents.

Patterson, David R. * 1984; PhD, 1982, Florida State University; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma.

Robinson, Lawrence R. * 1989; MD, 1982, Baylor University; psychiatry.

Stolov, Walter C. 1960, (Emeritus); MA, 1951, MD, 1956, University of Minnesota; psychiatry, electrodiagnostic medicine.

Turner, Judith A. 1980; MA, 1975, PhD, 1979, University of California (Los Angeles); psychology.

Yorkston, Kathryn * 1975; PhD, 1975, University of Oregon; neurogenic communication disorders in adults.

Associate Professors

Bell, Kathleen * 1981; MD, 1981, Temple University; brain injury and sleep disorders, community reintegration in brain injury, medical education.

Benditt, Joshua O. 1994, (Adjunct); MD, 1982, University of Washington; pulmonary and critical care medicine.

Berni, Rosemarian * 1962, (Emeritus); MN, 1973, University of Washington; rehabilitation nursing.

Bombardier, Charles H. * 1989; PhD, 1987, Washington State University; spinal cord injury, brain injury, alcohol abuse after injury, psychological comorbidities.

Chang, Michael Wei 1992; PhD, 1982, University of Washington, MD, 1988, University of Texas (Galveston); biomedical simulation, ultrasonography, electrophysiology, biomechanics.

Czerniecki, Joseph M. * 1982; MD, 1981, University of British Columbia (Canada), MS, 1985, University of Washington; rehabilitation engineering, prosthetics, biomechanics and gait analysis.

Egan, Kelly J. 1980, (Adjunct); MA, 1968, Texas Technological University, PhD, 1980, University of Washington; clinical psychology.

Engel Knowles, Joyce M. * 1993; PhD, 1988, University of Kansas; use of occupational therapy, pain management with children and persons with physical disabilities.

Esselman, Peter C. * 1986; MD, 1986, University of Washington; exercise in the elderly; treatment of traumatic brain injury and burn rehabilitation.

Gardner, Gregory C. 1989, (Adjunct); MD, 1984, Baylor University; rheumatology.

Goldstein, Barry * 1987; PhD, 1981, MD, 1986, University of California (Los Angeles); skin adaption to mechanical stress, pressure ulcers, overuse injuries of the upper extremity.

Guthrie, Mark R. * 1983; PhD, 1990, University of Washington; functional assessment, physical therapy efficacy.

Hammond, Margaret C. * 1979; MD, 1979, Medical College of Wisconsin; medical consequences of longstanding spinal cord injury.

Haselkorn, Jodie K. * 1985; MD, 1985, Louisiana State University; health services for the disabled; diagnostic accuracy of tests, effectiveness of interventions.

Hicks, Ramona R. * 1999; PhD, 1993, University of Connecticut; brain injury, neural plasticity, cell death and regeneration.

Johnson, Kurt Lewis * 1990; PhD, 1984, University of Wisconsin; counseling psychology; psychological, social vocational aspects of disability and chronic illness.

Kanny, Elizabeth M. * 1978; MA, 1977, Seattle University, PhD, 1996, University of Washington; education of allied health practitioners; ethical reasoning and ethics education.

Massagli, Teresa L. * 1985; MD, 1982, Yale University; pediatric psychiatry.

McMillan, Jo Ann * 1958, (Emeritus); MEd, 1968, University of Southern California; physical therapy.

Odderson, Ib R. * 1985; PhD, 1978, Indiana University, MD, 1985, Vanderbilt University; psychiatry, stroke, multiple sclerosis, spasticity, botulinum toxin.

Pepping, Mary * 1994; PhD, 1981, Washington State University; psychosocial outcome after TBI and mild TBI; neuropsychological features of dementia and mild TBI.

Reilly, Dominic F. 1991, (Adjunct); MD, 1988, University of Washington; general internal medicine.

Rodriguez, Arthur A. * 1999; MD, 1972, University of Wisconsin; musculoskeletal pain disorders and clinical neurophysiology.

Sanders, Joan Elizabeth * 1985, (Adjunct); PhD, 1991, University of Washington; soft tissue biomechanics and tissue adaptation to mechanical stress.

Shumway-Cook, Anne * 1995; MS, 1973, PhD, 1983, University of Oregon; physiologic basis for balance problems following neurological injury.

Slimp, Jefferson C. * 1979; PhD, 1976, University of Wisconsin; clinical neurophysiology, intraoperative neuromonitoring, evoked potentials, deep-brain stimulation.

Stiens, Steve A. 1987; MD, 1986, University of Cincinnati, MS, 1991, University of Washington; spinal cord injury medicine, rehabilitation, neurogenic bowel care, spinal cord neuroplasticity.

Assistant Professors

Barr, Karen P. 2001; MD, 1993, Northeastern Ohio University; musculoskeletal rehabilitation, sports medicine, acupuncture.

Bowen, James D. 1982, (Adjunct); MD, 1982, Johns Hopkins University; multiple sclerosis.

Brewer, Kristen K. 1999, (Clinical); PhD, 1997, University of Iowa.

Burns, Stephen P. 1992; MD, 1992, Brown University; medical complications and neurologic recovery in spinal cord injury, whiplash, sleep apnea.

Chan, Leighton * 1990; MD, 1990, University of California (Los Angeles); health service delivery related to Medicare patients.

Ciol, Marcia A. 2000, (Research); PhD, 1991, University of Washington; biostatistics.

Dudgeon, Brian J. 1982; MS, 1983, PhD, 2000, University of Washington; occupational therapy, assistive technology, disability studies.

Ehde, Dawn * 1991; PhD, 1992, University of North Dakota; chronic pain secondary to disability, psychological distress following disability.

Fann, Jesse R. 1990, (Adjunct); MD, 1989, Northwestern University, MPH, 1995, University of Washington; neuropsychiatry, psycho-oncology, epidemiology, health services research, depression, delirium.

Harrast, Mark A. 2001; MD, 1996, Northwestern University; spine, sports, and musculoskeletal medicine and rehabilitation.

James, Jennifer J. 1998, (Clinical); MD, 1994, University of Vermont; spine, sports, and musculoskeletal medicine and rehabilitation.

Kartin, Deborah * 1984; MS, 1988, PhD, 1996, University of Washington; developmental disabilities, prenatal drug exposure, high-risk infancy, postural development.

Kinney, Gregory A. 1997; PhD, 1996, Northwestern University; neuroscience.

Paynter, Kirsten S. 2001; MD, 1996, University of Florida; acute musculoskeletal injuries, sports medicine, back pain, amputee rehabilitation.

Powell, Janet M. 1998; PhD, 2001, University of Washington; vision, perception, and cognition following brain injury; rehabilitation outcomes.

Toshima, Michelle 1995, (Clinical); PhD, 1990, University of California (San Diego).

Washington, Kathleen A. * 1982, (Clinical); MS, 1980, University of Wisconsin.

Yu, David T. 2001; MD, 1992, Bowman Gray School of Medicine; stroke rehabilitation, motor recovery and shoulder pain in hemiplegia, neuromuscular stimulation.

Senior Lecturer

Ferguson, John R. 1996; BA, 1985, California State University, Fresno; post-operative amputation care.

Lecturers

Okumura, Ramona M. 1990; BS, 1981, University of Washington; pediatric limb deficiency, upper extremity prosthetics, prosthetic biomechanics.

Yamane, Ann 1979; BS, 1976, University of Washington; prosthetics and orthotics.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

REHAB 400 Medical Science (4) *Kanny, Powell* Lectures in fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students. Credit/no credit only.

REHAB 401 Medical Science (4) *Ferguson, Powell* Lectures in fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students. Credit/no credit only.

REHAB 402 Medical Science Laboratory (1, max. 2) To introduce students to the role of allied health professionals in the treatment of pathologies presented in 400, 401 lectures. Credit/no credit only.

REHAB 403 Exercise Physiology for Rehabilitation Professionals (2) *Anderson, Slimp* Normal and pathological physiology of the cardiovascular, respiratory, and musculoskeletal systems as a basis for evaluation and intervention in occupational therapy, physical therapy, and prosthetics/orthotics. Required for majors.

REHAB 413 Special Studies in Physical Therapy (1-15, max. 24) Theory and practice in specialized areas of physical therapy. Credit/no credit only.

REHAB 414 Psychological Aspects of Rehabilitation (2) *Patterson* Psychological processes underlying adjustment to disability; application of behavioral/analysis systems in patient therapy management; effects of cognitive or personality deficits on patient performance and treatment strategies. Credit/no credit only.

REHAB 416 Principles of Physical Therapy Administration (2, max. 4) *Guthrie, Jackins* 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. Credit/no credit only.

REHAB 420 Lower Extremity Prosthetics I (8) *Ferguson* Instruction in patient evaluation, casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, suspension systems, and documentation for transibial amputation. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 421 Lower Extremity Prosthetics II (11) *Ferguson* Instruction in transfemoral patient evaluation, casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, suspension systems, and documentation. Methods

of fitting through knee and hip disarticulation levels demonstrated. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 423 Lower Extremity Orthotics I (6) *Yamane* Patient evaluation and prescription considerations for orthotic management of the lower extremity. Lectures provide instruction in the biomechanics of the lower extremity during ambulation, clinical indications and fitting criteria for a variety of orthotic devices. Laboratory sessions provide experience in fabrication principles, and impression and measurement techniques. Required for prosthetics and orthotics majors.

REHAB 424 Lower Extremity Orthotics II (8) *Yamane* Orthotic treatment of pathological conditions that affect the knee and hip addressed. Focus is placed on development of prescription recommendation, fabrication, fitting, and follow-up of orthoses that support, assist, or stabilize the knee and hip. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 427- Applied Prosthetics and Orthotics I (1-, max. 4) Presentation and discussion of current clinical practice using research and journal articles and case presentations. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 428 Applied Prosthetics and Orthotics II (1-4, max. 13) Experience in patient management under the preceptorship of certified practitioners at clinical affiliation sites. Required for prosthetics and orthotics majors.

REHAB 429 Immediate Post-Operative and Early Fitting (2) *Ferguson* Lecture and laboratory designed to introduce the student to the principles of immediate postsurgical prosthetic fitting, including patient management.

REHAB 430 Engineering Concepts (2) Principles of mechanics and strength of materials, force analysis, and hydraulic control in relationship to orthotics and prosthetics design. Required for prosthetics and orthotics majors.

REHAB 442 Applied Kinesiology (4) *Guthrie, Shumway-Cook* Study of joint motion and muscle function in relation to both the normal and abnormal state, emphasizing gait. Specific techniques employed in the field of rehabilitation medicine are analyzed. Required for Department of Rehabilitation Medicine students; others by permission.

REHAB 444- Functional Musculoskeletal Anatomy (4-) *Guthrie* Functions of musculoskeletal system as applied to patterns of motion. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students, prosthetics and orthotics students, and physical therapy students; others by permission of instructor.

REHAB -445 Functional Musculoskeletal Anatomy (-4) *Guthrie* Functions of musculoskeletal system as applied to patterns of motion. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students, prosthetics and orthotics students, and physical therapy students; others by permission of instructor.

REHAB 448 Applied Kinesiology Laboratory (1) *Guthrie, Okumura, Powell, Yamane* Instruction and laboratory focus on practical experience and clinical problem solving in kinesiology. Potential topics include muscle and joint motion testing, sensory/perceptual assessment, prosthetic and orthotic devices, wheelchair use, gait training.

REHAB 451 Functional Anatomy Laboratory (1) Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material.

Required for physical therapy, occupational therapy, and prosthetic/orthotic students.

REHAB 452 Functional Anatomy Laboratory (1) Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for physical therapy, occupational therapy, and prosthetic/orthotic students.

REHAB 458 Augmentative and Alternative Communication: Implementation Strategies (2-3) NW Communication needs of nonspeaking individuals. Interdisciplinary approaches to the evaluation, selection, and implementation of aided and unaided communication augmentation systems. Recommended: basic course work in either SPHSC, OT, PT, or ENGR. Offered: jointly with SPHSC 453; irregularly, S.

REHAB 459 Augmentative and Alternative Communication: Access for Technology (3) NW Communication technology and motor evaluation of augmentative and alternative users. Issues related to hardware, software, switch placement and access, with opportunities for clinical trials. Recommended: SPHSC 453 or REHAB 458. Offered: jointly with SPHSC 454.

REHAB 476 Prosthetic and Orthotic Evaluation and Use (2) Okumura Instruction in mechanical component substitution for functional losses. Emphasis is on biomechanical principles, prosthetic-orthotic components, and alignment and fitting techniques. Credit/no credit only. Required for physical therapy students.

REHAB 496 Special Topics in Rehabilitation (1-9, max. 14) Guided opportunity for in-depth study in specific areas of rehabilitation. Topics vary.

REHAB 498 Undergraduate Thesis (*)

REHAB 499 Undergraduate Research (*) Opportunity to design, perform, and analyze research investigation in problem areas in rehabilitation medicine. These include clinical and basic research problems in, for example, head and spinal injury, chronic disease, pain neurophysiology, electrodiagnosis, communication, and bioengineering.

REHAB 500 Clinical Clerkships in Physical Therapy (2, max. 8) Robinson 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. Credit/no credit only.

REHAB 501 Lifespan I: General Lifespan Development (2) Hicks Provides professional physical therapy students an overview of typical human development across the lifespan, with particular emphasis on motor development. Serves as framework for understanding atypical development and the effects of disease and disability across the lifespan.

REHAB 502 Lifespan II: Pediatrics (3) Kartin, Mullens, Washington Provides an overview of pediatric physical therapy practices for children with atypical development. Assessment, development of physical therapy plans of care for children with various disabilities will be presented within the frameworks of family-centered-care and disablement models.

REHAB 503 Lifespan III: Geriatric Physical Therapy (3) Theory and principles of exercise procedures used when treating the geriatric patient. Includes a discussion of age related changes in the systems essential to movement control; factors contributing to physical disability and frailty with aging; adaptation of assessment and treatment procedures to the geriatric patient. Lectures and laboratories.

REHAB 504 Physical Therapy Procedures I: Assessment (2) McGough Development of clinical

competence in patient assessment techniques from a neuromusculoskeletal perspective. Discussion of normal and pathological findings. Special emphasis on upper quadrant anatomy and patient handling skills. Lecture and laboratory format.

REHAB 506 Physical Therapy Procedures II: Assessment (2) McGough Development of clinical competence in patient assessment techniques from a neuromusculoskeletal perspective. Discussion of normal and pathological findings. Special emphasis on lower quadrant anatomy, posture evaluation, and medical record documentation skills. Lecture and laboratory format.

REHAB 507 Physical Therapy Procedures III: Modalities (3-4) McGough Principles and practice of physical therapy clinical treatment procedures utilizing therapeutic modalities. Lecture and laboratory format.

REHAB 508 Physical Therapy Procedures IV: Therapeutic Exercise (5) Hicks Theory, principles and practice of exercise procedures used for treatment purposes in physical therapy, including motor learning, variables of motor performance, and exercise prescription. Lectures and laboratories. Simulated patient problems.

REHAB 509 Physical Therapy Procedures V: Physical Restoration (5) McGough Development of physical therapy treatment skills used in rehabilitation of severe neuromusculoskeletal dysfunction. Lecture and laboratory format.

REHAB 510 Rehabilitation Psychology (2) Jensen Processes and management methods for assimilation of disability, enhancing patient participation in rehabilitation process, and for helping in maintenance of performance; behavioral management and case conference strategies; rehearsal of contingency management techniques. Required for residents; others by permission of instructor.

REHAB 511 Musculoskeletal IV: Clinical Management (5) VanBuuren Physical therapy clinical evaluation and management of patients with musculoskeletal dysfunction. Special emphasis on upper quadrant anatomy. Lecture and laboratory format.

REHAB 512 Musculoskeletal V: Clinical Management (4) VanBuuren Physical therapy clinical evaluation and management of patients with musculoskeletal dysfunction. Special emphasis on lower quadrant anatomy. Lecture and laboratory format.

REHAB 513 Special Studies in Physical Therapy (1-5, max. 15) Theory and practice in specialized areas of physical therapy. Includes organization and administration of specialized programs, advanced evaluation and treatment techniques, role of the consultant. Credit/no credit only.

REHAB 516 Medical Information for Rehabilitation Counselors (3) Johnson 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. Prerequisite: permission of instructor.

REHAB 517 Physical Therapy Seminar (2-3, max. 21) Kartin Group seminar format focused on physical therapy topics pertaining to transcurricular and professional practice issues. Credit/no credit only.

REHAB 518 Infants and Young Children: Current Research (3) Deitz, Swanson Introduces students to recent research relating to assessment and intervention with infants and young children who are "at risk" or who are disabled. Critical evaluation of the current research emphasized. Prerequisite: clinical experience or coursework related to infants and young children with disabilities and permission of instructors.

REHAB 520 Seminar (1-5, max. 5) Conferences, seminars, discussions of advanced physical medicine and rehabilitation topics for graduate students, residents and postdoctoral fellows in rehabilitation medicine. Lectures, discussion, and laboratory work in selected aspects appropriate to elected area of study for applicants for master-level degree.

REHAB 522 Neurophysiological Topics in Rehabilitation Medicine (2) Anderson Review of traditional neurophysiological concepts and an exposition of recent advances in neurophysiological research related to the practice of rehabilitation medicine. Prerequisite: resident standing in rehabilitation medicine or permission of instructor.

REHAB 523 Neuroscience III: Applied Neurology (4) Shumway-Cook Theory and principles of advanced exercise procedures used when treating patients with neurologic pathology. Includes the application of principles of motor learning and control; facilitation and inhibition of variables affecting functional motor performance; adaptation of assessment and treatment procedures to patients with different types of neurologic impairments. Lectures and laboratories.

REHAB 527 Neuroscience IV: Physical Rehabilitation of Adult Neurological Disorders (2) Hicks Critical analysis and application of physical therapy assessment and treatment techniques to problems related to specific adult neurological disorders. Neurological disorders to be covered include stroke, spinal cord injury, traumatic brain injury, and multiple sclerosis.

REHAB 530 Medical Aspects of Vocational Counseling (2-3) Johnson Introduction to vocational implications of physical and emotional disabilities. Methods, counseling techniques, therapeutic modalities, community resources used in producing vocational assistance for persons with disabilities. Prerequisite: resident standing in rehabilitation medicine or permission of instructor.

REHAB 532 Clinical Affiliation for Rehabilitation Counselors (5-6) Johnson Under preceptorship of rehabilitation counseling staff, students counsel and evaluate patients with severe physical, emotional, or social problems; administer vocational testing; obtain placement on job stations; work with community resources for vocational/educational placement; and develop activity-oriented schedules. Prerequisite: permission of instructor.

REHAB 539 Communication Disorders in Rehabilitation Medicine (1) Yorkston Overview of communication disorders secondary to central and peripheral nervous system impairment. Emphasis on facilitating identification of speech/language disorders with discussion of implications for rehabilitation.

REHAB 544- Functional Anatomy for Physiatrists (2-) Goldstein Lectures and demonstrations to illustrate functional anatomy as applied by physicians in the practice of clinical rehabilitation. Intended to enhance functional assessments and to improve neuro/musculo/skeletal diagnosis and treatment through greater understanding of the underlying anatomy. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB -545 Functional Anatomy for Physiatrists (-2) Goldstein Lectures and demonstrations to illustrate functional anatomy as applied by physicians in the practice of clinical rehabilitation. Intended to enhance functional assessments and to improve neuro/musculo/skeletal diagnosis and treatment through greater understanding of the underlying anatomy. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 546 Teaching Practicum in Occupational and Physical Therapy (1-3, max. 3) Integration of

knowledge and skills in teaching through teaching in the classroom or presentation of a minicourse, workshop, or in-service training series. Prerequisite: MEDED 520 and permission of instructor.

REHAB 550 Neuropsychology in Rehabilitation (2) *Bobardier, Ehde* Examination and management of patients with brain lesions, as well as an understanding of the consequences of such conditions. Prerequisite: graduate standing in rehabilitation medicine.

REHAB 555 P-Neuromuscular Electrodiagnosis (2.5) *Kraft* Demonstration of fundamentals of electromyography and peripheral nerve stimulation followed by participation in clinical electrodiagnosis examinations. Develops awareness of knowing when such procedures are indicated for patients and interpreting results rather than developing proficiency in performing these examinations. Prerequisite: HUBIO 560 and permission of instructor.

REHAB 566 Special Topics in Rehabilitation (1-9, max. 14) Philosophy and concepts in the interdisciplinary rehabilitation of persons with major disabilities, including advanced content in the rehabilitation theory and process of selected categories.

REHAB 567 Practicum in Rehabilitation (1-12, max. 24) Specialized practicum experience in environment providing rehabilitation services. Practicum arrangements and permission by instructor.

REHAB 568 Biophysics as Applied to Physical Medicine (2) *Esselman* 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 of instructor.

REHAB 570 Foundations of Occupational Therapy (5) *Powell* An overview of the practice of occupational therapy, emphasizing the role of occupational performance in context, frames of reference, clinical reasoning, and purposeful activity. Introduces the diversity of occupational therapy practice environments through didactic and clinical experiences. Offered: A.

REHAB 571 Occupational Performance through the Life Span (4) Overview of human development as it relates to occupational performance and functional adaptation in the ages and stages of life from infancy through old-old age. Emphasis will be placed on environmental influences, activity, and occupational roles, tasks, and component behaviors as they relate to individuals in different ages and stages. Offered: W.

REHAB 572 Occupational Therapy Theory and Practice in Psychosocial Dysfunction I (5) *Engel-Knowles* An overview of bodies of knowledge in psychosocial practice as related to occupational performance. Learning topics include major frames of reference, effects of psychosocial disorders on occupational performance (life activities), and occupational therapy evaluation and intervention skills. Lectures, reading, class discussions, role-playing, problem-based learning, and fieldwork comprise the learning experiences. Offered: S.

REHAB 573 Occupational Therapy in Community Practice (4) *Engel-Knowles* Bodies of knowledge in occupational performance as they relate to the emerging area of community-based practice. Includes traditional and evidence based practice in the realms of health promotion, prevention, evaluation, and intervention. Lectures, assigned readings, class discussions, role playing, site visits, films, laboratory exercises, and problem-based learning tutorials. Offered: Sp.

REHAB 574 Occupational Therapy Theory and Practice in Physical Disabilities I (6) *Dudgeon* Provides theoretical bases and clinical practice skills used in evaluation and intervention of occupational performance (life activities). Focus is on individuals with sensorimotor (physical) and/or cognitive impairments. Practical applications of theory occur through lecture, laboratory, and problem-based learning approaches. Offered: A.

REHAB 575 Occupational Therapy Theory and Practice in Physical Disabilities II (5) *Powell* Provides theoretical bases and clinical practice skills used in evaluation and intervention of occupational performance (life activities). Focus is on individuals with sensorimotor (physical) and/or cognitive impairments. Practical applications of theory occur through lecture, laboratory, and problem-based learning approaches. Offered: W.

REHAB 576 Occupational Therapy Theory and Practice in Pediatrics (6) *Dietz* Provides knowledge and skills necessary for providing occupational therapy evaluation, intervention, and transition services focused on occupational performance (life activities) for children and teens with disabilities and their families. Offered: W.

REHAB 577 Occupational Therapy Theory and Practice in Geriatrics (5) *Powell* Occupational therapy evaluation and intervention with older adults. Covers psychology, physiology, and socio-demographics of aging. Emphasis on interaction skills with the elderly and occupational performance (life activities). Laboratory experiences and fieldwork in the practice setting enhance didactic coursework. Offered: Sp.

REHAB 578 Occupational Performance Analysis (3) *Dudgeon* Skills in the analysis, adaptation, and sequencing of therapeutic and functional activities as they apply to occupational performance. Analysis focuses on performance components (sensorimotor, cognitive, psychosocial, psychosocial, psychological), temporal aspects (chronological, developmental), and environmental aspects (physical, social, cultural). Offered: S.

REHAB 579 Therapeutic Communication (3) *Engel-Knowles* Introduces basic principles and skills of effective interpersonal communication in dyadic interactions and in groups. Emphasis on effective listening, interviewing, and principles and concepts of occupational therapy groups. Lectures, readings, class discussions, role playing, and in-class exercises comprise the learning experiences. Offered: Sp.

REHAB 580 Introduction to Research in Rehabilitation (3) *Deitz* Evaluation of rehabilitation research literature and design of research studies relevant to rehabilitation. Offered: S.

REHAB 581 Application of Measurement Systems (3) *Deitz* Provides basis for critically evaluating and using tests and measurements in occupational therapy evaluation. Focus on reliability, validity, norms, test development process, statistics relevant to tests and measurement, and ethical implications of testing. Critical evaluation of selected standardized test used in occupational therapy. Offered: A.

REHAB 582 Assistive Technology in Rehabilitation (3) *Dudgeon* Overview of the field of assistive technology as it impacts occupational performance in self-care, work, and leisure activities. Covers interface devices, computer applications, environmental controls, augmentative communications, power mobility, seating and positioning systems, and sensory enhancements. Offered: W.

REHAB 584 Health-Care Trends and Issues (3) *Kanny* Overview of the health services system in the United States and current trends and issues facing occupational therapists within this system. Content

includes: health service providers, reimbursement of health care services, regulation, personnel and role delineation, and health policy and advocacy. Offered: A.

REHAB 585 Leadership: Administration and Management (3) *Kanny* Provides student with knowledge and skills needed for leadership positions in occupational therapy practice. Focuses on administration and management functions including strategic planning, program planning, marketing, fiscal management, program evaluation, and personnel management. Offered: W.

REHAB 587 Industrial Rehabilitation (3) *Dudgeon* Provides knowledge and skills related to vocational assessment and industrial rehabilitation for individuals with medical or psychosocial problems. Emphasizes worker characteristics, job analysis, and accommodation in business and industrial settings. Clinical simulation components provide applications to specific diagnostic, impairment, or disability conditions. Offered: Sp.

REHAB 591 Master's Project (1-4, max. 7) Master's project focused on research, administration, education, practice, policy, or other scholarly or creative work. Offered: AWSpS.

REHAB 592 Principles of Orthotic Use in Rehabilitation (2) *Chang* General principles and clinical applications of orthoses in patient management, with exposure to research issues in orthotic design.

REHAB 593 Principles of Prosthetic Use in Rehabilitation (1) *Czerniecki* General principles of prevention of amputation, prosthetic design, biomechanics, and clinical applications of upper and lower extremity prostheses.

REHAB 594 Clinical Fieldwork in Occupational Therapy (10, max. 20) *Rollinger* Six months of supervised fieldwork education. Experience in delivering occupational therapy services to clients focusing on application of purposeful and meaningful occupation. Exposure to a variety of clients across the lifespan and in a variety of settings reflective of current practice in the profession. Credit/no credit only. Offered: AWSpS.

REHAB 595 Clinical Affiliation in Physical Therapy (2-10, max. 30) *Robinson* Clinical practice of physical therapy techniques under supervision in community-based clinics. Credit/no credit only.

REHAB 596 Electromyography and Clinical Neurophysiology (4) *Kraft* Didactic course covering electromyography and clinical neurophysiology. First part covers basic neurophysiology and second covers electromyography, nerve conduction studies, somatosensory-evoked potentials, residual- and auditory-evoked potentials, single fiber EMG, late response, quantitative analysis, and macro EMG. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 597- Electromyography and Electrodiagnosis Laboratory (1-) *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB -598- Electromyography and Electrodiagnosis Laboratory (-1-) *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB -599 Electromyography and Electrodiagnosis Laboratory (-1) *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 600 Independent Study or Research (*) Credit/no credit only.

REHAB 685 P-Chronic Disease and Disability (4) *Cox, Hays* Meets chronic-care requirement for medical students. Structured clinical experience on rehabilitation medicine services. Differences between acute and chronic medicine, identification of disability problems, and therapeutic techniques for removing disability. Hospitals are within University system, local area, and WWAMI area. Prerequisite: third-year medical student standing.

REHAB 686 P-Rehabilitation Medicine Clerkship—Pediatrics (8/12) *Hays, Jaffe, Massagli* Meets chronic-care requirement for medical students. Incorporates material of 685 and expands into disabling pediatric disease. School planning, family counseling, community support services included. Four- or six-week package permits inpatient, outpatient, and consultation experience. Recommended for students contemplating pediatrics. Prerequisite: third-year medical student standing.

REHAB 687 P-Rehabilitation Medicine Clerkship (8/12) *Hays* Meets chronic-care requirement for medical students. Incorporates material of 685 and expands into disability problems. Four- or six-week package permits inpatient, outpatient, and consultation experience. Recommended for careers in family medicine, internal medicine, rheumatology, cardiology, neurology, geriatrics, orthopedic surgery, neurosurgery, and cardiovascular surgery. Prerequisite: third-year medical student standing.

REHAB 689 P-Spinal Cord Injury (8/12) *Little* Introduction to diagnosis, management, rehabilitation of patients with spinal-cord injuries. Interaction with rehabilitation team, psychiatrists, and subspecialists in urology, neurosurgery, and plastic surgery. Performance at subintern level expected. Veterans Administration Medical Center only. Prerequisite: MED 665, SURG 665.

REHAB 697 P-Rehabilitation Medicine Special Elective (*, max. 24) Equivalent to 686, 687, or 688. Satisfies requirements in rehabilitation medicine/chronic care. Student arranges with another university, using the "Special Assignment Form." Students can qualify after review, similar experience at another university. Prerequisite: permission of instructor.

REHAB 699 P-WWAMI Rehabilitation Medicine Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

REHAB 700 Master's Thesis (*) Credit/no credit only.

Surgery

BB487 University of Washington Medical Center



General Catalog Web page:
www.washington.edu/students/gencat/academic/Surgery.html



Department Web page:
depts.washington.edu/surgery/

The Department of Surgery carries out instruction during all four years of School of Medicine attendance. The third-year six-week clerkship constitutes the core of student exposure to general surgery and is required of all students. The fourth-year emergency-room clerkship is also a required part of the curriculum. The department offers a variety of fourth-year elective clerkships in a number of the specialty aspects of the department's clinical activities,

including but not limited to trauma, cardiothoracic surgery, plastic surgery, vascular surgery, transplantation, surgical critical care, pediatric surgery, and the management of burn patients.

Faculty

Chair

Carlos A. Pellegrini

Professors

Ashbaugh, David G. 1982, (Emeritus); MD, 1957, Ohio State University; thoracic surgery.

Beach, Kirk Watson * 1976; MSChE, 1968, PhD, 1971, University of California (Berkeley), MD, 1976, University of Washington; arterial disease in diabetes, blood flow studies with ultrasonic Doppler.

Clowes, Alexander W. * 1980; MD, 1972, Harvard University; vascular smooth muscle cell growth control arterial injury and repair.

Copass, Michael K. 1971, (Adjunct); MA, 1964, MD, 1964, Northwestern University; neurology/emergency services.

Dean, Larry S. 2000; MD, 1980, University of Alabama; cardiology.

Dellinger, E. Patchen * 1977; MD, 1970, Harvard University; general and gastrointestinal surgery.

Engrav, Loren H. 1977; MD, 1969, University of California (Los Angeles); plastic and reconstructive surgery.

Gruss, Joseph S. 1991; MBChB, 1969, University of Witwatersrand (South Africa); craniofacial and maxillofacial surgery.

Hanel, Douglas Paul 1992, (Adjunct); MD, 1977, St Louis University; orthopaedics, hand/microvascular surgery.

Hannafor, Blake * 1989, (Adjunct); MS, 1982, PhD, 1985, University of California (Berkeley); haptic interfaces, robotics, biomechanics, bioengineering, controls, human-machine interaction.

Heimbach, David M. 1974; MD, 1964, Cornell University; burn and general surgery.

Herman, Clifford M. 1977, (Emeritus); MD, 1959, University of Vermont; general surgery.

Jurkovich, Gregory J. 1988; MD, 1978, University of Minnesota; general surgery.

Kohler, Ted R. 1983; MD, 1976, Harvard University; general and vascular surgery.

Maier, Ronald V. 1981; MD, 1973, Duke University; general surgery, trauma-critical care surgery.

Merendino, K. Alvin 1948, (Emeritus); MD, 1940, Yale University, PhD, 1946, University of Minnesota; general surgery.

Moe, Roger E. 1967, (Emeritus); MD, 1959, University of Washington; oncology and general surgery.

Patterson, David R. * 1984, (Adjunct); PhD, 1982, Florida State University; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma.

Pellegrini, Carlos A. 1993; MD, 1971, University of Rosario Medical School (Argentina); general and laparoscopic surgery.

Perkins, James D. 1989; MD, 1979, University of Arkansas; transplant surgery.

Tapper, David 1983; MD, 1970, University of Maryland; pediatric surgery.

Trumble, Thomas E. 1989, (Adjunct); MD, 1979, Yale University; orthopaedics, hand and microvascular surgery.

Verrier, Edward D. 1989; MD, 1974, Tufts University; cardiothoracic surgery.

Winterscheid, Loren C. 1958, (Emeritus); PhD, 1953, MD, 1954, University of Pennsylvania; general and thoracic surgery.

Zierler, R. Eugene 1984; MD, 1976, Johns Hopkins University; general and vascular surgery.

Associate Professors

Aldea, Gabriel S. 1998; MD, 1981, Columbia University; cardiothoracic surgery.

Anderson, Benjamin O. 1994; MD, 1985, Albert Einstein College of Medicine; oncology, general surgery.

Byrd, David R. 1992; MD, 1982, Tulane University; general surgery and oncology.

Daum, Guenter 1993; PhD, 1989, University of Konstanz (Germany); cellular and molecular biology, tryosine phosphatase and kinases.

Egbert, Mark A. 1986, (Adjunct); DDS, 1981, University of Washington; oral and maxillofacial surgery.

Foy, Hugh M. 1978; MD, 1978, University of Nebraska; general surgery.

Gibran, Nicole 1990; MD, 1985, Boston University; general, burn, and trauma surgery.

Hatsukami, Thomas 1988; MD, 1982, University of California (Los Angeles); vascular surgery.

Isik, F. Frank 1990; MD, 1985, Mt Sinai School of Medicine; plastic surgery/control of angiogenesis.

Langdale, Lorrie A. 1985; MD, 1979, University of Washington; general surgery.

Ledbetter, Daniel J. 1981; MD, MD, 1981, University of Florida, University of Florida.

Lupinetti, Flavian M. 1993; MD, 1978, Johns Hopkins University; cardiothoracic surgery.

Marsh, Christopher L. 1989; MD, 1980, Loma Linda University; transplant surgery.

Meissner, Mark H. 1985; MD, 1985, University of Colorado (Denver); general, vascular, and critical care surgery.

Nicholls, Stephen C. 1986; MBChB, 1975, University of Auckland (New Zealand); vascular surgery.

Pohlman, Timothy H. 1984; MD, 1978, Rush Medical College; general surgery.

Sawin, Robert 1989; MD, 1982, University of Pittsburgh; pediatric surgery.

Sinanan, Mika N. * 1980; MD, 1980, Johns Hopkins University, PhD, 1986, University of British Columbia (Canada); surgical education, biorobotic surgical instrument development, and clinical procedure development.

Stelzner, Matthias G. 1996; MD, 1983, University of Bonn (Germany); general surgery.

Vallieres, Eric 1996; MD, 1982, Laval University (Canada); thoracic, lung transplant.

Vedder, Nicholas 1990; MD, 1981, Case Western Reserve University; case history, plastic and reconstructive surgery.

Waldhausen, John H. 1992; MD, 1986, Pennsylvania State University; pediatric surgery.

Wood, Douglas E. 1992; MD, 1983, Harvard University; thoracic surgery.

Yeung, Raymond S. 1997; MD, 1982, University of Toronto (Canada); general and surgical oncology.

Assistant Professors

Allan, Christopher H. 1998, (Adjunct); MD, 1992, Northwestern University; hand and microvascular surgery.

Anderson, Richard V. 1997; MD, 1987, St Louis University; cardiac surgery.

Billingsley, Kevin G. 1998; MD, 1989, Johns Hopkins University; general surgery.

Bulger, Eileen 1992; MBBS, 1984, Madras Medical College (India); trauma, critical care.

Cornejo, Carol J. 1991; MD, 1991, University of California (San Francisco); trauma/critical care.

Curtis, William E. 1997; MD, 1988, University of Colorado (Denver); cardiac surgery.

Healey, Patrick J. 1993; MD, 1987, Boston University; general and pediatric surgery.

Horvath, Karen D. 1998; MD, 1990, New York Medical College; surgical critical care, laparoscopic surgery.

Karmy-Jones, Riyad 1997; MD, 1983, University of Alberta (Canada); thoracic surgery.

Kuhr, Christian S. 1988; MD, 1988, University of Washington; multi-organ transplantation, urologic surgery.

Levy, Adam E. 1990; MD, 1990, University of Cincinnati; transplant.

Lynge, Dana C. 1993; MD, 1985, McGill University (Canada); general surgery.

Mann, Gary N. 2000; MBBCh, 1989, University of Witwatersand (South Africa); surgical oncology, breast cancer, endocrine neoplasia, melanoma, soft tissue sarcoma.

Mock, Charles N. * 1992; MD, 1980, Brown University; injury: epidemiology, prevention, treatment; especially in less-developed countries.

Mulligan, Michael S. 1999; MD, 1989, University of Connecticut; thoracic surgery.

Nathens, Avery B. 1998; MD, 1990, Queen's University (Canada), PhD, 1997, University of Toronto (Canada); trauma and critical care surgery, surgical infection.

Whelan, Michael F. 1998; DDS, 1988, University of California (Los Angeles), MD, 1992, St. Louis University; craniofacial surgery, cleft lip and palate, microsurgery, jaw reconstruction, orthognathic surgery.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

SURG 498 Undergraduate Thesis (*) *Langdale* Offered to those students who have engaged in undergraduate research in general surgery. (Full- or part-time.)

SURG 499 Undergraduate Research (*) *Langdale* Provides an opportunity to participate in ongoing research projects or carry out an independent research project under supervision of Department of Surgery faculty. Practical experience in experimental design and execution is provided under direct supervision of selected faculty members. (Full- or part-time.)

SURG 505 P-Preceptorship in Surgery (1) *Langdale* Opportunity for first- and second-year medical students to gain personal experience with clinical faculty members in the community. Students observe general aspects of private practice, including clinical problems seen; practice limitation; doctor-doctor, doctor-patient, and doctor-nurse relationships in the office and hospital. Prerequisite: permission of department.

SURG 600 Independent Study or Research (*) *Langdale*

SURG 665 P-Clinical Clerkship (*, max. 12) *Langdale* (Harborview Medical Center, Providence Medical Center, University of Washington Medical Center, Veterans Affairs Medical Center, Virginia Mason Medical Center) Diagnosis and management of problems amenable to surgical therapy. Physiological basis of surgical care, differential diagnosis and decision making, and the basic principles of surgical management. Care of inpatients and outpatients, including participation in the operating rooms. Prerequisite: HUBIO 563. (Six weeks. Limit: twenty students.)

SURG 680 Emergency Medicine Elective (8) Basics of emergency medicine, including the primary survey, secondary survey, and approach to the critically ill patient. Students supervised by emergency boarded staff physicians at Madigan Army Medical Center Emergency Department. Prerequisite: basic clerkship in medicine, surgery, obstetrics, or pediatrics.

SURG 681 P-Peripheral Vascular Disease (4/8, max. 8) *Clowes* (Veterans Affairs Medical Center) Peripheral arterial and venous problems, including methods of clinical evaluation; new diagnostic procedures; and the available methods of treatment. Patient workup, performance of diagnostic studies, and presentation of case material to the staff. Prerequisite: SURG 665, HUBIO 563. (Two or four weeks. Limit: one student.)

SURG 682 P-Clinical Burn Care (*, max. 12) *Heimbach* (Harborview Medical Center) Offered on the burn unit of Harborview Medical Center. Exposure to the care of patients with thermal injury, including management of severe metabolic and septic problems and opportunity to participate in surgical procedures. Exposure to plastic and reconstructive surgery. Prerequisite: SURG 665. (Four or six weeks. Limit: two students.)

SURG 683 P-Pediatric Surgery Externship (8/12) *Tapper* (Children's Hospital and Regional Medical Center) Surgical conditions peculiar to the particular age group with a preponderance of congenital and neoplastic conditions that are amenable to surgical treatment. A reasonable background of knowledge in human embryology and genetics is recommended. Prerequisite: SURG 665. (Four or six weeks. Limit: two students.)

SURG 684 P-Trauma and Emergency Care (*, max. 16) *Copass, Eisenberg* (Harborview Medical Center, University of Washington Medical Center) Register for one or both segments of this course. Segment 1: emergency medicine and trauma at Harborview Medical Center with assignment to the emergency

department. Emphasis on management of severely injured and critically ill patients. Segment 2: acute medicine at University of Washington Medical Center. Evaluate and treat ambulatory emergencies. Prerequisite: SURG 665, MED 665. (Four weeks, third-year and fourth-year students. Limit: twelve students at Harborview Medical Center; three students at University of Washington Medical Center.)

SURG 685 P-Cardiothoracic Surgery Externship (*, max. 12) *Verrier* (University of Washington Medical Center) Serve as subintern, participate in patient care while learning cardiopulmonary hemodynamics of cardiac and thoracic surgery. Observe a wide variety of both cardiac and thoracic disease entities. Participate in the open-heart procedures in the operating room. Opportunity to gain additional understanding of physiology of cardiopulmonary bypass. (Four or six weeks. Limit: two students.)

SURG 686 P-Plastic Surgery Clerkship and Preceptorship (*, max. 12) *Vedder* (University of Washington affiliated hospitals) Introduces fundamental techniques and enhances knowledge of plastic surgery, wounds, trauma, burns, cancers, and pediatric and adult cosmetic and reconstructive surgery. Participate in all surgery-related activities. Prerequisite: SURG 665; MED 665. MS III only, two weeks, 4 credits, limit 2; MS III/MS IV four/six weeks (recommended), 8/12 credits, limit 4.

SURG 687 P-Transplantation Surgery Clerkship (8) *Perkins* (University of Washington Medical Center) Clerkship is in the University regional multi-organ transplantation center. Student participates fully in the care of all transplant patients, on twice daily multidisciplinary rounds, in pre-operative conference, and in the operating room and on the donor harvest team. Weekly didactic teaching sessions. Prerequisite: SURG 665 and MED 665. (Four weeks. Limit: two students.)

SURG 688 P-Subinternship in General Surgery (*, max. 16) *Langdale* (Veterans Affairs Medical Center, Harborview Medical Center, Providence Medical Center, University of Washington Medical Center) Offered on the general surgery wards of the University-affiliated hospitals. Diagnosis, preoperative care, and postoperative care; management of surgical emergencies, the ICU patient, and outpatient follow-up of discharged patients. Students function at the intern level under close supervision of the staff and house staff. Prerequisite: SURG 665. (Four or six weeks. Limit: six students.)

SURG 689 P-Community Surgery Clerkship (8) *Langdale* Designed to supplement basics learned in 665. Excellent opportunity to participate in general, thoracic, vascular, and plastic surgery in a group practice in a smaller city. Recommended for students entering primary care. Prerequisite: SURG 665 and permission of department. (Four weeks. Longview. Limit: one student. Coeur d'Alene. Limit: one student.)

SURG 690 P-Alaska Native Medical Center Surgery Sub-Internship (8/12) *Langdale* Designed to supplement basics learned in 665. Excellent opportunity to participate in general, thoracic, vascular, and plastic surgery in a specialized population of patients. Recommended for students entering primary care. Prerequisite: SURG 665 and permission of department. (Four or six weeks. Alaska Native Medical Center, Anchorage. Limit: one student.)

SURG 691 P-Surgical Intensive Care Unit Sub-Internship (8) *Langdale* Designed to augment experience gained in 665. Excellent opportunity to participate in the management of critically ill patients under the close supervision of the staff/house staff. Recommended for students entering surgery or primary care. Prerequisite: SURG 665. (Harborview Medical Center. Limit: two students. Veterans' Affairs Medical Center. Limit: one student.)

SURG 697 P-Surgery Special Electives (*, max. 24) *Langdale* Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: SURG 665 and departmental permission. (Four, six, or twelve weeks.)

SURG 698 P-Clinical Clerkship Away (*, max. 24) Clerkship equivalent to SURG 665, at sites outside the Seattle metropolitan area.

SURG 699 P-WWAMI Surgery Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Urology

BB1115 Health Sciences



General Catalog Web page:
www.washington.edu/students/genecat/academic/Urology.html



Department Web page:
depts.washington.edu/uroweb/

Urology is the surgical discipline concerned with diseases of the urinary tract in males and females, and the genital system in the male. The science is broadly based: major areas of practical and investigative concern include congenital defects, cancer, renal diseases, reproductive biology, neuropathology, renal stone formation, and transplantation.

Clinically, the field encompasses a large variety of technical skills including real-time imaging and manipulation, endoscopy, and open surgery. Medical diagnosis and treatment are a large part of the discipline.

The department is actively involved in patient care, instruction, and research concerning the problems of urology. Training for medical students starts in the second year and continues through the third and fourth years. Training is also provided for residents, fellows, nurses and applied specialists. The department is responsible for a fully approved urology residency program. Contact the Urology Clerkship Coordinator at 206-731-3205 for further information.

Faculty

Chair

Paul Henry Lange

Professors

Ansell, Julian S. 1959, (Emeritus); MD, 1951, Tufts University, PhD, 1959, University of Minnesota; congenital defects and pediatric urology.

Barnes, Glover W. * 1969; MA, 1955, PhD, 1961, State University of New York (Buffalo); tissue, organ immunology.

Berger, Richard E. 1982; MD, 1973, University of Chicago; infertility, infectious diseases, impotence and prostate disease.

Brannen, George 1979; MD, 1969, Northwestern University; general adult urology, third-world medicine.

Chapman, Warren H. 1962, (Emeritus); MD, 1952, University of Chicago; oncology and microsurgery.

Krieger, John N. 1982; MD, 1974, Cornell University; infectious diseases.

Lange, Paul Henry 1988; MD, 1967, Washington University; oncology, endourology and adult reconstruction.

Mayo, Michael Edward 1975; MBBS, 1962, St Thomas' Hospital Medical School (UK); neuro-urology and reconstruction, urodynamics.

Mitchell, Michael E. 1989; MD, 1969, Harvard University; pediatric urology and reconstruction.

Vessella, Robert L. 1989; PhD, 1974, University of Mississippi; tumor markers and immunology.

Associate Professors

Berry, Donna L. * 1988, (Adjunct); MN, 1981, University of Texas (Houston), PhD, 1992, University of Washington; health care of persons with, and at risk for, cancer.

Ellis, William J. 1991; MD, 1985, Johns Hopkins University; oncology, prostate disease.

Joyner, Byron David 1999; MD, 1988, Harvard University; pediatric urology.

Lentz, Gretchen M. 1992, (Adjunct); MD, 1986, University of Washington; urogynecology.

Marsh, Christopher L. 1989; MD, 1980, Loma Linda University; transplant surgery.

Miller, Jane L. 1985; MD, 1985, University of Oklahoma; female urology and urodynamics, urologic trauma.

Riley, Donald E. * 1982; PhD, 1976, University of Washington; pathogenic research and diagnosis involving DNA sequences.

Wessells, Hunter 2000; MD, 1988, Georgetown University; genitourinary trauma, reconstructive surgery.

Assistant Professors

Grady, Richard W. 1996; MD, 1990, University of Michigan; pediatric urology.

Kuhr, Christian S. 1988; MD, 1988, University of Washington; multi-organ transplantation, urologic surgery.

Nelson, Peter S. * 1993, (Adjunct); MD, 1986, University of Kansas; the study of human carcinogenesis using tools of genomics and bioinformatics.

Penson, David F. 1999; MD, 1991, Boston University, MPH, 1999, Yale University; clinical epidemiology and health services research in the areas of urologic disease.

Porter, James Roscoe 1992; MD, 1990, Medical College of Ohio; urologic trauma, laparoscopy, endourology.

Takayama, Thomas K. 1989; MD, 1985, Tufts University; biochemistry of prostate specific antigen.

Yang, Claire C. 1993; MD, 1988, Vanderbilt University; neurourology and electrophysiology testing.

Lecturer

Muller, Charles 1980; PhD, 1976, University of California (Berkeley); male fertility and sperm physiology.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

UROL 498 Undergraduate Thesis (*) Provides an opportunity for medical students to write in the area of urology.

UROL 499 Undergraduate Research (*) 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.

UROL 501 P-Urology Preceptorship (1) Individual experiences with one or more of the full-time department faculty members covering research, teaching, and patient care. Students observe activities in the clinic, hospital ward, operating room, and research laboratories. Prerequisite: first- or second-year medical student standing; permission of instructor.

UROL 675 P-Urology Preceptorship (*, max. 8) Student follows a private practice preceptor in all of his or her work. Becomes acquainted with the office management of urological problems. Prerequisite: UROL 680, HUBIO 562. (Two or four weeks.)

UROL 680 P-Urology Clerkship (*, max. 8) *Berger, Ellis, Grady, Krieger, Lange, Mayo, J. Miller, L. Miller, Mitchell, Penson, Porter, Takayama, Wessells* Full activities of clinical service. Basic principles of urology emphasized. Prerequisite: HUBIO 562. (Two or four weeks.)

UROL 681 P-Female Urology (4) *J. Miller, L. Miller* Observation of cases of lower urinary tract disorders specific to women, emphasizing behavioral management and multidisciplinary care. Ninety-five percent of cases observed are women. Not intended as the only exposure to urology for students considering urology as career choice. Prerequisite: third or fourth year standing and permission of instructor.

UROL 685 P-Urology Subinternship (*, max. 12) *Berger, Ellis, Grady, Krieger, Lange, Mayo, J. Miller, L. Miller, Mitchell, Penson, Porter, Takayama, Wessells* Subintern is responsible for patient workups and for preoperative and postoperative care and participates in the operating room. Prerequisite: MED 665 or pediatric basic clerkship, or permission of instructor.

UROL 690 P-Urology Specialties (*, max. 8) For those who wish further exposure to a specific aspect of urology. Students can spend time with one attending at University of Washington Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, or Veterans Administration Hospital studying oncology, infections, infertility, stone disease, impotence, or other aspects of urology. Prerequisite: UROL 680 and permission of instructor.

UROL 697 P-Urology Special Electives (*, max. 24) Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. (Six or twelve weeks.)

UROL 699 P-WWAMI Urology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

School of Nursing

Dean

Nancy F. Woods
T318 Health Sciences

Associate Deans

Ruth F. Craven, Educational Outreach
Pamela H. Mitchell, Research and Practice
Susan L. Woods, Academic Services



General Catalog Web page:
www.washington.edu/students/genecat/academic/School_Nursing.html



School Web page:
www.son.washington.edu

Nurse professionals are members of interdisciplinary teams in clinics, hospitals, and community settings, and work with people of all ages, cultural backgrounds, and lifestyles to help them achieve the highest level of wellness possible. Nurse practitioners fill critical health care needs in both urban and rural settings for portions of the population who have not received adequate health care. Nurse scientists conduct important research about a variety of health problems and how best to promote health, prevent disease, and care for people who are ill. Nurses also teach in schools of nursing, in colleges and universities through the world.

The School of Nursing offers programs leading to baccalaureate, master's, and doctoral degrees.

Undergraduate Program

Adviser

Dagmar Schmidt
T310 Health Sciences, Box 357260
206-221-2461
sonas@u.washington.edu

For information on the School of Nursing's undergraduate program, see the graduate and professional volume of the *General Catalog* or visit the *General Catalog* online at www.washington.edu/students/genecat/.

Graduate Program

Graduate Program Coordinator
T310 Health Sciences, Box 357260
206-543-8736
sonapo@u.washington.edu

The School of Nursing offers graduate study leading to the degrees of Master of Nursing, Master of Science, and Doctor of Philosophy in nursing science. At the master's level, programs are designed to meet the many needs of a diverse student body by providing opportunities for advanced study, practice, and research in nursing. The Master of Nursing program develops increased competence in selected areas of advanced practice nursing. The following focus areas are available: adult acute-care nurse practitioner (cardiovascular/AIDS/oncology), adult/older adult nurse practitioner, advanced community-health nursing (cross-cultural nursing/occupational health nursing/healthy aging/policy and program

development), advanced practice in care systems management, advanced practice home care nurse practitioner, advanced practice genetics nursing, advanced practice options in bio-behavioral nursing, family-centered pediatric nursing, nurse midwifery, perinatal nursing/neonatal nurse practitioner, psychosocial nurse practitioner, family nurse practitioner, pediatric nurse practitioner, women's primary care nurse practitioner, and an independent M.N. Research is an integral part of all programs. A thesis is required in the Master of Science program. The Master of Nursing program provides the option of a thesis or non-thesis project. The School of Nursing offers three concurrent graduate degree program with the School of Public Health and Community Medicine: the M.N./M.P.H., the M.S./M.H.A., and the M.N./M.H.A.

Part-time study is available in most focus areas of the M.N. program. Course work may be started prior to formal admission to a program as a graduate non-matriculated student (GNM). GNM status allows the student to earn up to 12 graduate-level credits which may be applied to a graduate program if the student is later admitted. Time limits for acceptance of courses taken as a GNM student are six years for a master's degree and ten years for a doctoral degree from the first course to completion of the degree.

The Doctor of Philosophy in Nursing Science program prepares scientists capable of advancing nursing practice and education through research and scholarly activity. The program provides for rigorous research training designed for individuals interested in careers in academia or for other types of leadership positions in health-service agencies in which the ability to design, plan, and implement research in nursing is a significant expectation.

Special Requirements

In addition to the basic requirements for graduate status in the University, admission to premaster's status in the School of Nursing requires baccalaureate preparation either in nursing or in another major, a basic course in statistics, Graduate Record Examination scores within the past five years, an admissions essay, and three references. Licensure as a registered nurse is required for application to the M.N. program. At least one year of practice is recommended for most clinical programs. Admission is usually for autumn quarter. The application deadline for most master's degree options is February 1. Early application is encouraged, although late applications may be accepted on a space-available basis. Additional information may be obtained from the School of Nursing Academic Programs Office

Admission requirements for the doctoral program, in addition to the above, include Graduate Record Examination scores within the past five years, three references, a statement of goals for doctoral study which includes a description of area-of-research interest, and an example of scholarly work. The deadline for application to the doctoral program is February 1.

Financial Aid

A limited number of nurse traineeships are available for premaster's study. Other financial aid is available on a limited basis. Teaching assistantships and research assistantships are available to a limited number of students. Priority for these appointments is given to predoctoral students.

Contact the Academic Programs Office, School of Nursing, for current information.

Faculty

Professors

Allen, David G. * 1988; PhD, 1975, University of Iowa; philosophy of science, critical and feminist theory, psychosocial nursing theory.

Barnard, Kathryn E. * 1972; MSN, 1962, Boston University, PhD, 1972, University of Washington; ecological factors of child development.

Batey, Marjorie V. * 1956, (Emeritus); MS, 1956, PhD, 1968, University of Colorado (Boulder); sociological factors in health-care systems.

Beaton, Randal D. * 1976; PhD, 1972, University of Washington; assessment and treatment of temporomandibular joint pain and dysfunction.

Benoliel, Jeanne 1970, (Emeritus); MS, 1961, University of California (Los Angeles), DNS, 1969, University of California (San Francisco).

Berkowitz, Bobbie * 1988; PhD, 1990, Case Western Reserve University; administration, leadership and policy development within public health and nursing.

Blackburn, Susan T. * 1973; PhD, 1979, University of Washington; high-risk infants and their families, infant care-giving interactions and environments.

Bond, Eleanor * 1984; MN, 1976, PhD, 1985, University of Washington; acute care and critical care nursing, gut motility, effect of ovarian hormones on GI track, stress.

Booth, Cathryn L. * 1980; PhD, 1974, Ohio State University; mother-infant interaction, observational methodology, child birth experiences and attachment.

Brandt, Patricia * 1981; PhD, 1981, University of Washington; influence of family functioning on early child development.

Brown, Marie Annette * 1983; PhD, 1983, University of Washington; women's health, depression, mood disorders, lifestyle changes, exercise, and loss/grief/dying.

Budzynski, Helen Kogan * 1968, (Emeritus); PhD, 1968, University of California (Los Angeles); stress response: cognitive/physiologic interface in chronic dysfunctions, self-management teaching.

Carwein, Vicky * 1995, (Adjunct); MS, 1972, University of California (San Francisco), DNS, 1981, Indiana University; specializing in descriptive work related to the use of alternative therapies by persons with HIV.

Chrisman, Noel J. * 1973; PhD, 1966, University of California (Berkeley); health beliefs and practices, social networks and social support; clinically applied anthropology.

Cowan, Marie J. * 1977, (Affiliate); MS, 1972, PhD, 1979, University of Washington; estimation of infarct size by electrocardiography, sudden cardiac death, physiological nursing.

Craven, Ruth F. * 1968; MN, 1968, University of Washington, EdD, 1984, Seattle University; gerontological nursing.

Cunningham, Susanna L. * 1978; MN, 1969, PhD, 1978, University of Washington; risk factors for atherosclerotic cardiovascular disease.

De Tornay, Rheba * 1975, (Emeritus); EdD, 1967, Stanford University; health services, nursing education.

Dimond, Margaret * 1988; MN, 1971, University of Iowa, PhD, 1978, University of Wisconsin; aging, bereavement, family caregiving, Alzheimer's disease, chronic illness, long-term care.

Eggert, Leona * 1978, (Emeritus); MA, 1970, University of Washington, PhD, 1984, University of Washington; adolescents, drug use, suicide, communication, personal relationships.

Gallucci, Betty J. * 1973; MS, 1971, North Carolina State University, PhD, 1973, North Carolina State University; oncology, nutritional assessment, pathophysiology of stomatitis, and graft versus host disease.

Giblin, Elizabeth C. * 1982, (Emeritus); MN, 1954, University of Washington, EdD, 1959, University of Colorado (Boulder); nursing assessment and nursing therapies, pathophysiological bases.

Graham, Katherine J. * 1988, (Emeritus); MN, 1967, PhD, 1978, University of Washington; family adaptation; quality of life in wellness and illness; professional commitment.

Haberman, Mel R. 1982, (Affiliate); PhD, 1987, University of Washington; quality of life of cancer survivors, impact of breast cancer on family.

Hegyvary, Sue T. 1986; MN, 1966, University of Washington, PhD, 1974, Vanderbilt University; administration and productivity of health care and nursing services.

Heitkemper, Margaret M. * 1981; MN, 1975, University of Washington, PhD, 1981, University of Illinois; gastroenterology, enteral nutrition, gerontology.

Horn, Barbara J. * 1977, (Emeritus); PhD, 1971, University of Michigan; effective organization of nursing resources.

Kelly, Jean F. * 1986; PhD, 1979, University of Washington; family factors that affect at-risk children.

Killien, Marcia G. * 1973; PhD, 1982, University of Washington; women's health, reproductive decision making, work and family.

Kodadek, Sheila M. 1996, (Affiliate); PhD, 1985, University of Illinois; population-based nursing.

Landis, Carol A. * 1991; MS, 1973, DNS, 1988, University of California (San Francisco); health consequences of sleep loss, neuroendocrinimmune interactions, methods of inquiry.

Lewis, Frances M. * 1978; PhD, 1977, Stanford University; complex organizational analysis, evaluation research, psychosocial factors in chronic illness.

Little, Dolores E. 1951, (Emeritus); MN, 1957, University of Washington; physiological nursing.

Magyary, Diane L. * 1981; PhD, 1981, University of Washington; family centered health care of children at risk, disabled or handicapped.

Mansfield, Louise W. 1979, (Emeritus); MA, 1951, Columbia University; physiological nursing.

Mitchell, Pamela H. * 1971; MS, 1965, University of California (San Francisco), PhD, 1991, University of Washington; neuroscience nursing, diagnostic strategies.

Muecke, Marjorie A. * 1979; PhD, 1976, University of Washington; community health, medical anthropology, reproductive health, Southeast Asia (Thailand).

Murphy, Shirley Ann * 1985, (Emeritus); PhD, 1981, Portland State University; addictive processes in women, coping with undesirable life events.

Osborne, Oliver H. * 1969, (Emeritus); PhD, 1968, Michigan State University; ideology, policy and health-care systems, cross-cultural health, mental health, nursing.

Patrick, Maxine L. * 1973, (Emeritus); DPH, 1970, University of California (Los Angeles); gerontology, geriatrics.

Price Sprattlen, Lois * 1976; PhD, 1976, University of Washington; sexual harassment and perceived workplace mistreatment in higher education.

Prinz, Patricia * 1976; PhD, 1969, Stanford University; pharmacology.

Salazar, Mary K. * 1984; MN, 1986, University of Washington, EdD, 1991, Seattle University; behavioral theory applied to health education, occupational health, program evaluation.

Siantz, Mary Lou * 1998, (Affiliate); MN, 1971, University of California (Los Angeles), PhD, 1984, University of Maryland; child/adolescent psychiatric nursing, risk and adaptation among migrant children and families.

Spieker, Susan J. * 1983; PhD, 1982, Cornell University; developmental psychology, infant security, mother-infant interaction.

Swanson, Kristen M. * 1985; PhD, 1983, University of Colorado (Boulder); caring therapeutics, responses to miscarriage, women's health, loss, bereavement.

Teri, Linda * 1984; PhD, 1980, University of Vermont; controlled clinical trials of caregiving training for patients with Alzheimer's.

Thompson, Frances Elaine A. * 1984; PhD, 1990, University of Washington; attribution theory, adolescent drug use, suicide.

Vitiello, Michael V. * 1982, (Adjunct); PhD, 1980, University of Washington; sleep, sleep disorders, circadian rhythms, aging, behavioral medicine.

Webster-Stratton, Carolyn *; PhD, 1980, University of Washington; parent intervention programs for behaviorally disturbed children.

Whitney, Joanne D. * 1991; MS, 1979, University of Michigan, PhD, 1991, University of California (San Francisco); wound healing.

Wilkie, Diana J. * 1990; MN, 1984, PhD, 1990, University of California (San Francisco); cancer pain assessment and management, pain research.

Wolf-Wilets, Vivian * 1969, (Emeritus); PhD, 1969, University of Chicago; curriculum development, instruction, stress management.

Woods, Nancy * 1978; PhD, 1978, University of North Carolina; women's health.

Woods, Susan L. * 1975; MA, 1975, University of Washington, PhD, 1991, Oregon Health Sciences University; cardiovascular clinical specialist, pulmonary artery catheter measurement.

Associate Professors

Baydar, Nazli * 2001, (Research); PhD, 1984, Interuniversity Programme in Demography (Belgium); normative child development, family processes, multivariate statistical methods, psychometrics.

Belza, Basia * 1991; MN, 1982, University of Virginia, PhD, 1991, University of California (San Francisco); chronic illness, gerontology, fatigue prevention and management in rheumatic diseases.

Berry, Donna L. * 1988; MN, 1981, PhD, 1992, University of Washington; health care of persons with, and at risk for, cancer.

Betrus, Patricia * 1978; PhD, 1985, University of Washington; women and depression, epigenesis of emotions, mental health, stress, violence quantitative analysis.

Bevens, Stella Hay * 1983, (Emeritus); MA, 1951, University of Minnesota; physiological nursing.

Blainey, Carol * 1967; MN, 1967, University of Washington; clinical teaching and problems of patients with diabetes mellitus.

Brandt, Edna M. 1979, (Emeritus); MN, 1953, University of Washington; physiological nursing.

Burr, Robert L. 1976; MSEE, 1978, PhD, 1986, University of Washington; cardiovascular/psychophysiology, autonomic nervous system.

Bush, James P. 1984, (Emeritus); MN, 1973, University of Washington, EdD, 1984, University of San Francisco; pain management, power and powerlessness as perceived by professional nurses.

Carnevali, Doris 1982, (Emeritus); MN, 1961, University of Washington.

Elmore, Shawn K. * 1983; PhD, 1990, University of Washington; psychobiological aspects of women with mood disorders and light therapy.

Ensign, B. Josephine * 1994; MS, 1986, Virginia College of Medicine, MPH, 1992, DPH, 1994, Johns Hopkins University; health care program planning and evaluation for marginalized populations and high-risk youth.

Estes, Nada * 1972, (Emeritus); MS, 1958, University of Colorado (Boulder); counseling people with substance-use disorder, depression.

Flagler, Susan B. * 1979; DNS, 1981, University of California (San Francisco); maternal role adjustment and early parent-infant interaction.

Fought, Sharon G. * 1986, (Adjunct); PhD, 1983, University of Texas (Austin); emergency care/critical care nursing; simulation gaming educational strategies.

Herting, Jerald R. * 1996; PhD, 1987, University of Washington; research methodology and at-risk youth.

Hoffman, Agnes * 1979, (Emeritus); PhD, 1977, University of Kansas; substance use disorders, mental health care of the elderly.

Horn, Beverly M. * 1976, (Emeritus); PhD, 1975, University of Washington; cross-cultural research in maternal-child nursing.

Jarrett, Monica E. * 1980; MN, 1981, PhD, 1988, University of Washington; psychobiology of women.

Johnson, Clark * 1994; MEd, 1973, PhD, 1978, University of Washington; applied research methods including development in applied statistics, assessment, and analysis.

Jordan, Pamela L. * 1984; PhD, 1984, University of Michigan; expectant/new fatherhood, transition to parenthood.

Kang, Rebecca R. * 1981; PhD, 1985, University of Washington; environment of at-risk infants and families, Asian and Pacific Islander health.

Kieckhefer, Gail M. * 1987; PhD, 1985, University of Washington; motivation for health promotional and illness management behavior in children.

- Lalonde, Bernadette 1980, (Adjunct Research); PhD, 1979, University of Toronto (Canada); public health program development, process and outcome program evaluation, evaluation research.
- Lentz, Martha J. * 1983; MN, 1975, PhD, 1984, University of Washington; physiological adaption: the influence of sleep and other biological rhythms.
- Leppa, Carol J. * 1990, (Adjunct); PhD, 1990, University of Illinois; ethics and comparative health care systems, palliative care approaches to end of life care.
- Lewis, Linda L. * 1989, (Emeritus); MS, 1981, PhD, 1987, University of Illinois; reproductive neuroendocrinology mood changes related to the human menstrual cycle.
- Lindenberg, Catherine S. 1998; DPH, 1985, Johns Hopkins University; public health management and policy.
- Logsdon, Rebecca G. * 1986; PhD, 1986, Oklahoma State University; geriatric psychology, Alzheimer's disease, caregiving.
- Lovell, David Gilbert * 1984; MSW, 1993, University of Washington; criminal justice policy and treatment of mentally ill offenders.
- Martell, Louise K. * 1992; PhD, 1990, Oregon State University; maternal adaptations to childbearing.
- McCurry, Susan Melancon * 1991; MS, 1977, MS, 1984, PhD, 1991, University of Nevada; dementia, aging, older adults, depression, sleep, psychotherapy intervention research.
- McGrath, Barbara B. * 1987; PhD, 1993, University of Washington; ethnographic studies with U.S. Pacific Islanders on health issues, specifically, HIV/AIDS prevention.
- Meyer, Kerry E. * 1992; MN, 1981, Vanderbilt University, PhD, 1990, University of Maryland; health informatics, expert systems in support of clinical decision making, and geriatrics.
- Mitchell, Ellen S. * 1977; MN, 1967, University of Florida, PhD, 1986, University of Washington; women's health; menstrual cycle symptom experience, food cravings and eating control.
- Molbo, Doris M. * 1969, (Emeritus); MA, 1968, University of Washington; oncology: prevention and screening, care and rehabilitation.
- Montano, Daniel E. * 1979, (Affiliate); PhD, 1983, University of Washington; attitude-behavior research and behavior change, cancer control, HIV prevention.
- Munet-Vilaro, Frances * 1997; PhD, 1984, University of Washington; coping of Latinos with a family member with cancer and/or AIDS.
- O'Connor, Frederica W. * 1986; PhD, 1986, Northwestern University; public sector mental health treatment provision, interventions promoting desired life quality.
- Olshansky, Ellen F. * 1985, (Affiliate); DNS, 1985, University of California (San Francisco); psychosocial implications of infertility related to the family, qualitative research, depression.
- Patterson, Diana * 1989; DNS, 1984, University of Alabama; childbearing family, pediatric primary health care.
- Pesznecker, Betty L. 1970, (Emeritus); MN, 1957, University of Washington.
- Pittman, Rosemary 1964, (Emeritus); MS, 1947, University of Chicago.
- Randell, Brooke P. * 1993; MN, 1969, University of California (Los Angeles), DNSc, 1987, University of California (San Francisco); preventive community-based interventions with high-risk adolescents and their families.
- Richardson, Mary L. * 1977, (Adjunct); MHA, 1978, PhD, 1984, University of Washington; organization, management, and analysis of policy relevant to health services.
- Schepp, Karen G. * 1988; PhD, 1985, University of Arizona; stress and coping of physically and mentally ill youth and their families.
- Schroeder, Carole A. * 1993; MSN, 1985, University of Nevada, PhD, 1993, University of Colorado (Denver); women's health experiences, critical approaches to knowledge development, and developing partnership.
- Schwartz, Anna L. * 1998, (Affiliate); MS, 1991, Florida State University, MS, 1994, Arizona State University, PhD, 1997, University of Utah; interventions and mechanisms to improve symptoms and quality of life for patients and survivors.
- Shannon, Sarah E. 1984; PhD, 1992, University of Washington, MSN, 1992, University of Washington; clinical ethics; decision-making surrounding use of life-sustaining therapies.
- Simpson, Terri A. * 1991; MN, 1975, University of California (San Francisco), PhD, 1988, University of Washington; critical care patients' physiological and psychological responses to environmental stressors.
- Spitzer, Ada 1993, (Affiliate); PhD, 1990, University of Washington; migration, cross-cultural nursing, stress and coping of children with illness, nursing scholarship.
- Thomas, Karen A. * 1981; PhD, 1986, University of Washington; preterm infant development, care unit environments, acute care pediatrics, thermoregulation.
- Thomas, Mary Durand * 1983; PhD, 1978, University of Hawaii; psychiatric illnesses, assessment and diagnostic reasoning, cultural aspects of care.
- Ward, Deborah * 1987; PhD, 1987, Boston University; health policy and politics, women's paid and unpaid caregiving work.
- White-Traut, Rosemary 1994, (Affiliate); DSc, 1983, Rush University; preterm infant physiological and behavioral responsiveness to multimodal stimulation by caregivers.
- Young, Heather M. * 1986; MN, 1989, PhD, 1991, University of Washington; community-based health care service for older adults.

Assistant Professors

- Altman, Gaylene M. 1983; MN, 1973, PhD, 1992, University of Washington; women's health and inflammation; pain and endometriosis.
- Bond, Gail E. 2000, (Research); PhD, 1995, University of Washington; aging, memory, substance-use disorders, long-term care.
- Carr, Catherine A. * 1998; PhD, 1993, University of Michigan; factors the affect provider practice and clinical outcomes of midwifery care.
- Carrere, Sybil 1989, (Research); PhD, 1990, University of California (Irvine); interface between family relationships, stress, and health.
- Cochrane, Barbara B. * 1985, (Affiliate); PhD, 1992, University of Washington; women's health; individual adaptations to health and illness, clinical therapeutics.

Davis, Shoni Kay * 1993, (Affiliate); DNSc, 1992, University of California (Los Angeles); program development, clinical treatment strategies, and research of perinatal chemically dependent.

Draye, Mary A. 1982; MPH, 1968, University of Michigan; primary health care, health promotion, risk appraisal, coping with infertility.

Huebner, Colleen Ellen * 1982, (Adjunct); PhD, 1991, MPH, 1994, University of Washington; the social bases of developmental problems in early childhood.

Jones, Mary C. 1964, (Emeritus); MS, 1962, Boston University.

Kasprzyk, Danuta M. 1991, (Affiliate); PhD, 1984, University of Washington; preventive and behavioral medicine and health psychology.

Kennedy, Michael 1987; PhD, 1994, University of Washington; symptom self-management, clinical nursing research.

Kim, Eunjung * 2001; PhD, 2001, University of Wisconsin (Madison); Korean-American parenting's influence on adolescents' developmental outcomes.

Kovalesky, Andrea H. 1992, (Adjunct); MSN, 1977, University of California (San Francisco), MA, 1990, Fuller Theological Seminary, PhD, 1997, University of Washington; maternal/child nursing.

Kozuki, Yoriko 2000; PhD, 1999, University of San Francisco; symptom awareness and neuroleptic adherence in schizophrenia spectrum disorders.

Labyak, Susan * 2001; PhD, 1993, University of Michigan; human sleep and circadian timing.

Larson, Margaret L. * 1958, (Emeritus); MN, 1967, University of Washington; cross-cultural variables in mental illness, nursing interventions in disturbed behaviors.

Lydon-Rochelle, Mona 2001; PhD, 1999, University of Washington; applied epidemiology in maternal health.

MacLaren, Aileen * 1994; MSN, 1982, University of Miami (Florida), PhD, 1998, Johns Hopkins University; nurse midwifery.

Moniz, Donna M. 1998, (Affiliate); MN, 1975, JD, 1982, University of Washington; nursing and the law.

Motzer, Sandra Adams * 1976; MN, 1976, University of Washington, PhD, 1992, Oregon Health Sciences University; NK cell function in women with chronic health disturbance (i.e., irritable bowel syndrome).

Sales, Anne * 1997, (Adjunct); MSN, 1989, University of North Carolina, PhD, 1998, University of Minnesota; patient and organizational outcomes, health care work force, health economics.

Sikma, Suzanne 1979, (Adjunct); MSN, 1979, Loyola University (Chicago), PhD, 1994, University of Washington; caring in organizations, development and evaluation of organizations, care delivery systems.

Solchany, JoAnne E. 1995; PhD, 2000, University of Washington; relationships between children and their primary caregivers.

Strickland, Carolyn J. B. * 1991; MS, 1976, PhD, 1983, University of Washington; health related behavior, complex organizations, American Indian populations.

Venkatraman, Manorama M. 1995, (Research); MSW, 1984, PhD, 1990, University of Michigan; cross-cultural comparison of mid-life women in the United States and India.

Weston, Donna 2001; PhD, 1983, University of California (Berkeley); methods for characterizing early manifestations of pathology.

Willgerodt, Mayumi * 2001; PhD, 1999, University of Illinois (Chicago); ethnic minority health issues as they relate to acculturation and cultural orientation.

Zierler, Brenda * 1988; PhD, 1996, University of Washington; research in patient with venous thromboembolism; clinical outcomes, process outcomes.

Senior Lecturers

Albert, Marilyn L. 1989; MSN, 1974, Boston University; health policy and politics; kin care and women's studies.

Christianson, Phyllis L. 1988; MN, 1990, University of Washington; gerontology.

Cornman, Barbara J. * 1979; PhD, 1988, University of Washington; sexual assault victims, kinetic family drawings, family having child with cancer.

Gilmore, Susan L. 1996; MN, 1993, University of Washington; cardiovascular nursing.

Gochnour, Michelle Kom 1994; MN, 1997, University of Washington; occupational health nursing, safety and ergonomics.

Gordon, Patricia E. 1993; MN, 1977, University of Washington; individuals, couples, and family therapy.

Hoffman, Martha A. 1978; MN, 1978, University of Washington; maternal-infant health.

Lecturers

Hoyle, Christine A. 1985; MN, 1979, University of Washington; women's health, peri and post menopausal years, primary care of pediatric patients, asthma, diabetes.

Jensen, Marilee M. 1990; MSN, 1988, University of Washington; women's primary care nurse practitioner.

Johnson, Gail 1987; MN, 1987, University of Washington; asthma management and education, pediatrics and women's health.

Petersen, Karla Renee 1990; MN, 1988, University of Washington; primary care of children.

Zimmer, Phyllis Arn 1983; MN, 1982, University of Washington; family nursing practitioner role, practice characteristics, education, and political advocacy.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

Nursing

NURS 401 Care in Illness I (5) Selected psychopathologic and pathophysiologic health alterations and therapies across life span. Assesses human functioning, pathophysiology, pharmacology, psychosocial, cultural variation, health care resources, and person-environment relationships to select nursing strategies for acutely and chronically ill individuals of all ages.

NURS 405 Care in Illness II (5) Continuation of 401, further examining selected psychopathologic and pathophysiologic alterations in health of individuals

in context of families across life span. Emphasizes assessing functioning in psychosocial, cultural, person-environment relationships, and health care resources to plan nursing strategies for acutely/chronically ill individuals of all ages.

NURS 407 Cultural Variation and Nursing Practice (3) Introduces knowledge and skills for culturally competent health care for all. Compares health related values, beliefs, and customs among major cultural groups. Views family and social network as culturally variable health seeking behavior contexts. Examines Western biomedicine and alternative healing methods within broader environment, including government, other social institutions.

NURS 408 Nursing Care with Families in the Community (3) Application of biopsychosocial and social environmental theories and assessments to diagnose alterations in health/mental health of families, small groups in community settings. Emphasizes interpersonal and clinical therapies; coordination of community resources, evaluating effectiveness of changes; characteristics of nursing care in home visiting.

NURS 410 Legal and Ethical Issues in Clinical Practice (3) Identification of ethical and legal issues and the ensuing dilemmas relevant to the profession of nursing and nurses as health professionals and citizens. Selected problems and dilemmas affecting nurses, nursing, and the delivery of health care analyzed using specific moral-ethical perspectives.

NURS 412 Nursing Care Systems (3) Introduction to analyzing current health care systems and their effectiveness in achieving desired health outcomes for selected client populations from a system perspective. Emphasizes key features of interface between client and health care professionals, and environmental factors and organizational structures which influence the transaction.

NURS 413 Nature of Health, Threats to Health, and Health Promotion (3) Introduction to scientific principles of nursing care to promote health, wellness, prevent disease in clients. Emphasis on understanding multidimensional aspects of health; personal, environmental factors that support healthy functional patterns of individual clients, health promotion interventions. Assessment of health patterns in terms of risk, vulnerability, resilience, protective factors. Corequisite: NCLIN 414. Offered: A.

NURS 445 Topics in Nursing (1-10, max. 10) Guided survey and discussion of current literature on major topics in physiological nursing. Seminar/lecture with analysis and discussion of selected topics and readings. May have clinical component. Implications for nursing practice and health care emphasized.

NURS 451 Connecting to Families in Transition (1-2, max. 6) Focuses on working with families as partners in care for clients who are experiencing personal or family life and health transitions. Begins with family experiences with transitions and the way health issues were learned from the family and widens the lens through discussions with classmates and experiences with other families.

NURS 495 Child Rearing, Culture, and Health (3) I&S 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. Offered: jointly with ANTH 440.

NURS 499 Special Electives (1-4, max. 15) Seminars on selected nursing issues of clinical problems, with independent study option, under supervision of nursing faculty. Offered: AWSpS.

NURS 500 Children and Adolescents with Special Health Needs, Their Families and Communities (2/4, max. 4) Advanced practice with infants, children, and adolescents at risk for or with chronic physical, neurobiological, developmental, or psychosocial problems. Focus on assessment and referral with select management strategies relevant for primary and specialty health care. Includes care coordination, multidisciplinary, culturally competent, and family centered approaches. Prerequisite: permission of instructor.

NURS 501 Advanced Mental Health Interventions with Children (3) Developmentally based assessment and therapeutic approaches relevant for children with psychosocial health problems. Consideration to matching therapeutic approaches with specific nature of symptomatology and other child, family, cultural, and environmental characteristics, including social and educational systems. Individual and group evaluation research emphasized. Prerequisite: NURS 500.

NURS 502 Human Responses in Health and Illness I (3) Survey of selected human responses to environmental demands in health and illness as expressed at physiologic, pathophysiologic, experiential, and behavioral levels. Such concepts as host defenses, ventilation, circulation, elimination, and nutrition are discussed. Prerequisite: graduate standing.

NURS 503 Human Responses in Health and Illness II (3) Survey of selected human responses to environmental demands in health and illness at physiologic, pathophysiologic, experiential, and behavioral levels. Such concepts as immune response, stress response, circadian rhythms, pain, sleep, cognition, and consciousness. Prerequisite: graduate standing.

NURS 504 Clinical Nursing Therapeutics (1-6, max. 6) Critical analysis of therapeutic modalities to assist patients with a variety of responses to health problems. Includes selected therapies such as suction/drainage, positioning to address responses in critical, life threatening, and chronic/continuing health states. Varying credits assigned for modules covering particular therapies. Prerequisite: NURS 502, NURS 503, or permission of instructor.

NURS 505 Selected Topics in Psychosocial and Community Health Nursing (2-10, max. 10) In-depth exploration of the major theoretical issues in psychosocial nursing. Seminar with analysis and discussion of selected topics and readings and implications for research and health care.

NURS 506 Foundations in Psychosocial Nursing (3) Introduces students to Psychosocial Nursing by study of classic published papers. Current status of the specialty analyzed by review of standards of practice, certification criteria, and discussion of ethical, clinical, and educational issues. Examines visions and projected needs for the future.

NURS 508 Seminar in Group Treatment (2) 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 509 Issues in Violence and Aggression for Health Professionals (3) Focuses on research and theory of violent/aggressive behavior. Perspectives of victim, offender, family, community, society examined. Focus is recognition of violence against women. Course is designed to challenge students to clarify beliefs, values related to topics such as rape, homicide, domestic violence. Prerequisite: graduate nursing student or permission of instructor.

NURS 510 Primary Care Foundations: Diagnosis and Management of Common Health Concerns (1-3, max. 9) Focus on diagnosis and management of common primary care problems of adolescents and adults, including older adults, within advanced nursing practice. Emphasizes individual and family responses and nursing strategies including differential diagnosis, treatment, patient education, and follow-up. Content focus changes each quarter. Prerequisite: permission of instructor; recommended: concurrent field work.

NURS 511 Seminar in Neonatal Nursing (3) Neonatal neurobehavioral and physiologic adaptation within context of physical and social environment. Neonatal responses to alterations in growth and illness. Assessment modalities and therapeutic strategies used during the neonatal period. Prerequisite: NURS 514 or permission of instructor.

NURS 512 Critical and Interdisciplinary Approaches to Women's Health (3) Critical examination of the historical, socio-political, and scientific influences on women's health. Issues of sexism, racism, and heterosexism discussed from the perspective of different disciplines. Offered: jointly with WOMEN 512.

NURS 513 Seminar in Contemporary Women's Health Issues (3) Critical analysis of contemporary and historical literature relevant to health care for women across the life span. Synthesis of a holistic view of women's health to guide research and practice. Offered: jointly with WOMEN 513.

NURS 514 Physiologic Adaptation in Women and Children (1-6, max. 6) Analysis of developmental physiologic adaptations in four units: women/reproductive processes, pregnancy/postpartum, fetus/neonate, and infancy through adolescence. Emphasis on implications for nursing practice. Examination of research basis for selected intervention strategies.

NURS 515 Common Adolescent Health Problems (2) Focuses on assessment, clinical decision making, and management of common adolescent problems. Concepts and theories of health promotion, adolescent development, and intervention strategies are explored to provide a broad framework for caring for adolescents in primary settings.

NURS 516 Pediatric Pulmonary Anatomy and Physiology: Clinical Applications (2) Lung development, anatomy, and physiology; clinical application when caring for children with acute and chronic lung disease. Prerequisite: permission of instructor.

NURS 517 Pediatric Pulmonary Pathophysiology: Clinical Applications (2) Applies knowledge of pediatric anatomy and physiology to assessment and treatment of pulmonary pathophysiology in children. Nursing issues in caring for children and families with acute and chronic lung disease. Prerequisite: permission of instructor.

NURS 518 Advanced Practice Pediatric Primary Care Management (3) Focuses on use of clinical decision making framework to develop theoretically and empirically sound individualized comprehensive management plans for the young child who presents with common physical and behavioral symptoms in the primary care setting. Prerequisite: permission of instructor.

NURS 519 Curriculum Development in Nursing Education (3) 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. Prerequisite: graduate standing.

NURS 520 Evaluation of Clinical Performance in Nursing (3) For graduate students preparing for fac-

ulty or staff development positions in nursing. Theory and principles of evaluation. Instruments to appraise clinical nursing performance developed as part of course requirements. Prerequisite: graduate standing or permission of instructor.

NURS 524 Conceptual Foundations for Care Systems Management (3) Critical analysis of nature and theoretical bases of care systems management practice. Concepts of nursing and organization science foundations to person-provider transaction management and leadership in context of economic, political, and social environments and health outcomes. Prerequisite: graduate standing.

NURS 525 Managing Clinical Effectiveness Within Care Systems (3) Optimizing person-provider clinical therapeutic transactions at multiple levels of care systems complexity and population aggregation. Emphasis on designing, managing and evaluating clinical effectiveness and efficiency within care systems. Prerequisite: NURS 524 or permission of instructor.

NURS 526 Managing Organizational Effectiveness Within Care Systems (3) Analysis of management strategies for attaining effective and efficient organizational structures and processes within health care systems. Prerequisite: NURS 524 or permission of instructor.

NURS 527 Managing Effective Access and Utilization Within Care Systems (3-4) In-depth inquiry into health care access and resource utilization patterns among diverse populations, with emphasis on management strategies for establishing effective population-system fit. Additional credit for exploring access and utilization patterns within specific populations.

NURS 528 Implications of Human Embryology and Genetics for Clinical Practice (3) Normal development of the human embryo and fetus and principles of human genetics. Alterations in development leading to common anomalies and implications for clinical practice. Prerequisite: graduate standing or permission of instructor.

NURS 529 Childhood Common Developmental and Behavior Issues (2) Focus on common developmental and behavioral issues presented by children and their families in primary care setting. Emphasis on the developmental, family, and cultural aspects of assessment and management of the common issues.

NURS 530 Conceptual Frameworks for Parent-Child Nursing (3) Designed to assist graduate students in exploration, criticism, and analysis of selected concepts, frameworks, and models relevant to parent-child nursing practice. Group seminar work focuses on the discussion of issues influencing the roles and practice of clinical nurse specialists in parent-child nursing. Skills necessary for developing a conceptual framework for practice.

NURS 531 Selected Topics in Family and Child Nursing (1-6, max. 12) In-depth examination of the literature pertinent to major theoretical issues in parent and child nursing. Seminar with analysis and discussion of selected topics and readings. Implications for research, prevention, and health care stressed. Prerequisite: permission of instructor.

NURS 533 Seminar in Cardiovascular Nursing (3) Systematic inquiry into the influence of physical and emotional factors on pathophysiology underlying selected cardiovascular conditions; group study of current therapies with emphasis on prevention and rehabilitation. Individual study of topic of interest.

NURS 534 Seminar in Nursing in Gerontology (3) Gerontological research findings applied to complex

nursing problems in maintenance of health and maximum functioning in the aged.

NURS 535 Seminar in Neuroscience Nursing (3) Guided survey of clinical and experimental literatures regarding selected concepts of human functioning mediated by the nervous system: consciousness, mentation, movement, sensation, integrated regulation, coping with disability. Clinical and research measurement, current research and implications for further research, clinical applications.

NURS 536 Biological Aspects of Cancer: Implications for Care (3) Survey of major concepts from tumor biology and implications for advanced oncology nursing practice. Areas covered include carcinogenesis, cancer epidemiology, pathology, metastasis, treatments (chemotherapy, radiation, surgery, immunotherapy), and cancer detection and prevention. Discussion of role of advance nurse clinician and complex patient responses are incorporated into discussion of basic biological concepts.

NURS 537 Pain Management: Pharmacological and Nonpharmacological Therapeutics (3) Course focuses on nursing management of pain as a multi-dimensional phenomenon. Pharmacologic and non-pharmacologic therapeutics are critically reviewed for appropriateness in treatment of acute, chronic, and cancer pain. Nursing actions to initiate and maintain optimal therapy, based on individual responses, are reviewed and evaluated. Research-based clinical decisions are practiced.

NURS 539 Seminar in Critical-Care Nursing (3, max. 9) Systematic inquiry into pathophysiology, initial nursing management, and systems of care for the critically ill adult or child.

NURS 540 Special Topics in Biobehavioral Nursing and Health Systems (3-6, max. 9) Guided survey of the experimental literature of major topics in physiological nursing, including cardiopulmonary, biology of aging, neuromuscular, cancer, and endocrine. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized.

NURS 541 Care of Well Women (4) Examines components the components of advanced nursing/midwifery care of well women. Emphasis on assessment, diagnosis, and management of common health issues and problems of women across the life span. Prerequisite: permission of instructor.

NURS 542 Care During Childbearing I (4) Advanced nursing/midwifery care and management of the low-risk childbearing woman and fetus through preconception, prenatal, intrapartum, and postpartum periods. Prerequisite: NURS 514.

NURS 543 Advanced Practice Childbearing and Women's Health Care (1-4, max. 4) Assessment and management related to advanced nursing/midwifery perinatal care and women's health care problems. Topics covered are ambulatory antepartum and postpartum care, intrapartum care, and advanced women's health care and adolescents at risk. Module(s) selected depends on program requirements or student elective. Offered: W.

NURS 544 Psychosocial Adaptations of Individuals and Families during the Perinatal Period (3) Adaptation of individuals and families during the perinatal period, with emphasis on psychosocial adaptation, consumer education, transition to parenthood, parent-infant interaction and community based support. Prerequisite: permission of instructor.

NURS 545 Care of the Neonate and Infant (2) Adaptation of neonate to the extrauterine environment and continuum of care to promote the health of

infants within the context of family, community, and other environments. Prerequisite: NURS 514, NURS 528, or permission of instructor.

NURS 546 Interpersonal Aspects of Behavior (3) Selected theories in relation to psychosocial development and adaptation across life span for individuals, families, and small groups and as explanatory models of major psychosocial disabilities. General and psychosocial nursing models evaluated for heuristic value for research and practice. Prerequisite: graduate standing or permission of instructor.

NURS 547 Biologic Aspects of Psychosocial Disabilities (3) Analysis of biological processes influencing psychosocial behavior in response to internal and external stimuli. Research and theory of neuroendocrine mechanisms in psychosocial disabilities. Analysis of nursing management and evaluation of biopsychosocial modalities used in modification of behavior. Prerequisite: graduate standing in nursing or permission of instructor.

NURS 548 Seminar in Infant Mental Health (1-, max. 3) Reviews four aspects of infant mental health: early development, prevention, multigenerational phenomena, and multidisciplinary perspectives. Includes presentations by faculty, visiting scholars, practitioners, and students. Exposes students to leading theories, major developmental issues, prevention models, and the long-term consequences of risk and protective factors. Credit/no credit only.

NURS 549 Assessment in Psychosocial Nursing (4) Conceptual and clinical approaches to advanced-level data collection and diagnostic reasoning in psychiatric/psychosocial disorders. Synthesizes knowledge from psychosocial nursing and multiple allied fields to enhance learners' cognizance of principles for establishing accurate and comprehensive data bases and sound multifaceted diagnostic formulations. Emphasizes DSM diagnostic scheme.

NURS 550 People of Color, Psychosocial Health, and the Culture of Oppression (3) Explores relationships among the psychosocial health of people of color, American cultural patterns of intersecting forms of oppression (e.g., gender, race, and class) and the role of health professionals in defining, ameliorating and/or aggravating psychosocial distress.

NURS 551 Theoretical Foundations of Primary Care (1-3, max. 3) Presentation and interpretation of theoretical basis of advanced nursing practice in primary care. Provides students with conceptual foundation upon which to base their development as nurse practitioners. Prerequisite: graduate standing; permission of instructor.

NURS 552 Health Promotion (2-3) Emphasis on health promotion, screening, and disease prevention in primary care. Examination of individual and family wellness, models of risk assessment and behavior change, health promotion strategies, and barriers to achieving health. Opportunity to explore age-related health risks. Prerequisite: graduate standing and permission of instructor; recommended: nurse practitioner students take fieldwork concurrently.

NURS 553 The Mentally Ill Offender in Correctional and Community Settings (3) Survey of social, political, economic, legal, and moral problems posed by individuals with mental disorders who commit crimes. Covers historical antecedents and current responses of correctional and mental health systems to mentally ill offenders, prevalence and correlates of incarceration, and roles of professionals in correctional mental health field. Credit/no credit only. Offered: W.

NURS 554 Psychosocial Interventions in Nursing (3) Conceptual foundations and interpersonal skills for interventions to promote personal change.

Application made to nursing care of persons with psychosocial or physical health problems. Lecture-discussion and in-class practice. Prerequisite: graduate standing in nursing or permission of instructor.

NURS 555 Psychopathology, Assessment, and Diagnostics of Children 3 and Under (2-, max. 4) Psychopathology, mental health assessment, and diagnostics in children aged 3 and under, framed by the Diagnostic Classification for Developmental and Mental Health Disorders (DC:0-3). Develops skills and techniques necessary in infant mental health. Prerequisite: acceptance into Infant Mental Health Certificate program or permission of instructor. Offered: WSP.

NURS 556 Biopsychosocial Perspectives on Addictions (3) Psychosocial and pathophysiological aspects of substance use examined for their effects on individuals and families throughout life span. Theories and empirical findings serve as basis for evaluating preventive and therapeutic nursing approaches to substance use disorders, including those related to target populations. Prerequisite: basic course in biological sciences.

NURS 558 Infancy: The Context of Relationships (4) Comprehensive overview of infancy. Topics include caregiving-child interaction, attachment, mental health diagnostic classifications, ecological aspects of the caregiving environment. The NCAST Parent-Child Interactive Scales and the Zero to Three Diagnostic Classification are presented.

NURS 559 Theories of Psychiatric Disabilities (3) Theories from psychosocial nursing, psychiatry, and behavioral sciences explanatory of psychiatric disabilities provide basis for identifying psychosocial problems. Structure and functions of mental health organizations and social networks analyzed. Prerequisite: NURS 547 or permission of instructor.

NURS 560 Dynamics of Community Health Practice (3/5) Examination of and experience with principles of clinical practice in community settings. Included are family as community constituent, populations at risk, community assessment, and community development. Prerequisite: graduate standing or permission. Offered jointly with HSERV 508.

NURS 561 Selected Topics in Comparative Nursing Care Systems (2-3, max. 10) In-depth examination of the literature pertinent to major theoretical issues in cross-cultural nursing and health-care systems. Seminar with analysis and discussion of selected topics and readings. Implications for research and health care stressed.

NURS 562 Clinically Applied Anthropology (3) Anthropology as it relates to interdisciplinary delivery of culturally relevant health care. Cultural variation in illness beliefs and behavior, types of healing practices, illness prevention, social support networks. Prerequisite: graduate standing, permission of instructor. Offered: jointly with ANTH 562.

NURS 563 Advanced Community Health Nursing (3) Systematic inquiry into the nature and foundations of community health nursing. Analytic and theoretical perspectives on health risk assessment and nursing interventions in the community. Implications for community health nursing services. Prerequisite: permission of instructor and graduate standing.

NURS 564 Biopharmacological Management in Psychosocial Nursing (3) Biological and pharmacological interventions pertinent to practice of psychosocial nursing, including psychopharmacology, electroconvulsive therapy, and phototherapy. Emphasis on empirical neuroendocrine bases and then nursing management issues pertaining to these interventions. Legal and ethical issues pertaining to advanced practice and putative neurological mech-

anism are examined. Prerequisite: NURS 547 or permission of instructor.

NURS 565 Self-Management Strategies and Techniques in Patient Care (3) Theories underlying cognitive/behavioral self-management strategies and techniques in patient care. Evaluation of the clinical appropriateness and utility for nursing. Application to such clinical problems as abstinence in the recovering alcoholic, depression, and eating disorders. Prerequisite: graduate standing or permission of faculty.

NURS 566 Occupational Stress and Stress Management (3) Relationships between occupational stressors and worker's health, well-being, productivity. Analyzes models of occupational stress. Investigates similarities, differences between job-related stressors and stress responses in various occupations. Explores elements of worksite stress management programs. Prerequisite: graduate standing in nursing or allied health discipline; advanced undergraduates with permission of instructor.

NURS 567 Theoretical Basis of Management of Stress Response (3) Theories of physiologic responses linked to theories of cognitive/affective and behavioral responses to stressors. Conceptual basis of self-management techniques. Research findings relevant to these theories and techniques examined and analyzed. Prerequisite: course in human physiology or physiologic psychology, permission of instructor.

NURS 568 Health Politics and Policy (3) Analyzes the formal and informal political context of health care delivery, professionals, and institutions in the United States. Addresses medical coverage and public persuasion, as well as policy analysis. Special attention is paid to women's political resources and participation. Credit/no credit only.

NURS 569 Observation and Assessment of Relationships (2-, max. 4) Classification of attachment behaviors in infancy and preschool years according to systems developed by Ainsworth, Main and Solomon, Cassidy, Marvin et al., and Crittenden. Extensive first-hand experience in conducting and coding Strange Situation attachment assessments. Standardized national tests in attachment classification. Offered: WSP.

NURS 570 Family Concepts: Health and Illness (3) Emphasizes the family as unit of care across the life span. Predominant themes: factors influencing family health promotion, including resilience, vulnerability, risk reduction, and health policy; continuity, change and transition; and promotion of family health during acute and chronic illness episodes.

NURS 571 Advanced Interpersonal Therapeutics with Families (3) Models and research on therapeutic relationships and interpersonal processes evaluated and applied to group interactions among family members, among professionals, and between the family, professionals, and macrosystems. Partnership building emphasized. Individual and group characteristics examined across the life span in social, cultural, and health contexts. Prerequisite: permission of instructor.

NURS 572 Family Nursing Therapeutics: Behavioral Models (3) Behavioral models of health-related behavior analyzed to develop therapeutic programs and services for families experiencing health-related concerns or disruptions. Seminars introduce didactic material and laboratory assignments facilitate development of therapeutic and programmatic content. Prerequisite: permission of instructor.

NURS 573 Professional Issues for Nurse Practitioners (2) Presentation and analysis of cur-

rent health care trends and key professional issues influencing nurse practitioner practice. The NP's leadership role, role in influencing health policy, accountability to the profession/public, marketability, and legal dimensions of practice are stressed. Prerequisite: NP student nearing program completion or permission.

NURS 575 Grief and Loss in Clinical Practice (2-4, max. 4) Analysis and study of social, cultural, and psychological conditions that influence human loss, grief, and death in modern society. Research findings, selected readings, and direct experience provide direction for examination of philosophic, theoretical, and pragmatic issues underlying choices and decisions in clinical practice. Open to graduate students with permission of instructor. (Limit: sixteen students.)

NURS 576 Populations at Risk in the Community (3) Health needs and risks of selected populations in the community and theoretical and analytical perspectives on assessment and intervention strategies in community health nursing practice with groups and populations whose health is at risk. Prerequisite: graduate standing and permission of instructor.

NURS 577 Seminar in Infant Mental Health Intervention Models, Consultation, and Leadership (1-, max. 3) Capstone course in Infant Mental Health Certificate Program. Explores intervention models, role of consultation and leadership in the field. Field work in Infant Mental Health Program serves as context for exploring consultation and leadership roles. Synthesis and reflection of personal preparation and role encouraged. Offered: AWS.

NURS 578 Health, Care, and Community (3) Analysis of health care in community from nursing and behavioral science perspectives. Sociocultural influences on health beliefs and practices, natural-care units, and community life patterns analyzed. Community as both context and target of change explored in relation to nursing approaches in health promotion and maintenance. Prerequisite: graduate standing.

NURS 579 Transcultural Nursing Practices (3) 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 580 Current Issues in Occupational and Environmental Medicine (2, max. 12) *Kaufman* Interdisciplinary seminar on current and emerging topics in the practice of environmental and occupational health. Faculty- and student-led presentations with an interdisciplinary focus, including occupational hygiene, nursing, and medical issues. Prerequisite: environmental health graduate student, occupational health nursing student, or permission of instructor. Offered: jointly with ENV H 596; AWSp.

NURS 581 Study of International Health (2-3) *Hegyvary* International health based on the concept of health ecology. Assigned readings, discussions, and analyses include different perspectives, strategies, systems, and the wide range of conditions and forces that affect global and local health and illness. Emphasizes roles of health care providers. Credit/no credit only.

NURS 582 Socio-Cultural Perspectives of Public Health Genetics (3) Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with ANTH 574/PHG 521.

NURS 584 Critical and Interdisciplinary Approach to Health Policy (3) Advanced seminar to critically analyze various public health policies from a social justice framework.

NURS 587 Role Transition Seminar (2) Emphasis on transition to doctoral study and eventual post-graduate roles. Includes information to clarify expectations and skills to facilitate success: various forms of scholarly and interpersonal communication, principles of scholarly collaboration, giving and receiving critiques, and other topics developed by participants. Credit/no credit only.

NURS 588 Philosophical Basis of Nursing Inquiry (3) Overview and critical analysis of historical and contemporary views of knowledge development and of science, with particular emphasis on the ways these views influence approaches to nursing inquiry. Emphasis on analyzing the underlying epistemological and ontological assumptions and implications of diverse approaches to knowledge generation in nursing.

NURS 589 Theoretical Perspectives in Nursing (3) Critical analysis of theory development, including evaluation of relationships among theories, evidence, and explanation. Diverse approaches used to appraise historical and contemporary milestones in the development and evaluation of nursing knowledge. Emphasis on process and implications of theory development for nursing research, practice, education, and systems. Prerequisite: NURS 588. Offered: W.

NURS 590 Ecology of Human Health (5) Focus on the pluralistic constructions of health as related to different environments. Personal and biological characteristics vary, interact with, and transform the person and the environment. Emphasis on nursing as a social construction which is interactive with the human's experience of health and healing.

NURS 591 Advanced Seminar in Nursing Science (3, max. 15) In-depth analysis and evaluation of literature in focused areas of research. Synthesis of literature related to selected fields of nursing science. Oral analysis of assigned papers and topics. Prerequisite: graduate standing or permission of instructor.

NURS 592 The Science of Nursing Therapeutics (4) Addresses the state of the science of nursing therapeutics. Students examine the practices of nursing to promote, maintain, and restore human health from an ecological perspective. Therapeutics considered from the perspectives of the individual, family, and community systems.

NURS 593 Preventive Therapeutics (3) Examines literature in the field of health promotion and illness prevention with the purpose of students developing their individual model of health promotion and illness prevention in their own foci of interest considering the social and political forces prevailing.

NURS 594 Advanced Seminar on Healing (3) Advanced seminar to critically analyze current thinking and practice applications that fall under the heading of "healing." Credit/no credit only.

NURS 595 Synthesis of Nursing Science (3) Provides a forum for critical analysis, integration, and synthesis of core content provided during the initial year of the Ph.D. in Nurse Scientist Program and further planning of program of study. Prerequisite: completion of first year required courses of doctoral program. Credit/no credit only.

NURS 596 Colloquium, Scientific Conduct, and Dissertation Seminar (2, max. 12) Focuses on group discussion of issues pertinent to research conduct. Scientific conduct issues include guidelines relevant to designing, conducting, and disseminating

research; risk management in reference to scientific misconduct and negligence; and collaborative and peer-review skills relevant to intra- and interdisciplinary research.

NURS 599 Selected Readings in Nursing Science (1-3, max. 18) Analysis of synthesis of selected readings with faculty mentor. Credit/no credit only. Prerequisite: permission of instructor.

Nursing Clinical

NCLIN 402 Practicum: Care in Illness I (4) Provides supervised nursing care to individuals and families with acute and chronic illness. Emphasis on increasing skill in systematic assessment, developing competency in selected nursing therapies, and developing role as care agent for persons of all ages. Credit/no credit only.

NCLIN 406 Practicum: Care in Illness II (4-10, max. 10) Provides supervised nursing care to individuals and families with acute and chronic illness. Emphasis on increasing skill in systematic assessment, developing competency in selected nursing therapies, and developing role as caring agent for persons of all ages. Credit/no credit only.

NCLIN 409 Partnerships in Community Health (6) Analysis, application, and evaluation of nursing process at level of community. Formulation of community health diagnoses as basis for community-level interventions to maintain and promote biopsychosocial health, prevent disease, and enable self care by the community. Analysis of nursing's role in community health/mental health.

NCLIN 411 Transition to Professional Practice (12-20) Intensive field work in a nursing care specialty focusing on critical examination, synthesis, and evaluation of professional nursing care. Client populations include individuals and/or groups reflecting diverse settings, ages, ethnic communities. Emphasizes mastering theoretical concepts, applying research findings, improving skill competency, developing leadership capabilities.

NCLIN 414 Practicum: Health Promotion (4) Provides the opportunity to apply the nursing process to promote health and prevent illness. Integrates the perspectives of the client with the current scientific bases for health promotion. Incorporates analysis of the effect of multiple dimensions on health and wellness. Credit/no credit only. Corequisite: NURS 413. Offered: A.

NCLIN 500 Comprehensive Health Assessment (2) Provides framework for systematic collection, interpretation, and communication of data to determine health status of individuals. Develops beginning advanced practice competence in history-taking and screening physical examination of adolescents and adults. Analysis of multiple health indicators to determine health status. Credit/no credit only. Prerequisite: permission of instructor.

NCLIN 501 Diagnostic Health Assessment (1-5, max. 5) Provides framework for learning symptom analysis, selection/performance of examination techniques, and selection/interpretation of common diagnostic procedures. Develops beginning competence in focused history-taking and directed physical exam to evaluate common health problems in adolescents and adults. Credit/no credit only. Prerequisite: NCLIN 500, which may be taken concurrently.

NCLIN 502 Pediatric Health Assessment and Promotion (1-5, max. 5) Gives experience in obtaining a health history and performing a physical assessment of infants, children, and adolescents. Interviewing techniques, problem-oriented charting, and a systems approach to the physical examination. Emphasis on screening principles, health promotion, and wellness care for children/families.

Credit/no credit only. Prerequisite: permission of instructor.

NCLIN 503 Advanced Fieldwork Community Health Nursing (2-6, max. 12) Guided experience in delineating nursing roles in community settings. Development of a philosophy of community health nursing. Application of core concepts pertaining to health, ethics, care, and community. A minimum of four hours of guided experience weekly. Prerequisite: graduate standing and permission of instructor.

NCLIN 505 Diagnostic Testing and Monitoring in Serious Illness (2) Lecture, discussion, and laboratory sessions to develop students' assessment, diagnostic, and monitoring expertise in the care of acutely ill individuals. Students refine clinical decision-making skills, apply specialized assessments, gain insight into clinical experts' critical thinking, and refine assessment knowledge for a specific patient population. Prerequisite: NCLIN 501 or equivalent.

NCLIN 508 Seminar in Group Treatment (1) 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.

NCLIN 509 Teaching Methods and Practicum in Nursing Education (3) 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.

NCLIN 512 Advanced Practicum in Parent and Child Nursing I (2-12, max. 25) Clinical seminar and practicum provide opportunities to develop advanced nursing practice competencies in the care of women, parents, children, and/or adolescents. Application of theory and principles to direct care, consultation, education and/or care coordinator roles with individuals and/or groups.

NCLIN 525 Managing Clinical Effectiveness Within Care Systems (1) Optimizing person-provider clinical therapeutic transactions at multiple levels of care systems complexity and population aggregation. Emphasis on designing, managing and evaluating clinical effectiveness and efficiency within care systems. Prerequisite: NURS 524 or permission of instructor.

NCLIN 526 Managing Organizational Effectiveness Within Care Systems (1) Analysis of management strategies for attaining effective and efficient organizational structures and processes within health care systems. Prerequisite: NURS 524 or permission of instructor.

NCLIN 528 Advanced Practice in Care Systems Management (4-8, max. 8) Analysis of relationship between theory and practice in real-time conditions. Comparative analysis of structure and behavior of management approaches. Prerequisite: core courses in Care Systems Management.

NCLIN 540 Relationship Development and Intervention (3-, max. 15) Clinical work with infant and toddlers and their parents in relation to infant disorders of affect, self-regulation, attachment trauma, and stress disorders. Reflective supervision in groups and individually required. Restricted to candidates in the Infant Mental Health Certificate Program. Credit/no credit only. Offered: AWSpS.

NCLIN 541 Specialization in Clinical Practice (1-10, max. 10) Clinical fieldwork and seminar opportunities to synthesize, apply, evaluate, and communicate knowledge about a specific domain of advanced clinical practice. Clinical fieldwork emphasizes the refinement of assessment and diagnostic

skills. Seminars focus on critical analysis of clinical issues. Students develop a professional portfolio to highlight their expertise.

NCLIN 544 Roles in Clinical Practice (1-10, max. 20) Clinical fieldwork emphasizes analytical skills in the implementation of intervention and evaluation strategies for practice, education, and/or administration. Seminars focus on critical analysis of role-related issues. Students refine their professional portfolio of expertise. Credit/no credit only. Prerequisite: NCLIN 541.

NCLIN 546 Management of Acute and Chronic Wounds (2-3) Evaluation and treatment of acute and chronic wounds. Includes wound healing physiology, pathophysiology, patient evaluation, evaluation of environmental and systemic factors related to risk of impaired healing, methods for assessing wound progress, and evidenced based treatment options. Optional one credit clinical and lab experience. Prerequisite: graduate standing or permission of instructor.

NCLIN 549 Nurse Practitioner Clinical Practicum I: Adults/Older Adults (1-10, max. 10) Clinical fieldwork and seminar in advanced nursing practice with individual/groups. Students practice under clinical preceptor supervision. Focuses on data collection/critical thinking related to health status and threats to health, incorporating knowledge from the biological, behavioral, and social sciences. Credit/no credit only. Prerequisite: permission of instructor, or NCLIN 501 or equivalent.

NCLIN 550 Nurse Practitioner Clinical Practicum II: Adults/Older Adults (1-10, max. 10) Clinical fieldwork and seminar in advanced practice nursing. Builds on NCLIN 549, emphasizing critical thinking related to the differential diagnosis/management of health problems and human responses. Students practice under clinical preceptor supervision. Addresses selected role issues in advanced practice nursing. Credit/no credit only. Prerequisite: NCLIN 549 or permission of instructor.

NCLIN 551 Advanced Practice Nursing Clinical Practicum III: Adults/Older Adults (1-10, max. 10) Clinical fieldwork and seminar in advanced practice nursing. Builds on NCLIN 550, emphasizing the integration and application of previous learning in the care of people with multiple health problems. Students practice under preceptor supervision. Addresses selected role issues in advanced practice nursing. Credit/no credit only. Prerequisite: NCLIN 550 or permission of instructor.

NCLIN 552 Nurse Practitioner Clinical Practicum IV: Adults/Older Adults (1-10, max. 10) Intensive clinical experience in which students integrate previous learning to assume responsibility for care of older adults and/or adults with multiple health problems. Students practice as an advanced practice nurse supervised by a preceptor, assuming increasing responsibility for planning/implementing therapies and for documenting/evaluating outcomes. Credit/no credit only. Prerequisite: NCLIN 551.

NCLIN 553 Seminar in Primary Care I: Health Promotion (2) Weekly seminars with supervised field study within selected primary-care and wellness settings. Emphasis on health assessment and strategies related to improving health in people of all ages. Analysis of, and counseling on, life-styles, nutrition, physical fitness, stress management, self-care, and prevention. Credit/no credit only. Prerequisite: graduate standing, permission of instructor.

NCLIN 554 Occupational Health Nursing: Practice Issues (2-6, max. 6) In-depth overview of occupational health and safety. Includes discussion of American workforce, work environments, regulations, and political issues; identifies trends which affect practice; introduces prevalent health disorders which

result from occupational exposure; examines and applies nursing theory to the prevention and control of occupational injuries and illnesses.

NCLIN 556 Seminar in Primary Care II: Management of Common Health Concerns (3) Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary health-care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

NCLIN 557 Seminar in Primary Care III: Management of Common Health Concerns (3) Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary health-care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

NCLIN 558 Occupational Health Nursing: Program Development (2-6, max. 6) In-depth examination of occupational health and safety programs including organizational analyses, budgeting, marketing, case management, and workers' compensation; also political, economic, legal, and ethical issues. Focuses on development, implementation, and evaluation of programs including health promotion, EAP, and health surveillance. Applies public health and nursing sciences to selected work-related problems.

NCLIN 559 Seminar in Primary Care IV: Management of Common Health Concerns (3-5) Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: permission of instructor; nurse practitioner students register for NURS 510 concurrently.

NCLIN 560 Seminar in Primary Care V: Complex Clinical Decision Making ([1-11]-, max. 11) Seminar with associated field study. Synthesis of advanced knowledge base and clinical family nurse practitioner skills with effective management of complex clinical problems. No grade given until 11 total credits completed. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

NCLIN 566 Advanced Clinical Practicum in Psychosocial Nursing (1-6, max. 12) Seminar and associated field study. Focuses on development of advanced clinical and role-function skills. Provides practice in settings with selected populations corresponding to subspecialty interests with supervision by expert clinicians. Seminar uses inferential process leading from the observed to the conceptual. Credit/no credit only. Prerequisite: NURS 556, NURS 559, NURS 567.

NCLIN 569 Practicum in Biopsychosocial Assessment (2/4, max. 4) Practicum in either physical health assessment with opportunity to refine skills in taking health history and performing physical examinations or psychosocial assessment with opportunity to refine skills in psychosocial assessment interview, mental status examination, standardized clinical assessment instruments. Credit/no credit only. Prerequisite: NCLIN 500 and NCLIN 501, NURS 549 which may be taken concurrently.

NCLIN 581 Seminar in Advanced Community Health Nursing (2-6, max. 6) Focuses on construction and analysis of community health nursing theories/models, presentation of community problems, and interventions/evaluation strategies. Synthesizes nursing theories and organizational/community concepts into conceptual framework of CHN practice.

Analyzes research questions that emerge from field of study. Prerequisite: NURS 563, NURS 576, and NURS 578 or permission of instructor.

NCLIN 599 Independent Study Clinical Practicum (1-12, max. 25) Clinical practicum to develop advanced-practice nursing skills in care of individuals, groups, communities, or care systems. Individually arranged with faculty member for application of theory and principles to direct care, consultation, education or care coordinator roles. Prerequisite: matriculated MN student or post-masters student, and permission of academic adviser and instructor. Offered: AWSpS.

Nursing Methods

NMETH 403 Introduction to Research in Nursing (3) Organization of the structure of nursing knowledge through research. Concepts and processes of research utilized in the investigation of nursing science.

NMETH 499 Undergraduate Research (1-5, max. 12) Supervised individual scholarly inquiry on a specific nursing problem.

NMETH 520 Methods of Research in Nursing (3) Research process as it applies to nursing. Use of the literature in building theoretical rationale. Selection of appropriate methods. Presentation of findings. Minimum of two laboratory hours weekly. Prerequisite: a course in statistics.

NMETH 521 Methods of Research in Nursing (2) Continuation of 520, with emphasis on methods of research applied to the solution of problems in all fields of nursing.

NMETH 575 Methodological Issues in Family Research (3) Emphasizes research with the family as unit of analysis. Examines patterns of family functioning in relation to responses to heal situations. Reviews family units from generational and intergenerational perspectives. Critiques methods assessing dyadic and triadic relationships and therapeutic interventions on family outcomes. Prerequisite: permission of instructor.

NMETH 580 Methodological Perspectives in Nursing Inquiry (5) Allows students to translate philosophical and theoretical perspectives into research methodologies. Foci will include: the relationship of theoretical perspectives to methodologies; the methodological issues among and between varying schools of thought (including contemporary empiricist, interpretive, and critical/postmodern); and how the methodologies influence choices of research design and methods.

NMETH 581 Observational Research Methods (2-6, max. 6) Examines observational methods for conducting verbal and nonverbal behavioral research. Emphasizes critical analysis and rigor in research question formulation, measurement decisions, coding scheme development, data collection, and analysis and interpretation of data. In-depth application of observational method optional. Prerequisite: graduate standing and basic research methods course or permission of instructor. Offered: W.

NMETH 582- Interpretative Methods in Nursing Research (4-) Seminar and field practicum for interpretative research methods. Study on health-related issues using a selected tradition in interpretative methods. Prerequisite: permission of Instructor.

NMETH -583 Interpretative Methods in Nursing Research (-4) Seminar and field practicum for interpretative research methods. Study on health-related issues using a selected tradition in interpretative methods. Prerequisite: permission of Instructor.

NMETH 584 Methods: Physiologic Measures (4) Exploration of the measurement of physiologic functioning in human and animal models. Examples include biochemical and biophysical measure. Students develop beginning skills with one physiologic measure. Prerequisite: physiology and chemistry and permission of instructor.

NMETH 585 Meta-Analysis (4) Meta-analysis examined as a method to synthesize research. Overview of meta-analytic methods; description of the collection, analysis, synthesis, and reporting of studies; explanation of statistical calculations; and discussion of reliability and validity measures incorporated into meta-analytic design. Prerequisite: permission of instructor.

NMETH 586 Instrument Development and Testing (4) Includes measurement theory, reliability, validity, level of measurement, and the process of scale development, modification, or translation. Students learn to evaluate, develop, modify, translate, and test instruments for use in research. Prerequisite: student in health science discipline and permission of instructor.

NMETH 587 Methods of Theory Testing: Causal Modeling with Path Analysis and Structural Equation Modeling (4) Includes causal inferencing and theory testing through causal modeling with path analysis and structural equations modeling. Students learn to evaluate theory models and to apply the content by developing and testing models. Prerequisite: student in health science discipline and permission of instructor.

NMETH 590 Special Topics in Nursing Research (2-3, max. 9) Examination of a specific research method, with evaluation of appropriateness, efficiency, rigor of measurement, and potential for inference for nursing research. Prerequisite: minimum of 5 credits of basic nursing research methodology at graduate level and permission of instructor.

NMETH 591 Clinical Outcome Research I (4) Examination of philosophical, analytical, and methodological decisions and processes in evaluating the effectiveness of interventions and programs designed to enhance health outcomes. Alternative designs are addressed in consideration of underlying assumptions about prevention/causation research; clinical human phenomena; design sensitivity; and threats to validity. Theory development emphasized. Prerequisite: permission of instructor.

NMETH 592 Clinical Outcome Research II (2-4, max. 4) Application and evaluation of philosophical, methodological, and analytical concepts and issues examined in 591. Two modules are offered: a) case study and small-n studies and b) large-n studies. Students demonstrate application of decision-making process involved in development of clinical outcome study. Prerequisite: permission of instructor.

NMETH 593 Time Series and Sequential Analysis (4) Basic introduction to terminology and methods of time series and sequential analysis as applicable to nursing-relevant processes in the form of samples of interval and categorical data collected over time; autocorrelation, autoregression, spectrum, socinor, Markovian, lag sequential, and log-linear analyses. Development of practical analysis skills on real data sets. Prerequisite: permission of instructor. Credit/no credit only.

NMETH 598- Special Projects ([1-12]-, max. 12) Fulfills the requirements of the non-thesis option for Master's students in nursing. Projects involve scholarly inquiry with in-depth focused analysis, culminating in a written product/report for dissemination. Credit/no credit only. Prerequisite: NMETH 520 and NMETH 521 or permission of instructor.

NMETH 600 Independent Study or Research (*) Credit/no credit only.

NMETH 700 Master's Thesis (*) Credit/no credit only.

NMETH 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

College of Ocean and Fishery Sciences

Dean

Arthur R.M. Nowell
207 Ocean Sciences

Associate Dean

Ken Chew



General Catalog Web page:

www.washington.edu/students/genocat/academic/College_Ocean_Fish.html



College Web page: www.cofs.washington.edu

The marine environment has been a dominant factor in the history of the Pacific Northwest from the time of the first Native American settlements to the modern days of aquaculture, container ships, and waterfront condominiums. It is not surprising, therefore, that the University of Washington has a long tradition of commitment to teaching, research, and public service in subjects related to marine and freshwater activities.

The College of Ocean and Fishery Sciences comprises five of the major units of the University in the marine and freshwater sciences: the Applied Physics Laboratory; the Schools of Aquatic and Fishery Sciences, Marine Affairs, and Oceanography; and the Office of Marine Environmental and Resource Programs, which includes the Washington Sea Grant Program. Each of the units of the College focuses on a difference aspect of the aquatic environment, but there is much overlap of interests.

The College offers both undergraduate and graduate instructional programs in fisheries and oceanography, and graduate programs in marine affairs. For undergraduates, it is easy to pursue joint undergraduate degrees with departments such as Zoology, Chemistry, and Geology in the College of Arts and Sciences. College faculty, staff, and students carry out research in oceans, estuaries, and freshwater lakes and rivers all over the world. Facilities for research and teaching range from ocean-going vessels to well-equipped laboratories and classrooms.

The College also supports career-oriented resources for students to complement traditional course work and research. An annual Career Fair, held each February, brings more than 30 potential employers to campus to meet with students and discuss career possibilities and employment opportunities. A well-equipped Career Center is available for students, providing information about career planning, résumé preparation, and job opportunities in the marine and freshwater sciences. *Northwest Water Work*, a semi-monthly summary of current employment opportunities and internships available in water-related areas, is published by the College and made available free of charge to students. Internships are encouraged as a way to help students bridge the transition from the classroom to employment after graduation. The College also supports educational outreach activities and innovative learning technologies.

In 1999, the College had 200 undergraduate and 250 graduate students enrolled, a faculty of 198 mem-

bers, and a total budget of \$60 million, making it one of the largest institutions of its kind in the nation.

The School of Aquatic and Fishery Sciences is concerned with wise management of fish and shellfish stocks, ecological relationships between aquatic organisms and their environment, culture of aquatic plants and animals, and impacts of human population pressures on the aquatic environment.

The School of Oceanography carries out research and teaching on the physical, chemical, geological and geophysical, and biological processes in the ocean, and interactions of the ocean with the earth, the biosphere, and the atmosphere. It is concerned with the study of ocean currents and mixing, life in the sea, the chemical composition and properties of seawater, the sediments and rocks beneath the sea, and the geophysics of the sea floor. It offers both undergraduate and graduate degrees.

The School of Marine Affairs is concerned with policy and institutional issues related to the ocean. It combines natural sciences and engineering with law, economics, international affairs, and public administration. Marine affairs, coastal zone management, ports and marine transportation, atmospheric and marine policy, living marine resources, and international law of the sea are all part of the School's teaching and research programs. It offers a Master of Marine Affairs degree.

The Applied Physics Laboratory is a research and development unit with strong capabilities in marine science and technology, acoustic sensors and sound propagation, marine instrumentation, and polar science and technology. No degrees are offered, but a regular seminar series is presented. APL faculty members with joint appointments in other University departments teach courses and advise graduate students on theses. Part-time employment for students, including a program offering four years of support to students who contemplate a career in engineering or science, is also provided.

The Washington Sea Grant Program is a component of the National Sea Grant Program which was created by Congress to enhance the wise use and protection of the nation's marine resources through coordinated efforts in research, education, and public service. The Washington Sea Grant Program is administered as a division of the College but has additional statewide and multi-institutional responsibilities. It funds research and education throughout the state; supports advisory services; presents workshops, short courses, and lectures; and produces publications. The University of Washington was one of the first four universities in the country designated in 1971 as Sea Grant Colleges in recognition of outstanding sustained programs in research, education, and advisory services in the marine area.

Aquatic and Fishery Sciences

116 Fishery Sciences



General Catalog Web page:

www.washington.edu/students/genocat/academic/Fisheries.html



School Web page: www.fish.washington.edu

The School of Aquatic and Fishery Sciences, established in 1919, is the largest and most diverse academic fisheries program in the United States. Students benefit from our faculty, whose breadth of expertise includes marine biology, freshwater ecology, habitat restoration, quantitative fishery management, invertebrate and finfish aquaculture, and a number of disciplines related to physical, biological

and societal processes that bear on growing issues of fisheries conservation. Faculty and students in the School draw upon a wide range of disciplines including biology, botany, chemistry, genetics, mathematics, nutrition, oceanography, physics, physiology, and zoology to conduct basic and applied research in the field of fishery science.

Courses

A full spectrum of undergraduate- and graduate-level courses allows students to learn the basic principles of fishery science and to develop expertise in specialized fields such as quantitative fishery management, aquaculture, and aquatic ecology. Among the wide variety of courses open to students are ichthyology, world fisheries and aquaculture, freshwater ecosystems, forestry-fisheries interactions, marine biology, salmonid behavior and life history, fisheries stock assessment, ecology of marine fishes, conservation, and physiological effects of water pollutants.

The School cooperates with other units on campus (Biology, Civil and Environmental Engineering, Forest Resources, Marine Affairs, Quantitative Science, Program on the Environment, Zoology, and Oceanography) to offer jointly listed courses. Instruction is offered both on the main campus and at the Friday Harbor Laboratories on San Juan Island.

Advising

The Student Services Office is located in 116 Fishery Sciences. Students can receive assistance regarding curriculum, course scheduling, and graduation requirements. The Student Services Office may be reached by email at safs@u.washington.edu.

Related Programs

The Center for Quantitative Science is an interdisciplinary program sponsored by the Office of Undergraduate Education, the School of Aquatic and Fishery Sciences, and the College of Forest Resources. It is dedicated to providing high-quality instruction in mathematical and applied statistical methods for undergraduate students who major in the biological and ecological sciences, renewable resources management, and environmental studies. The philosophy of the center is to provide instruction in an atmosphere that emphasizes the use of quantitative methods to better understand a variety of scientific phenomena. Faculty represent various applied scientific disciplines within Forest Resources, Aquatic and Fishery Sciences, and other campus units. Students may wish to complete a minor in quantitative science to document their understanding of the mathematical and statistical methods used in the analysis of data.

Quantitative Ecology and Resource Management:

The graduate program offered by the Quantitative Ecology and Resource Management (QERM) interdisciplinary group provides a unique opportunity for students to study the application of statistical, mathematical, and decision sciences to a broad array of terrestrial and marine ecology, natural resource management, and biometrical and mathematical biology problems. The QERM program of study leads to Master of Science and Doctor of Philosophy degrees, and is designed to attract mathematically trained students interested in working on contemporary ecological or resource-management problems from a quantitative perspective. Faculty associated with this interdisciplinary program come from thirteen campus units, including Statistics, Applied Mathematics, Forest Resources, Aquatic and Fishery Sciences, Zoology, Biostatistics, Marine Affairs, and Public Affairs. This pool of faculty talent is available to enrich the academic experience of all QERM students. Prospective students interested in QERM should contact the Graduate Program Coordinator at 206-616-9571 or qerm@u.washington.edu.

Research

The faculty, staff, and students of the School conduct basic and applied research on regional, national, and international fishery and aquatic resource problems. Research foci are grouped under major disciplines of aquatic biodiversity (e.g., microbiology, marine mammals, fish systematics), aquatic organismal processes (e.g., aquaculture, physiology, genetics, pollution/toxicology), and aquatic ecology (marine fisheries, stream/riparian ecology, policy, and management). Examples of research projects include the influence of physical oceanographic factors on recruitment of larval fish and shellfish, stock assessment of marine fishes, mechanisms controlling growth and growth efficiency in fishes, application of molecular biotechnology to the study of phylogeny, behavioral studies of homing and straying in Pacific salmon, contaminant transport through aquatic food chains, effects of forest practices on fish habitat, development of mitigation measures for restoring damaged wetlands, and approaches for reducing pollution caused by aquaculture effluent.

The School continues to coordinate long-term programmatic research on anadromous fishes. The Alaska Salmon Program, the High-Seas Salmon Program, and the Wetland Ecosystem Team, as well as individual projects collectively focus on the origins, abundance, migratory patterns, and ocean distribution of Pacific salmon and steelhead trout; spawning distribution, growth, and abundance of sockeye salmon in Bristol Bay, Alaska; and environmental (physical and biological) factors influencing salmonid productivity.

Researchers in the School collaborate with scientists within the University and with investigators employed by other agencies. The School benefits from the presence in Seattle of laboratories of the National Marine Fisheries Service, the U.S. Geological Service's Biological Resources Division, and the Washington State Departments of Ecology, Fish and Wildlife, and Natural Resources. The headquarters and research staff of the International Pacific Halibut Commission are located on the campus as well. Researchers also collaborate with the scientific staff of private companies located in the Puget Sound region and elsewhere. School of Aquatic and Fishery Sciences researchers frequently participate in inter-institutional projects that involve scientists from other states and countries.

The research program is enhanced through the activities of several institutes and centers with which the School collaborates closely.

The *Washington Cooperative Fish and Wildlife Research Unit* was established in 1967 and is part of the Biological Resources Division of the U.S. Geological Survey. The goal of the WACFWRU fish and wildlife research program is to facilitate studies on a variety of resource management issues. Base funding is provided by the USGS, the University of Washington School of Aquatic and Fishery Sciences, and the Washington Departments of Ecology, Fisheries, and Wildlife, and Natural Resources. Both graduate and undergraduate students are encouraged to participate in the research being conducted in the WACFWRU.

The *Center for Streamside Studies* is an interdisciplinary unit of the College of Forest Resources and the College of Ocean and Fishery Sciences. The center conducts research and offers classes related to management issues that surround the production and protection of forest, fish, wildlife, and water resources associated with streams and rivers in the Pacific Northwest. A minor in streamside studies is also available to students.

The *Western Regional Aquaculture Center* is one of five regional aquaculture centers supported by the U.S. Department of Agriculture. Participating scien-

tists from twelve Western states conduct research directed toward enhancement of commercial aquaculture production.

The *Olympic Natural Resources Center*, located in Forks, WA, is an interdisciplinary research and educational program related to the marine and forest resources of the Olympic Peninsula in Washington state.

Facilities and Services

The Fishery Sciences, Fisheries Teaching and Research, Marine Studies, and Fisheries Center buildings are located adjacent to the Lake Washington Ship Canal. The buildings contain classrooms, laboratories, and support facilities. The Fisheries-Oceanography Library, a branch library offering research materials in fisheries, food science, oceanography, and wildlife science, is located nearby in the Oceanography Teaching Building. The School's Fish Collection has served as a resource for teaching and varied scientific investigations for over 50 years. One of five major permanent facilities on the west coast of the United States, the collection is by far the largest in our region in terms of number of specimens, containing in excess of 230,000 juvenile and adult specimens, and well over 3.3 million eggs and larvae. Together the collections represent some 3,778 species in 1,419 genera and 310 families.

An annual run of several thousand salmon has been developed and is maintained at the School by the release of thousands of fingerlings each spring. Returning adults use a fish ladder to enter the School's Teaching and Research Hatchery facility. The run is the basis for both instruction and research on the life cycle of Pacific salmon, as well as the focus for the School's popular outreach programs, which accommodate thousands of school children annually.

The Marine Molecular Biotechnology Laboratory is jointly operated by the Schools of Aquatic and Fishery Sciences and Oceanography. Advanced equipment is available for semi-automated sequencing of DNA as well as other techniques of molecular biology.

Other laboratories provide for the study of the physiology, biochemistry, and behavior of fishes and of the effects of pollutants on fishes. Physiological facilities include equipment for surgical procedures and biochemical analysis of body fluids and tissues from both freshwater and marine fishes.

The School uses various small vessels for instructional and research work, including tow netting, purse seining, and trawling. These vessels, as well as chartered vessels, are used in regular courses or training cruises to introduce students to shipboard operations. Fisheries field stations in Alaska and at Big Beef Creek on Hood Canal provide additional opportunities for field studies and research in stream and estuarine ecology.

Financial Aid

The University of Washington Financial Aid Office administers a variety of government and University funded financial aid programs for which applicants must submit the Free Application for Federal Student Aid form (FAFSA). Please check with the Financial Aid Office, located in 105 Schmitz Hall, for applications and timelines. The FAFSA may also be obtained at any college, university, or high school in the United States.

Through the generous donations of alumni and friends, the School of Aquatic and Fishery Sciences has established a strong scholarship program to assist students. Scholarships are awarded on the basis of academic merit and other factors. The application process commences in spring; please check with the Office of Student Services for applications and deadlines to apply for scholarships.

Employment

Aquatic and fishery scientists are employed in three major sectors in the economy: public, private, and nonprofit. Jobs in the public sector are found with federal, state, county, and municipal agencies. The private sector includes fisheries and seafood companies and environmental consulting firms. Nonprofit agencies are involved in research, public policy, and public education. Much of their work is done by volunteers. Paid staff may be involved in field research, grant writing, public relations work and volunteer coordination.

One factor that has expanded the job base in aquatic and fishery sciences in recent years has to do with national policies on endangered species, marine mammals, environmental quality, and overharvesting or harvesting of nontarget species. For example, observers are required on all large commercial fishing vessels and much work is done in public agencies regarding the health of fish and shellfish stocks and the environments that support them. Much of the information gathering is done in the field and also might involve becoming familiar with important aspects of public policy and interacting with public groups.

There is a Career Center run through the College of Ocean and Fishery Sciences (COFS) located at 202 Ocean Sciences Building. In addition to collecting and disseminating job announcements, the Career Center also publishes an employment newsletter (*Northwest WaterWorks*) twice monthly, listing current openings. This publication can be picked up at Student Services. Those who are not members of the UW community may also subscribe to receive either an electronic or print version by calling 206-543-0719. Also, each winter the College organizes a Career Fair specifically for COFS students.

Graduate Program

Graduate Program Coordinator
116 Fishery Sciences, Box 355020
206-543-7457
safs@u.washington.edu

The School offers programs leading to the Master of Science and Doctor of Philosophy degrees.

Admission Requirements

Minimum requirements for admission to the graduate program in the School are a bachelor's degree from an institution of recognized standing, a GPA of 3.00 in the last two years of college work, and approval of the School and the Graduate School. Students enter the School from varied disciplines at many universities. All have in common a strong background in the sciences and mathematics. Previous training in fisheries is not required.

Applicants for the graduate program must submit a completed application form and description of their interests and objectives, GRE scores (general test only is required), transcripts of all previous college course work, three letters of recommendation, and a TOEFL score (only for applicants who are non-native English speakers). Admission is also dependent upon program resources and fit between student and program. Admissions are limited to autumn quarter. Applicants may contact the School of Aquatic and Fishery Sciences Student Services Office for complete application materials, including a list of faculty and their research interests. All application materials are also available on the School's Web page at www.fish.washington.edu.

Master of Science

Applicants without a master's degree from a recognized school are expected to start at the master's

level. A minimum of 45 quarter credits, including completion of a thesis research project, leads to the Master of Science degree. A minimum of 45 400-level or graduate credits must be earned, including successful completion of the School of Aquatic and Fishery Sciences core curriculum plus 18 credits of FISH 700 (Thesis Research). A seminar on results of the research and oral defense of the thesis are required for graduation. The degree must be completed within six years of initial enrollment.

Doctor of Philosophy

The student must complete at least three years of graduate study (90 credits) and complete a dissertation to earn the Ph.D. Completion of a master's degree program may be applied toward one year of the doctoral program. The core classes must be taken if the student has obtained a master's degree from another program or received a master's degree from the School of Aquatic and Fishery Sciences under a different set of requirements than those outlined here. In some instances, students who have initially been accepted into a master's program will be allowed to proceed directly to the Ph.D. Preparation for a Ph.D. dissertation requires registration for 27 credits of FISH 800 (Dissertation Research). Requirements must be completed within 10 years.

Financial Aid

General information on graduate student support is available from the Office of Student Financial Aid, 105 Schmitz. The majority of first-year graduate students are offered research assistantships by appropriate faculty members, depending on the availability of research funding. The School of Aquatic and Fishery Sciences also has a limited number of fellowship opportunities for outstanding entering students. Other students may have their studies supported by the agency for which they work or they may be international students with scholarships from their home countries.

Graduate applicants are urged to discuss their financial needs with professors in their potential major fields during the early stages of the graduate application process. The graduate applicant will automatically be considered for any fellowships, research assistantships, or teaching assistantships available from the School of Aquatic and Fishery Sciences.

Faculty

Chair

David A. Armstrong

Professors

Armstrong, David A. * 1978; MS, 1974, Oregon State University, PhD, 1978, University of California (Davis); crustean ecology and fisheries, estuarine habitat protection, impacts on dragging, pesticides.

Bare, B. Bruce * 1969, (Adjunct); MS, 1965, University of Minnesota, PhD, 1969, Purdue University; forest land management and valuation, taxation, finance, management science.

Brown, George W. * 1967, (Emeritus); PhD, 1955, University of California (Berkeley); fish biochemistry and biochemical ecology.

Burgner, Robert L. * 1956, (Emeritus); PhD, 1958, University of Washington; salmon ecology and salmon biology.

Chew, Kenneth K. * 1962, (Emeritus); PhD, 1962, University of Washington; shellfish biology and aquaculture; Director, Western Regional Aquaculture Center.

Conquest, Loveday L. * 1976; PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.

Dickhoff, Walton W. * 1977; PhD, 1976, University of California (Berkeley); fish physiology, endocrinology, aquaculture.

Erickson, Albert W. * 1974, (Emeritus); PhD, 1964, Michigan State University; wildlife biology and marine mammals.

Francis, Robert C. * 1983; PhD, 1970, University of Washington; fisheries management, marine ecosystem dynamics, fisheries oceanography and global climate change.

Gallucci, Vincent * 1976; PhD, 1971, North Carolina State University; stock assessment, fisheries management.

Gunderson, Donald R. * 1978; PhD, 1975, University of Washington; marine fisheries, stock assessment, recruitment processes.

Halver, John E. * 1949, (Emeritus); PhD, 1953, University of Washington; fundamental fish nutrition, physiology and metabolism, nutrients balance in feed formulations.

Hilborn, Ray * 1987; PhD, 1974, University of British Columbia (Canada); stock assessment, population dynamics, fisheries policy.

Karr, James * 1991; PhD, 1970, University of Illinois; stream and watershed ecology, tropical forest ecology, conservation biology, environmental policy.

Kocan, Richard M. * 1978, (Emeritus); PhD, 1967, Michigan State University; aquatic toxicology, fish and wildlife diseases.

Landolt, Marsha L. * 1975; PhD, 1976, George Washington University; fish and shellfish disease; aquatic toxicology.

Liston, John * 1957, (Emeritus); PhD, 1955, University of Aberdeen (UK); food science, marine microbiology.

Mathews, Stephen B. * 1972, (Emeritus); PhD, 1967, University of Washington; quantitative fishery management.

Miles, Edward L. * 1974, (Adjunct); PhD, 1965, University of Denver; international law and organization; science, technology, and international relations; marine policy.

Miller, Bruce S. * 1971, (Emeritus); PhD, 1969, University of Washington; life history and ecology of marine fishes, especially early life history.

Miller, Marc * 1979, (Adjunct); PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology and social/cultural change.

Naiman, Robert J. * 1988; PhD, 1974, Arizona State University; forest stream ecosystems, aquatic landscape dynamics.

Pietsch, Theodore W. * 1978; PhD, 1973, University of Southern California; systematic ichthyology, zoogeography, behavior, functional morphology, biotic survey.

Pigott, George M. * 1965, (Emeritus); PhD, 1963, University of Washington; food engineering.

Quinn, Thomas P. * 1986; PhD, 1981, University of Washington; fish ecology, fish behavior, ecology, evolution.

Royce, William F. 1983, (Emeritus); PhD, 1943, Cornell University; applications of fisheries science.

Seymour, Allyn H. 1962, (Emeritus); PhD, 1956, University of Washington; radioecology.

Skalski, John R. * 1987; PhD, 1985, Cornell University; population estimation, environmental statistics and sampling, effects assessment.

Smith, Lynwood S. * 1965, (Emeritus); PhD, 1962, University of Washington; fish physiology.

Swartzman, Gordon Leni * 1973, (Research); PhD, 1969, University of Michigan; ecological modeling, quantitative natural resources management.

Taub, Frieda B. * 1959, (Emeritus); PhD, 1959, Rutgers University; ecology.

Wissmar, Robert C. * 1972; PhD, 1972, University of Idaho; freshwater ecosystems, fish ecology, and trophic dynamics, river restoration.

Associate Professors

Anderson, James J. * 1981; PhD, 1977, University of Washington; biomathematics, ecology, fisheries oceanography, toxicology, fish protection at power plants.

Bolton, Susan M. * 1992, (Adjunct); MS, 1979, University of North Dakota, MS, 1985, PhD, 1991, New Mexico State University; hydrology, watershed management, stream restoration, ecological engineering.

Grue, Christian E. * 1989; PhD, 1977, Texas A&M University; wildlife toxicology, wildlife science.

Herwig, Russell P. * 1983; PhD, 1989, University of Washington; environmental applied aquatic microbiology, bioremediation-related microbiology.

Huppert, Daniel D. * 1987, (Adjunct); PhD, 1975, University of Washington; economics and management of natural resources, especially marine fisheries.

Punt, Andre * 2001, (Research); PhD, 1991, University of Cape Town (South Africa); methods for assessing and managing marine renewable resource populations, Bayesian assessment.

Sibley, Thomas H. * 1978; PhD, 1976, University of California (Davis); environmental effects on biota.

Simenstad, Charles A. * 2001, (Research); MS, 1971, University of Washington; estuarine/coastal ecology, food web structure, juvenile salmon ecology, wetland restoration.

VanBlaricom, Glenn R. * 1993; PhD, 1978, University of California (San Diego); marine wildlife, community ecology.

Assistant Professors

Beauchamp, David A. * 1987; PhD, 1987, University of Washington; aquatic community ecology, bioenergetics, food web modeling, predator-prey, interactions, behavior.

Friedman, Carolyn * 2001; PhD, 1990, University of California (Davis); examination of infectious and non-infectious diseases of wild and cultured marine invertebrates.

Horne, John K. * 2000, (Research); PhD, 1995, Memorial University of Newfoundland (Canada); spatial ecology, predator-prey interactions, fisheries acoustics.

Parrish, Julia * 1990; PhD, 1988, Duke University; animal aggregation, fish schooling, seabirds, marine conservation, by catch.

Schindler, Daniel E. * 1997, (Adjunct); PhD, 1995, University of Wisconsin; ecosystem and community ecology - especially of aquatic systems.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

FISH 401 Systematics, Zoogeography, and Evolution of Fishes (5) NW Advanced course in ichthyology with emphasis on living bony fishes of the world; past and present biodiversity, evolutionary history, classification, comparative morphology, geographic distribution, and historical zoogeography. Recommended: 10 credits biological science.

FISH 404 Diseases of Aquatic Animals (5) NW Overview of communicable and noncommunicable diseases that affect fish and shellfish. Major pathogens of free-ranging as well as captive animals discussed. Students learn to recognize, prevent, and control economically and ecologically important disease syndromes. Recommended: 10 credits biological science.

FISH 405 Molluscan Aquaculture and Fisheries (5) NW Biology, ecology, management, and economic importance of oysters, clams, scallops, mussels, abalones, cephalopods, and other mollusks. Emphasis on techniques for production through aquaculture as well as harvest strategies for wild stocks. Field trips. Recommended: 10 credits biological science.

FISH 406 Crustacean Fisheries and Aquaculture (4) NW Biology, ecology, management, and economic importance of shellfish, emphasizing crustaceans. Wild populations and aquaculture production of important phyla discussed. Field trips. Recommended: 10 credits biological science.

FISH 415 Fish Physiology (5) NW Examines physiological principles and adaptations of fish for growth, metabolism, salt and water balance, digestion, locomotion, special senses, stress, reproduction, and neural and endocrine control mechanisms. Emphasis on environmental physiology and evolution. A nine-week laboratory component involves original experiments with juvenile salmon in hatchery on campus.

FISH 420 Life History of Marine Fishes (5) NW Modes of reproduction, spawning, development, identification and ecology of eggs and larvae. Food and feeding, aging, subpopulation identification, movements, species assemblages/habitat associations of juvenile and adult fishes. Recommended: FISH 311.

FISH 428 Restoration of Fish Communities and Habitats in River Ecosystems (5) NW Examines opportunities to encourage recovery through natural developmental processes that enhance the complexity of habitats and connectivity between habitats in the river basin. Class discussion and participation on field trips focuses on current restoration concepts for ecosystems, designs of projects, and case studies. Recommended: fish ecology and hydrology courses. Offered: odd years; Sp.

FISH 429 Seminar in Streamside Studies (1, max. 6) Discussion by invited speakers on current research and issues related to streamside studies. Speakers are a mix of on-campus and off-campus experts. Credit/no credit only. Offered: jointly with CFR 429; AWP.

FISH 430 Biological Problems in Water Pollution (3/5) NW Ecological risk assessment of toxic chemicals and problems associated with electrical power production. Considers safety and toxicity and effects on individuals, populations, and communities.

Laboratory covers simulation models of chemical exposure and community effects. Recommended: senior or graduate standing in fisheries, engineering, or related field. Offered: jointly with CEE 461.

FISH 434 Ecological Effects of Waste Water (3/5) NW Principles of aquatic ecology that relate to causes and effects of water quality problems in lakes and streams. Population growth kinetics, nutrient cycling, eutrophication; acidification, oxygen/temperature requirements, and effects of various wastes on aquatic animals. Offered: jointly with CEE 462; A.

FISH 438 Biological Monitoring and Assessment (5) NW Explores the technical questions (conceptual, sampling, and analytical), the rationale, policy relevance, and legal basis for tools—existing and needed—to assess ecological health. Prepares students to see the biological components of ecological systems in diverse ways. Offered: jointly with BIOL 438.

FISH 439 Attaining a Sustainable Society (1/3, max. 3) I&S/NW *Karr* Discusses diverse environmental issues, the importance of all areas of scholarship to evaluating environmental challenges, and the connections between the past and the future, to reveal integrative approaches to protect the long-term interests of human society. Offered: jointly with ENVIR 439.

FISH 444 Conservation Genetics (5) NW Advanced genetic concepts and methods related to aquatic species' conservation and management. Includes genetic diversity, small populations and fragmentation, genetic viability, management of wild and captive populations (including aquaculture), reintroductions, hatchery-wild interactions and forensics. Labs include molecular techniques. Recommended: GENET 371.

FISH 447 Watershed Ecology and Management (3) NW Explores fundamental ecological processes at the watershed scale, identifies human-induced changes to ecological systems, and discusses approach to improve watershed management. Includes lectures, field trips, and discussions with organizations and agencies about how they are addressing ways to improve watershed management. Offered: W.

FISH 450 Salmonid Behavior and Life History (3/5) NW Marine distribution, homing migration, and spawning behavior of adult salmon: incubation, emergence, migration, and residence of fry; fingerling distribution and residence with reference to species interaction and population evolution. Recommended: FISH 311. Offered: A.

FISH 451 Reproduction and Early Development of Fishes (4) NW Reproductive development, sexual maturation, spawning and incubation in selected fish species; embryology and developmental traits of different salmonid and non-salmonid species; practical experience in artificial spawning techniques, egg handling and care, incubation techniques and the handling of newly-hatched alevins. Recommended: FISH 310; FISH 311.

FISH 452 Aquatic Animal Nutrition (5) NW Nutritional requirements, nutrient interactions of aquatic animals in the wild or raised in captivity for purposes such as stock enhancement, food production, the aquarium/ornamental fish industry. Nutritional needs of marine mammals. Feed ingredients, formulation techniques, environmental impacts. Experimental design, completion of laboratory nutritional study. Recommended: 10 credits biological science.

FISH 453 Spatial Information Technologies in Ecosystem Sciences (3) NW *Logsdon* Introduction to the use of GPS, GIS, and Remote Sensing in the ecosystem sciences. Integrates these technologies in an applied research setting. Two overnight week-

end field trips required. Offered: jointly with OCEAN 452.

FISH 454 Aquatic Wildlife Ecology (3) NW Conceptual examination of relationships of aquatic wildlife populations (mammals, birds, reptiles, amphibians) to one another and to the aquatic realm. Application of conceptual background to contemporary high-profile issues in aquatic wildlife ecology, conservation, and management. Included is exposure to primary technical literature in the field.

FISH 455 Fish and Wildlife Toxicology (3/5) NW Overview of fish/wildlife toxicology: history of the field; regulations; methods used to assess risks contaminants pose to fish/wildlife; classes of contaminants and their direct, sublethal and indirect effects; and contemporary threats of contaminants to fish/wildlife, their habitats and prey. Includes laboratory. Offered: jointly with ESC 457; W.

FISH 456 Introduction to Quantitative Fishery Science (5) NW Conveys fundamental concepts of fish population dynamics and fishery management within context of real-world fisheries problems. Lectures discuss notation, terminology, mathematical models, fisheries principles, and case studies. Laboratory time devoted to practical applications, problems. Recommended: either MATH 125, MATH 135, or Q SCI 292; Q SCI 381. Offered: jointly with Q SCI 456; A.

FISH 457 Methods of Abundance Estimation (4) NW Methods of estimating fish abundance by direct sampling and indirectly from tagging, catch, and effort analysis. Confidence limits and bias adjustments. Design of marine fishery surveys using statistical sampling principles. Laboratory work with real fishery data and data collected during trawl sampling survey. Recommended: Q SCI 292; Q SCI 381; Q SCI 456 or FISH 456. Offered: jointly with Q SCI 457.

FISH 458 Fisheries Stock Assessment (4) NW *Francis* Emphasizes quantitative analysis of fisheries data to determine how the fishery would respond to alternative management actions. Major topics include production models, stock and recruitment, catch at age analysis, and formulation of harvest strategies. Recommended: either Q SCI 456 or FISH 456. Offered: jointly with Q SCI 458; Sp.

FISH 475 Marine Mammalogy (3/5) NW Evolution, taxonomy, physiology, life history, and behavior of marine mammals; the techniques of studying and the management and conservation of them. Recommended: 15 credits of biological science, vertebrate anatomy, and physiology, for laboratory sections.

FISH 478 Topics in Sustainable Fisheries (3, max. 9) Parrish Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Pre-seminar discussion section focusing on select readings. Final paper. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with BIOL/ENVIR 478.

FISH 480 Marine Resource Conservation and Management (3) I&S/NW *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with ENVIR 480/SMA 480.

FISH 490 Aquatic Microbiology (3/5) NW Basic principles of aquatic microbiology and aquatic microbial ecology: role and identity of aquatic microorganisms; introduction to modern methodologies for research. Laboratory work with local freshwater and marine samples for those enrolled in 5-credit section.

Recommended 15 credits of biological science, 10 credits of chemistry.

FISH 491 Aquatic Ecological Research in Alaska (12) NW Intensive, full-time research training experience where a team of students works on focused research problems guided by a group of faculty, post-doctoral, and graduate student mentors. Examines behavioral ecology, limnology, and population dynamics. Students also choose specific research questions for their own exploration. Course location: Alaska. Offered: S.

FISH 492 Friday Harbor Labs Apprenticeship (9/15) NW Intensive, full-time research training experience where teams of students work on focused research problems guided by a group of faculty, post-doctoral and graduate student mentors. Research questions vary. Course location: Friday Harbor Laboratories.

FISH 494 Capstone Project I (3-9, max. 9) Self-directed research or project under direction of a faculty member. Typically includes defining research question, determining methodology, data collection and analysis, writing a paper, and presenting findings. Course is first of two-quarter requirement for graduation for majors. May be taken concurrently with FISH 495, if approved.

FISH 495 Capstone Project II (3) Self-directed research project under direction of a faculty member. Typically includes defining a research question, determining methodology, data collection and analysis, writing a paper, and presenting findings. May be taken concurrently with FISH 494 with permission of instructor.

FISH 497 Special Topics in Fisheries (1-5, max. 5) NW One-time offerings of topics in fisheries by resident or visiting faculty.

FISH 498 Internship/Experiential Learning (1-15, max. 15) Structured, practical training in the fishing industry, government agencies and other areas utilizing fisheries, food science, or quantitative science expertise. Experiences are supervised and evaluated. Written reports required. Credit/no credit only. Offered: A/WSpS.

FISH 499 Undergraduate Research (1-15, max. 15) Individual research within the School of Aquatic and Fishery Sciences. Each project supervised by an individual faculty member. Written reports required.

Courses for Graduates Only

FISH 507 Special Topics in Fisheries (1-5, max. 15) Recommended: permission of instructor.

FISH 510 Current Topics in Genetics and Physiology (2, max. 8) Contemporary problems and issues in genetics and physiology as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 511 Current Topics in Evolution, Ecology, and Behavior (2, max. 8) Contemporary problems and issues in evolution, ecology and behavior as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 512 Current Topics in Quantitative Science (2, max. 8) Contemporary problems and issues in quantitative science as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 513 Current Topics in Management, Conservation, and Restoration (2, max. 8) Contemporary problems and issues in management, conservation, and restoration as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 514 Current Topics Aquaculture, Utilization, and Pathology (2, max. 8) Contemporary problems and issues in aquaculture, utilization, and pathology as they relate to fisheries and aquatic sciences. Topic varies. Credit/no credit only.

FISH 521 Research Proposal Writing for Graduate Students (4) Practice in reading, writing, critiquing, and evaluating research grant and contract proposals. Lecture and discussion of funding resources, structure of proposals, proposal review, evaluation criteria, and agency feedback. Examples of successful and unsuccessful grant applications. Preparing proposals and critiquing other's efforts.

FISH 522 Classical Literature of Fisheries Science and Aquaculture (2) Discussion of the classic literature of aquatic and fishery sciences. Both oral and writing communication skills stressed. Credit/no credit only. Offered: A.

FISH 525 Ecology and Behavior of Fishes (3) Basic principles of ecology and behavior (e.g., habitat associations, competition and predation, migrations and movements, reproductive patterns) as applied to fishes. Critical evaluation of current literature and fieldwork required. Recommended: 311 or equivalent or permission of instructor.

FISH 526 Advanced Fisheries Ecology II: Populations, Communities, and Ecosystems (5) Recent advances in the study of aquatic communities and ecosystems in relation to a number of contemporary issues in fisheries science and management. Focus on case histories drawn from freshwater, estuarine, and marine ecosystems. Emphasis on relationships between science and public policy in attempting to resolve these issues.

FISH 527 Aquatic Community Responses to Chemical Stress (3) Aquatic ecotoxicology; bridging the gap between physiological and ecosystem responses to toxic chemicals. Detecting effects against natural variability; altered species abundances and dominance, counter-intuitive responses. Case histories, controversies on data interpretation. Recommended: at least one course in ecology, limnology, oceanography or permission of instructor.

FISH 529 Topics in Streamside Studies (1) Discussion by invited speakers on current research related to streamside studies. Offered: jointly with CFR 529; AWSp.

FISH 535 Aquatic Toxicology (3) Principles of toxicology applied to aquatic organisms. Recognition of physiological and biochemical responses of organisms to toxins and practical application of toxicity testing methods to identification of pollution and toxins in aquatic environment. Toxicity test design, interpretation, and data analysis. Recommended: organic or biochemistry and physiology or equivalent or permission of instructor.

FISH 542 Principles and Applications of Molecular Methods (3) Techniques of molecular analysis with emphasis on DNA methods, including PCR, DNA sequencing, RFLP, RAPD and VNTR analysis and cloning. Applications of these techniques to fisheries, aquaculture, oceanography, population and evolutionary studies, and other areas of science. Prerequisite: permission of instructor. Offered: jointly with OCEAN 574; A.

FISH 543 Molecular Techniques (4) Laboratory on DNA methods. Experiments analyzing genetic variation at the intra- and interspecific level, including one experiment of student's own design. Techniques include DNA extraction and quantitation, PCR, DNA sequencing, RFLP analysis and cloning. Prerequisite: FISH 542 or OCEAN 574 or permission of instructor. Offered: jointly with OCEAN 575.

FISH 547 Stream and River Ecology (5) Characterizations of stream and river ecosystems from a watershed perspective. Emphasis on fundamental processes affecting the structure and dynamics of aquatic communities and the riparian zone. Resource conflicts, new technologies, field trips, and class projects. Offered: jointly with ESC 547; Sp.

FISH 548 Special Topics in Streamside Studies (2, max. 6) Contemporary problems and issues in forestry, fisheries, and wildlife management in watersheds. Topics vary, yet focus on interactions of land and water resources in the forests of the Pacific Northwest. Recommended: permission of instructor. Offered: jointly with ESC 548.

FISH 552 Current Topics in Aquatic Animal Nutrition (5) Nutrient requirements of finfish, shellfish, ornamental fish, and marine mammals for growth, development, and reproduction. Fish feed formulation techniques. Critical review of historical papers and current literature in aquatic animal nutrition. Offered: Sp.

FISH 556 Mathematical Analysis in Fisheries Stock Assessment (3) Analytic approaches to stock assessment and population management applications of parent-progeny models and logistic models; biological and economic yields of natural populations; analysis of population data on computers. Recommended: Q SCI 292, 392, 456, and 483 or permission of instructor.

FISH 557 Estimation of Population Parameters (4) Statistical analysis of population data; design and analysis of mark-recapture experiments on natural populations; laboratory work on computers. Recommended: probability theory and Q SCI 292 and 483.

FISH 558 Advanced Analysis in Fisheries Stock Assessment (3) Deterministic and stochastic representations of age-dependent and size-dependent models for stock assessment; analysis of multi-species models; risk analysis and uncertainty in fisheries management strategies; analysis of population data on computers. Recommended: 456, 458, 557, or permission of instructor.

FISH 565 Marine Fish Biology (9) Taxonomy, ecology, and life history of the fishes of the San Juan Islands and northeast Pacific Ocean. Prerequisite: permission of instructor. Offered: Friday Harbor Laboratories.

FISH 578 Graduate Topics in Sustainable Fisheries (2, max. 6) Parrish Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Post-seminar discussion section led by speaker on topics covered in lecture. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with ZOO 526.

FISH 581 Fishery Management: Case Studies (3) Examination of historical case studies chosen to illustrate specific fishery management problem areas. Faculty presentations occupy first half of quarter, student presentations the second half. Prerequisite: FISH 580. Offered: jointly with SMA 581.

FISH 600 Independent Study or Research (*) Credit/no credit only.

FISH 700 Master's Thesis (*) Credit/no credit only.

FISH 800 Doctoral Dissertation (*) Credit/no credit only.

Marine Affairs

3707 Brooklyn Avenue Northeast



General Catalog Web page:
www.washington.edu/students/genecat/academic/School_Marine.html



School Web page: www.sma.washington.edu

Graduate Program

Graduate Program Coordinator
3707 Brooklyn NE, Box 355685
206-543-4326, 206-543-7004
uwsma@u.washington.edu

Master of Marine Affairs

The School of Marine Affairs offers an interdisciplinary program of study leading to the Master of Marine Affairs degree. Marine affairs concerns management and policy questions on the uses of the coastal and offshore regions of the ocean and their resources. The core curriculum includes courses from marine affairs, economics, law, oceanography, political science, and public affairs.

The School of Marine Affairs offers an internationally recognized master's degree program for launching careers in marine policy and administration. Students learn creative approaches to resolving marine problems and conflicts, charting rational use of living and non-living marine resources, and managing human activities on the coasts, at sea, and in estuaries, wetlands, and large inland bodies of water.

A major program objective is to prepare students for professional careers in policy making, management, teaching, and research. Breadth of study is emphasized, and all students are expected to gain familiarity with relevant aspects of the social, technological, and environmental sciences. In addition, each student is expected to develop a professional and scholarly proficiency in a particular aspect of marine affairs.

Completion of the M.M.A. program normally requires two academic years for students who have received a baccalaureate degree. During the first year, students develop a comprehensive understanding of the marine affairs field and acquire analytic skills. During the second year, a special competence is developed in an topical area of interest (e.g., ocean and coastal management, ports and marine transportation, marine environmental protection, marine resources management, ocean and coastal tourism and recreation), and a thesis is prepared and presented under the guidance of a faculty supervisory committee. Individual courses of study may be adjusted to accommodate prior experience and academic background.

Admission Requirements

Admission to the School of Marine Affairs is based on evaluation of required application materials in competition with other applicants. Required materials include Graduate Record Examination general-test scores, completed departmental supplementary information form, three letters of recommendation, official academic transcripts, and a statement of career objectives. Applicants must apply directly to, and be accepted by, the University's Graduate School. Course sequences begin each autumn quarter, and new students normally are admitted only at that time.

Financial Aid

The School of Marine Affairs has a limited number of positions for graduate student appointments as research assistants. Applicants in need of support are urged to investigate outside sources of funding.

Faculty

Chair

Marc Hershman

Professors

Allen, Craig H. 1994, (Adjunct); JD, 1989, University of Washington; marine affairs, evidence, environmental regulation.

Alverson, Dayton L. * 1982, (Affiliate); PhD, 1967, University of Washington; marine affairs.

Crutchfield, James A. * 1960, (Emeritus); PhD, 1954, University of California (Berkeley); natural resources economics, policy and management, especially marine and environmental resources.

Delaney, John R. * 1977, (Adjunct); PhD, 1977, University of Arizona; geological oceanography, origin of oceanic crust, igneous petrology.

Francis, Robert C. * 1983, (Adjunct); PhD, 1970, University of Washington; fishery oceanography, effects of climate on marine ecosystems, paleoecology, fisheries management.

Gallucci, Vincent * 1976, (Adjunct); PhD, 1971, North Carolina State University; biomathematics and population dynamics.

Heath, G. Ross * 1984, (Adjunct); PhD, 1968, University of California (San Diego); geochemistry and mineralogy of deep-sea sediments.

Hershman, Marc * 1976; JD, 1967, Temple University, LLM, 1970, University of Miami (Florida); coastal zone management law.

Miles, Edward L. * 1974; PhD, 1965, University of Denver; international law and organization; science, technology, and international relations; marine policy.

Miller, Marc * 1979; PhD, 1974, University of California (Irvine); maritime anthropology, cognitive anthropology and social/cultural change.

Olson, David J. * 1974, (Adjunct); PhD, 1971, University of Wisconsin; American government and politics (urban, state, and labor relations).

Vesper, Karl H. * 1969; PhD, 1969, Stanford University; business policy, mechanical engineering, marine studies.

Wooster, Warren S. * 1976, (Emeritus); PhD, 1953, University of California (San Diego); effects of climate change on marine ecosystems, use of scientific information in marine management.

Associate Professors

Canning, Douglas J. 1997, (Affiliate); MS, 1987, Evergreen State College; coastal zone management, public trust doctrine, global climate change and sea level rise.

Copping, Andrea * 1992, (Affiliate); PhD, 1982, University of Washington; marine environment and water quality, marine science/marine policy.

De Master, Douglas Paul * 1994, (Affiliate); PhD, 1978, University of Minnesota; marine mammals, population dynamics, conservation biology.

Duxbury, Alyn C. * 1954, (Emeritus); PhD, 1963, Texas A&M University; estuarine processes and the management of human uses of these marine systems.

Floharty, David L. * 1983; PhD, 1977, University of Michigan; natural resource and environmental policy.

Goodwin, Robert F. 1973, (Affiliate); MA, 1972, University of Washington; geography of the coastal zone, coastal zone management, urban waterfront development.

Huppert, Daniel D. * 1987; PhD, 1975, University of Washington; economics and management of natural resources, especially marine fisheries.

Kaczynski, Wlodzimierz M. * 1977; PhD, 1973, University of Gdansk (Poland); fishery economics, international joint ventures in marine fisheries, international fisheries policy.

Leschine, Thomas M. * 1983; PhD, 1975, University of Pittsburgh; marine pollution management, ocean policy studies.

Assistant Professors

Christie, Patrick 1999, (Research); PhD, 1999, University of Michigan; tropical coastal zone management.

Klinger, Terrie 1993; PhD, 1988, University of California (San Diego); marine ecology and conservation biology.

Mantua, Nathan J. * 1998, (Affiliate); PhD, 1994, University of Washington; climate change, El Niño, Southern Oscillation, climate impacts on human activities and ecosystems.

Parrish, Julia * 1990, (Adjunct); PhD, 1988, Duke University; animal aggregation, fish schooling, seabirds, marine conservation, by catch.

Ryan, Clare * 1997, (Adjunct); PhD, 1996, University of Michigan; natural resource policy and administration, environmental conflict management, water policy.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

SMA 455 Marine Business Environment in Russia and Eastern Europe (3) I&S *Kaczynski* International marine business environment of Russia and the maritime nations of East Europe; their transition process from communist to free market economic systems. Covers aspects of doing business in marine-related fields such as shipping, fisheries, shipbuilding, ports, and land infrastructures, marine tourism, and water sports. Offered: jointly with SISRE 455.

SMA 480 Marine Resource Conservation and Management (3) I&S/NW *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with FISH 480/ENVR 480.

SMA 499 Undergraduate Research (1-15, max. 15) Research on assigned topics under the supervision of faculty members. Prerequisite: permission of instructor.

Courses for Graduate Students Only

SMA 500 Marine Affairs (5) *Hershman* Surveys a wide range of academic disciplines and substantive problems pertinent to interaction of human beings and the world's oceans and coasts. Management of living/nonliving resources, shipping, scientific research, pollution, recreation, and others. Lecture and discussion by invited specialists.

SMA 501 Integrated Marine Affairs Practice (3) Introduction to the practice of integrated assessment in marine affairs through the use of case studies and group analysis projects. Prerequisite: SMA 500 plus two of the following: SMA 519, SMA 536, SMA 591, or permission of instructor. Offered: A.

SMA 505 Introduction to Administrative Law and Process (2) *Hershman* Constitutional and administrative law applied to selected coastal and marine statutes. How to research legislative and administrative materials. Reading and briefing selected judicial opinions. Control of administrative agencies by the executive, legislative, and judicial branches. Designed for non-law graduate students pursuing natural resources and environmental subjects. Prerequisite: permission of instructor.

SMA 506 International Law of the Sea (4) *Allen* Ways nations claim authority to regulate activities at sea. Fundamental policies and decisions regarding navigation for commercial and military purposes, fisheries, exploitation and conservation, continental shelf resources, scientific research, protection of environment, deep-sea mining, and other uses of the ocean. Offered: jointly with LAW B 561.

SMA 507 International Organizations and Ocean Management (3) *Miles* Survey of the manner in which international regimes and organizations attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of the effectiveness of regimes and of processes that support or constrain these organizations. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with PB AF 538.

SMA 508 National Marine Policy Processes (3) *Miles* Comparative institutional dimensions of marine policy processes. Marine policy context at the national level and the dynamics that drive policy formulation and policy implementation.

SMA 509 Integrated Coastal Management (3) *Christie, Hershman* Managing multiple uses of coastal waters and the adjacent land; conflicts arising from competition for space and resources; organization, scientific, and economic problems associated with coastal management; planning and management experience in the United States and Southeast Asia. Prerequisite: SMA 500 or permission of instructor.

SMA 510 Ecological Concepts for Decisionmakers (3) *Klinger* Evaluation of ecological assumptions implicit in discussion, development, and implementation of environmental policy. Lectures focus on marine environmental policy debates and decisions that exemplify the use of ecological concepts. Group projects to evaluate the ecological foundations of management plans, regulations, legislation, or other policy problems.

SMA 514 Marine Pollution Management Issues (3) *Leschine* Management and policy aspects of marine environmental protection, emphasizing the two-way interaction between environmental managers and environmental and policy scientists which shapes policy.

SMA 515 U.S. Coastal and Ocean Law (4) *Hershman* Study of the legal framework in the United States controlling allocation and use of coastal and marine resources. Topics include coastal zone management, fisheries management, protection of marine

mammals and endangered species, marine pollution, offshore oil and gas development, and marine transportation. Offered: jointly with LAW B 565.

SMA 516 Seaport Management (3) Role of port and harbor agencies in management of marine uses: cargo and trade, economic development, tourism and recreation, fisheries, environmental protection. Management functions of planning, marketing, finance, engineering, environmental assessment. Examples and guest speakers from Port of Seattle and other Puget Sound ports. Prerequisite: SMA 500 or permission of instructor.

SMA 517 Marine Uses: Transportation and Commerce (3) *Hershman* Role of the oceans in the transportation of people and materials, character and trends in vessel design and terminal facilities, pattern and nature of industry organization, regulations, economics of the shipping industry, management of fleets and vessels, individuals at sea and ashore, national policies affecting the merchant marine and port facilities. Prerequisite: SMA 500 or permission of instructor.

SMA 519 Marine Policy Analysis (3) *Leschine* Goal is appreciation for and basic working knowledge of techniques used in policy analysis. Techniques are explored in both quasi-realistic settings and in application to real world problems of marine policy.

SMA 521 Governmental Responses to Global Climate Change (3) *Miles* Exploration of major scientific, policy and legal issues pertaining to problems of global climate change including regime design, use of climate models, impact on hydrology water resources, and forests.

SMA 523 International Science and Technology Policy (3) *Miles* Analyzes the relationships between research and development policy, capabilities, and national technological strategies for advanced industrial and less-developed countries. Deals with international implications as countries make policies in regional and global organizations. Examples chosen from space telecommunication, weather and climate modification, airline transportation, nuclear energy, and seabed exploration.

SMA 525 Marine Protected Area Management and Science (3) *Fuharty, Klinger* Examines management and scientific issues involved with the design, establishment, operation, and maintenance of MPAs. Offered: Sp.

SMA 536 Applied Microeconomics for Marine Affairs (3) *Huppert* Acquaints students with microeconomic tools commonly employed in policy analysis. Emphasis is placed on mastery of basic concepts, definitions, and models useful to marine policy, including determinants of price and outputs in competitive markets, effects of other market structures, market failure, and applied welfare economics.

SMA 537 Economic Aspects of Marine Policy (3) *Huppert* Development of pertinent economic concepts and their application to selected topics in marine policy decision making, including maritime policy, OCS oil and gas development, and wetlands management. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with ECON 537; W.

SMA 538 Economics of Living Marine Resources (3) *Huppert* Develops pertinent economic concepts and applications for conservation, regulation, and restoration of fisheries and other living resources. Gives special attention to fishery management, including harvest regulation and enforcement, recreational fisheries evaluation, property rights regimes, contemporary issues, and marine protected area management. Offered: jointly with ECON 538; Sp.

SMA 540 International Strategic Planning for Marine Resources (3) *Kaczynski* Marine economies

are affected by shrinking resources, population pressure, expanding economic globalization. Case studies from the third world and economies in transition illustrate strategic economic planning. Students research selected topics. Prerequisite: SMA 500 or permission of instructor. Offered: A.

SMA 550 Special Topics in Marine Studies (1-3, max. 18) Examination of various aspects of marine studies. Content varies, depending upon the interests of the faculty and students. Intended for the joint participation by the faculty and advanced students in the investigation of selected topics. One or more groups are organized each quarter.

SMA 555 Russian Ocean Policy (3) *Kaczynski* Russian ocean policy following Perestroika and disintegration of Soviet empire. Discusses Russian navy, fishery industry, merchant marine, ocean research fleet in light of international agreements and joint ventures and new politic, economic, and social environments. Prerequisite: knowledge of Soviet/Russian socio-economic problems or permission of instructor. Offered: jointly with SISRE 555.

SMA 570 Thesis Presentation (1) *Fuharty* Completion of the thesis requirement for SMA. Prepare a professional presentation to a peer audience. Offered: AWPSp.

SMA 581 Fishery Management: Case Studies (3) *Huppert* Examination of historical case studies chosen to illustrate specific fishery management problem areas. Faculty presentations occupy first half of quarter, student presentations the second half. Prerequisite: SMA 580 or permission of instructor. Offered: jointly with FISH 581.

SMA 591 Marine Science in the Coastal Zone (4) *Heath, Klinger* Major oceanic and nearshore processes, conditions, and their influence on human activities in coastal zone. Methods of understanding and accessing the accumulated knowledge on marine processes and its applications to decision-making process. Lectures and discussions of biological, chemical, geological, and physical oceanography. Generation and use of data bases as interpretative tools. Offered: jointly with OCEAN 591; A.

SMA 600 Independent Study or Research (*)

SMA 700 Master's Thesis (*)

Oceanography

108 Oceanography Teaching Building

 *General Catalog Web page:*
www.washington.edu/students/genocat/academic/Oceanography.html

 *School Web page:*
www.ocean.washington.edu

Oceanography is the study of the marine environment and its interactions with the earth, the biosphere, and the atmosphere. The study is prompted both by the intellectual desire to understand how the oceans move and how life develops in a salty, cold environment, and the need to use wisely the ocean's resources for the benefit of humanity. It is an interdisciplinary science integrating the basic principles of biology, chemistry, geology, physics, geophysics, mathematics, botany, zoology, meteorology, and geography. Applications of high technology to oceanographic instrumentation and vessels, increasingly sophisticated computers, satellite remote sensing, and innovative methodologies are rapidly opening new possibilities for exploration and study. Oceanography is divided into four areas of emphasis:

Biological Oceanography examines the processes governing the distribution, abundances, and production of plants, animals, and nutrients in the oceanic ecosystem. Emphasis is on investigations of bacteria, phytoplankton, zooplankton, and benthic organisms.

Chemical Oceanography investigates the complex chemistry, distribution and cycling of dissolved substances, nutrients, and gases in seawater, the mechanisms controlling them and their origins and fates.

Marine Geology and Geophysics studies marine sediments (their formation, transport, and deposition); ocean basin formation (plate tectonics); processes governing shoreline formation; and the origin, structure, and history of the oceanic crust and upper mantle.

Physical Oceanography endeavors to understand and predict motions in the sea from millimeters through tidal and current scales to the great ocean gyres, the distribution of physical properties (temperature, salinity, sea ice), and air-sea interaction and its implications for climate.

The School of Oceanography, which had its beginnings in 1930, offers courses and conducts basic research in oceanography, the science that examines physical, geological, chemical, and biological processes in the ocean and interactions of the ocean with the earth, the biosphere, and the atmosphere. Education and research in the School include studies of seawater in motion; life in the sea; chemical composition and properties of seawater; interactions between the sea and the atmosphere, the sea and the land, sediments and rocks beneath the sea; and the geophysics of the ocean floor. Because the science of oceanography is interdisciplinary in nature, joint programs are maintained in the areas of astrophysics, atmospheric sciences, biochemistry, environmental chemistry, geochemistry, geophysical fluid dynamics, geophysics, and marine biology and botany with the departments of Applied Mathematics, Astronomy, Atmospheric Sciences, Botany, Chemistry, Genetics, Geological Sciences, Geophysics, Microbiology, and Zoology, and with the other units in the College of Ocean and Fishery Sciences.

Courses

A full spectrum of basic and advanced courses is offered in each area of specialization: biological, chemical, and physical oceanography, and marine geology and geophysics. Among the wide variety of courses open to students are molecular approaches to oceanographic questions, marine microbiology, zooplankton ecology, aquatic organic geochemistry, estuarine circulation and mixing, ocean and climate variation, sedimentary dynamics and history of the ocean, marine science of coastal zone management, and human impacts on the ocean.

Summer-quarter instruction is offered both on the main campus and at the Friday Harbor Laboratories on San Juan Island.

Advising

The Student Services Office is staffed by an academic counselor, who assists students with curriculum, scheduling, and career counseling. Students also consult with a faculty adviser.

Research

Each year the School participates in a broad range of oceanographic investigations, ranging from individual research projects to multidisciplinary or multi-university projects. Major biological programs are carried out in Puget Sound, in the waters of the continental shelf off Washington and California, and in the North Pacific Ocean. These projects include investi-

gations of the processes governing the communities of organisms in the water column and on the seabed, and microorganisms occurring in extreme environments (hydrothermal vents, polar sea ice, abyssal habitats). Chemical oceanography includes study of the distribution and fluxes of organic and inorganic chemicals and stable and radioactive isotopes in the water column and sediments on local, regional, and global scales with special emphasis on the ocean carbon cycle. Geological investigations include theoretical studies and field experiments on sediment motion and sedimentary processes. This work ranges from the deep waters of the Scotian Rise in the Atlantic Ocean to Prudhoe Bay, Barents Sea, New Guinea, the Amazon, and the east and west coasts of the United States.

Geophysical research is concerned with the oceanic crust and upper mantle. Topics include seismic experiments on plate boundaries, crustal formation, hydrothermal processes in the Juan de Fuca-Gorda Ridge System, and studies of the earth's magnetic field. Physical oceanographic programs range from large-scale circulation studies of the North Pacific, the North Atlantic, the tropical oceans, and the Antarctic circumpolar current to coastal and estuarine circulation studies and small-scale mixing programs. The theoretical and experimental programs include studies of air-sea interaction, surface and internal waves, oceanic fronts, and sea ice.

Studies in local waters include sediment transport, mixing processes, subsurface structure, and biological communities in the fjords and inlets of Puget Sound. The Puget Sound Regional Synthesis Model (PRISM), an interdisciplinary initiative, proposes to develop and sustain a dynamic understanding of the environmental and human factors that will shape the estuary's future.

Facilities and Vessels

Housed in four large and several smaller buildings on campus by Portage Bay, the School is equipped with extensive laboratories and teaching facilities, including controlled-environment rooms, a paleomagnetism laboratory, a sea-ice laboratory, a marine molecular biotechnology laboratory, and a geophysical fluid dynamics laboratory. The new 100,000 square-foot Oceanography Sciences Building features state-of-the-art laboratory facilities and provides additional office space for faculty and students.

The School operates its own midscale interactive computer and highly specialized laboratory instruments, such as mass spectrometers, scanning electron microscopes, and seawater sediment transport flumes. Access to other more sophisticated facilities and instruments, as well as super computers, is available on campus. Docks provide mooring for the School's two research vessels. Deep-ocean research programs are accommodated on the 274-foot *R/V Thomas G. Thompson*. Graduate students are involved in all of the cruises, most often for their thesis research. The 65-foot *R/V Clifford A. Barnes* undertakes short cruises into Lake Washington and Puget Sound for the instructional and research programs.

Friday Harbor Laboratories on San Juan Island offer unique opportunities for research and study. Specialized courses in new areas of oceanography are offered each summer. The facilities are used by faculty members and students throughout the year for oceanographic research.

Funding

The School is supported primarily by funds from the state of Washington and federal agencies. Major sources of federal funding include the National Science Foundation, National Oceanic and Atmospheric Administration, Office of Naval Research, and Department of Energy. Funds are also

provided by various state and local government agencies and private organizations.

Graduate Program

Graduate Student Services
108 Ocean Teaching, Box 357940
206-543-5039
student@ocean.washington.edu

The School of Oceanography provides excellent instruction and research opportunities at the graduate level in all areas: biological, chemical, and physical oceanography, and marine geology and geophysics. The program of study emphasizes independent research in conjunction with basic and specialized courses. Interdisciplinary research is encouraged, and students enjoy the opportunity to work across the usual scientific boundaries. Course work during the first two years is required in each option; specialized course work is structured to fit the student's background and objectives. Foreign-language proficiency is required only when deemed crucial to scholarly research.

Admission

Students enter the School from varied undergraduate disciplines at many universities. All have in common a strong background in the sciences and mathematics; most have never taken courses in oceanography. Evaluation of candidates is based on Graduate Record Examination scores, the undergraduate transcript (scholarship and depth), three letters of recommendation, and the applicant's statement of objectives and interests. Admission can be accommodated at the beginning of any quarter except winter, although autumn entry is most common.

Master of Science

The program of study includes course work in the student's area of interest and the other oceanography options, and the completion of an approved research project and oral presentation of the results. Thesis and non-thesis programs are offered; most students select the non-thesis option.

Doctor of Philosophy

The degree program places a strong emphasis on research following completion of course requirements and General Examination. Upon successful completion of the General Examination, the student undertakes an original research investigation, which is described in the dissertation and defended during the Final Examination.

Financial Aid

Normally all students pursuing a graduate degree are supported by research or teaching assistantships, or by fellowships and scholarships from national or private sources. Most appointments continue through the summer when students are engaged in research.

Faculty

Chair

Bruce W. Frost

Professors

Aagaard, Knut * 1968; PhD, 1966, University of Washington; physical oceanography, ocean circulation, arctic oceanography.

Anderson, George C. 1972, (Emeritus); PhD, 1954, University of Washington; plankton ecology, biological oceanography.

- Baker, Edward T. 1973, (Affiliate); PhD, 1973, University of Washington; distribution, characterization, and impacts of hydrothermal emissions, linkage to tectonic processes.
- Banse, Karl * 1960, (Emeritus); Doct, 1955, University of Kiel (Germany); biological oceanography, plankton production and methodology, polychaete systematics.
- Baross, John A. * 1984; PhD, 1973, University of Washington; microbial oceanography, bacterial ecology.
- Cannon, Glenn A. * 1983, (Affiliate); PhD, 1969, Johns Hopkins University; physical oceanography of coastal waters and deep-sea hydrothermal venting.
- Carpenter, Roy * 1968; PhD, 1968, University of California (San Diego); marine geochemistry of metals and hydrocarbons in coastal zones.
- Cattolico, Rose A. * 1975, (Adjunct); PhD, 1973, State University of New York (Stony Brook); signal transduction and calcium cycle processes in toxic marine algae.
- Creager, Joe S. * 1958, (Emeritus); PhD, 1958, Texas A&M University; geological oceanography, sedimentology.
- Criminale, William O. * 1968; PhD, 1960, Johns Hopkins University; fluid dynamics, nonlinear mechanics, stability theory.
- D'Asaro, Eric A. * 1980; PhD, 1980, Massachusetts Institute of Technology; physical oceanography, internal waves, turbulence and mixing processes.
- Delaney, John R. * 1977; PhD, 1977, University of Arizona; geological oceanography, origin of oceanic crust, igneous petrology.
- Deming, Jody W. * 1988; PhD, 1981, University of Maryland; evolution and ecology of marine bacteria in the pressurized ocean.
- Devol, Allan H. * 1975; PhD, 1975, University of Washington; biogeochemistry, sediment diagenesis, anoxic systems, carbon fluxes.
- Emerson, Steven R. * 1976; PhD, 1974, Columbia University; marine geochemistry, chemical oceanography, sediment diagenesis.
- Eriksen, Charles C. * 1986; PhD, 1977, Massachusetts Institute of Technology; experimental physical oceanography; equatorial and upper ocean dynamics, internal waves.
- Ewart, Terry E. * 1956, (Emeritus); PhD, 1965, University of Washington; physics, ocean microstructure, diffusion, acoustic transmission.
- Francis, Robert C. * 1983, (Adjunct); PhD, 1970, University of Washington; fishery oceanography, effects of climate on marine ecosystems, paleoecology, fisheries management.
- Frost, Bruce W. * 1969; PhD, 1969, University of California (San Diego); biological oceanography, marine zoogeography, plankton ecology and systematics.
- Gammon, Richard H. * 1985; PhD, 1970, Harvard University; atmospheric chemistry, chemical oceanography, environmental chemistry; biogeochemical cycles.
- Gregg, Michael C. * 1974; PhD, 1971, University of California (San Diego); physical oceanography, ocean microstructure, coasts, estuaries, hydraulics, internal waves.
- Harrison, Don Edmunds * 1985, (Affiliate); MS, 1973, PhD, 1977, Harvard University; ocean circulation modeling, air-sea interaction, ocean and climate dynamics.
- Heath, G. Ross * 1984; PhD, 1968, University of California (San Diego); geochemistry and mineralogy of deep-sea sediments.
- Hedges, John I. * 1976; PhD, 1975, University of Texas (Austin); organic geochemistry, sources, transport, fate of organic material in coastal zones.
- Hickey, Barbara M. * 1973; PhD, 1975, University of California (San Diego); physical oceanography, dynamics of equatorial and shelf circulation.
- Holmes, Mark L. 1975; PhD, 1975, University of Washington; estuarine geologic processes, natural hazards in Puget Sound, crustal evolution at mid-ocean ridges.
- Johnson, Harlan Paul * 1976; PhD, 1972, University of Washington; paleomagnetism and marine geophysics.
- Jumars, Peter A. 1975, (Affiliate); PhD, 1974, University of California (San Diego); biological oceanography, benthos, biological sedimentary dynamics and spatial statistics.
- Kelly, Kathryn A. * 1996, (Affiliate); PhD, 1983, University of California (San Diego); physical oceanography, specializing in combining models with satellite observations.
- Kunze, Eric L. * 1987; PhD, 1985, University of Washington; mesoscale phenomena, wave/mean flow interaction double diffusion and mixing.
- Lewis, Brian T. R. * 1970, (Emeritus); PhD, 1970, University of Wisconsin; marine geophysics, marine seismology, gravity, magnetics, and computer modeling of those processes.
- Martin, Seelye * 1969; PhD, 1967, Johns Hopkins University; geophysical fluid dynamics, properties of sea ice.
- McCormick, Norman J. * 1966, (Adjunct); PhD, 1965, University of Michigan; radiative transfer, optical oceanography, reliability/risk analysis, mechanical engineering design.
- McDuff, Russell E. * 1981; PhD, 1978, University of California (San Diego); marine geochemistry.
- McManus, Dean A. * 1959, (Emeritus); PhD, 1959, University of Kansas; geological oceanography, continental shelf sediments, geoscience education.
- McPhaden, Michael J. * 1982, (Affiliate); PhD, 1980, Scripps Oceanographic Institution; equatorial ocean dynamics, climate scale air-sea interaction.
- Merrill, Ronald T. * 1967, (Adjunct); MS, 1961, University of Michigan, PhD, 1967, University of California (Berkeley); geomagnetism, paleomagnetism.
- Mobley, Curtis D. 1997, (Affiliate); PhD, 1977, University of Maryland; optical oceanography and radiative transfer, especially numerical modeling.
- Moore, Dennis W. 1996, (Affiliate); PhD, 1968, Harvard University; equatorial oceanography, geophysical fluid dynamics, and inertial boundary currents.
- Morison, James H. * 1972, (Affiliate); PhD, 1980, University of Washington; upper ocean physical processes in the polar regions.
- Murray, James W. * 1973; PhD, 1973, Massachusetts Institute of Technology; marine geochemistry, aquatic chemistry.
- Nelson, Bruce K. * 1986, (Adjunct); MS, 1979, University of Kansas, PhD, 1985, University of California (Los Angeles); isotope geochemistry, volcanism, mantle chemistry and evolution.
- Nittrouer, Charles * 1998; PhD, 1978, University of Washington; geological oceanography, continental-margin sedimentation.
- Nowell, Arthur R. M. * 1978; PhD, 1975, University of British Columbia (Canada); physical oceanography, turbulent boundary layer dynamics, sediment transport.
- Perry, Mary J. 1976, (Affiliate); PhD, 1974, University of California (San Diego); biological oceanography, phytoplankton physiology, nutrient cycling.
- Quay, Paul D. * 1977; PhD, 1977, Columbia University; chemical oceanography, stable isotope geochemistry, ocean tracers and mixing.
- Rattray, Maurice 1950, (Emeritus); PhD, 1951, California Institute of Technology; physical oceanography, hydrodynamics, ocean circulation modeling.
- Rhines, Peter B. * 1984; PhD, 1967, Cambridge University (UK); the circulation of the oceans and evolution of climate.
- Richey, Jeffrey E. * 1973; PhD, 1973, University of California (Davis); quantitative problems of aquatic ecosystems, primary Amazon River, limnology.
- Sanford, Thomas B. * 1979; PhD, 1967, Massachusetts Institute of Technology; physical oceanography, dynamics of ocean currents, motional induction, instrumentation.
- Sarachik, Edward S. * 1984, (Adjunct); PhD, 1966, Brandeis University; atmospheric dynamics, air-sea interactions, greenhouse warming, equatorial dynamics, climate change.
- Shreve, Ronald L. 2000, (Research); PhD, 1959, California Institute of Technology; geology, geomorphology, glaciology, geological physics, and geophysics.
- Spindel, Robert C. 1987, (Adjunct); MS, 1966, PhD, 1971, Yale University; ocean acoustics, signal processing, acoustic navigation systems, acoustic tomography.
- Sternberg, Richard * 1965, (Emeritus); PhD, 1965, University of Washington; geological oceanography, marine sedimentation processes.

Associate Professors

- Balistreri, Laurie S. * 1995, (Affiliate); MS, 1977, University of Washington; aqueous and environmental geochemistry, processes controlling trace elements in aquatic systems.
- Duxbury, Alyn C. * 1954, (Emeritus); PhD, 1963, Texas A&M University; estuarine processes and the management of human uses of these marine systems.
- Feely, Richard A. * 1983, (Affiliate); PhD, 1974, Texas A&M University; chemical oceanography, oceanic sources and sinks for carbon dioxide.
- Holcomb, Robin T. 1988, (Affiliate); PhD, 1979, Stanford University; volcanology.
- Howe, Bruce M. 1987; PhD, 1986, University of California (San Diego); physical oceanography, acoustic tomography.
- Johnson, Gregory C. * 1990, (Affiliate); PhD, 1991, Massachusetts Institute of Technology; large-scale ocean circulation, dynamics and variability.
- Kawase, Mitsuhiro * 1988; PhD, 1986, Princeton University; geophysical fluid dynamics; oceanic general circulation; tracer oceanography.

Keil, Richard G. * 1991; PhD, 1991, University of Delaware; microbial degradation of organic compounds in aquatic and soil environments.

Kelley, Deborah S. * 1992; PhD, 1990, Dalhousie University (Canada); marine geology, volcanic-hosted submarine hydrothermal systems, sulfide-microbial habitats.

Kessler, William S. * 1995, (Affiliate); PhD, 1989, University of Washington; equatorial ocean circulation and waves; interannual climate variability.

Krieger-Brockett, Barbara * 1976, (Adjunct); MS, 1972, PhD, 1976, Wayne State University; reaction engineering, chemical kinetics and catalysis simulation.

Lessard, Evelyn J. * 1989; PhD, 1984, University of Rhode Island; microzooplankton ecology and physiology; physical/biological interactions at oceanic fronts.

Lilley, Marvin D. * 1984; PhD, 1983, Oregon State University; chemical oceanography.

MacCready, Parker * 1994; PhD, 1991, University of Washington; ocean circulation in estuaries and the southern ocean.

Mofjeld, Harold 1970, (Affiliate); PhD, 1970, University of Washington; tsunami dynamics, long waves and currents in the ocean, storm surge inundation.

Nystuen, Jeffrey A. 1999, (Affiliate); PhD, 1985, University of California (San Diego); acoustical oceanography, applied to oceanic rainfall and physics of the air-sea interface.

Riser, Stephen C. * 1981; PhD, 1981, University of Rhode Island; physical oceanography, mesoscale mixing, physics of mesoscale eddies, numerical modeling.

Shuman, Frank R. 1999, (Affiliate); PhD, 1978, University of Washington; monitoring activities in marine waters: sediment, water, plants and animals, toxic substances.

Thompson, Luanne * 1990; PhD, 1990, Massachusetts Institute of Technology; numerical modeling of mesoscale and general circulation of the oceans.

Warner, Mark J. * 1989; PhD, 1988, University of California (San Diego); physical oceanography, ocean ventilation and mixing processes.

Wilcock, William S. D. * 1993; PhD, 1992, Massachusetts Institute of Technology; marine seismology, dynamics of mid-ocean ridges, geological fluid dynamics.

Williams, Kevin L. * 1998; PhD, 1985, Washington State University; propagation and scattering of sound in the ocean: applied to remote sensing and sediment acoustics.

Assistant Professors

Alford, Matthew H. * 2001, (Affiliate); PhD, 1998, University of California (San Diego); internal waves, turbulence, double diffusion and mixing in the ocean.

Armbrust, E. Virginia * 1996; PhD, 1990, Massachusetts Institute of Technology; molecular ecology, genetic diversity of microbial populations, diatom sexual reproduction.

Bullister, John L. 1991, (Affiliate); PhD, 1984, University of California (San Diego); chemical tracers of large-scale ocean circulation and mixing, gases in the ocean and atmosphere.

Butterfield, David A. 1997, (Affiliate); PhD, 1990, University of Washington; geochemical systematics

of hydrothermal fluids, relation to seafloor volcanism, microbial activity.

Cronin, Meghan 1998, (Affiliate); PhD, 1993, University of Rhode Island; upper-ocean heat, salt, and momentum balances, western boundary currents, eddy-mean flow interaction.

Dushaw, Brian D. 1999, (Affiliate); PhD, 1992, University of California (San Diego); acoustic tomography, applications to ocean temperature, tidal dissipation, ocean mixing.

Grunbaum, Daniel * 1991; PhD, 1991, Cornell University; zooplankton ecology, population biology, behavioral ecology, mathematical biology, and biomechanics.

Hautala, Susan L. * 1994; PhD, 1992, University of Washington; physical oceanography, abyssal and paleoabyssal circulation.

Lee, Craig M. * 1987, (Affiliate); PhD, 1995, University of Washington; upper-ocean processes, internal waves, fronts, interactions between dynamics and biology.

Logsdon, Miles G. * 1989, (Research); PhD, 1997, University of Washington; spatial modeling and analysis of environmental systems in the earth sciences.

Napp, Jeffrey M. 1991, (Affiliate); PhD, 1986, University of California (San Diego); biological-physical interactions in the epipelagic zone, zooplankton ecology, fisheries oceanography.

Newton, Jan A. 1998, (Affiliate); PhD, 1989, University of Washington; production and export of organic material, estuarine/coastal dynamics and marine water quality.

Ogston, Andrea S. * 1997, (Research); PhD, 1997, University of Washington; sediment transport processes in the marine environment.

Oltman-Shay, Joan M. 1991, (Affiliate); PhD, 1986, University of California (San Diego); nearshore waves and currents: wave climatology, generation and dissipation, sediment dynamics.

Parsons, Jeffrey D. * 2000; PhD, 1998, University of Illinois (Urbana-Champaign); sediment dynamics, environmental fluid mechanics, submarine and Martian morphology.

Resing, Joseph A. 2001, (Affiliate); PhD, 1997, University of Hawaii; effects of submarine volcanism and hydrothermal effluent on the large-scale chemistry of the oceans.

Rocap, Gabrielle L. * 2001; PhD, 2000, Massachusetts Institute of Technology; ecology and evolution of cyanobacteria; comparative genomics and distribution of genetic diversity.

Sabine, Christopher L. 1999, (Affiliate); PhD, 1992, University of Hawaii; carbon cycling in the global oceans including air-sea fluxes and estimates of anthropogenic carbon.

Tynan, Cynthia T. 1999, (Affiliate); PhD, 1993, University of California (San Diego); biological-physical processes, distribution and abundances of plankton and marine mammals.

Woodgate, Rebecca A. 1999, (Research); PhD, 1990, University of Cambridge (UK); physical oceanography research, especially collection and analysis of in situ time series.

Senior Lecturer

Emerick, Christina M. 1985; PhD, 1985, Oregon State University; marine geochemistry and tectonics.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

OCEAN 400 Chemical Oceanography (4) NW Physical and chemical properties of seawater and marine products; processes determining the chemical makeup of the oceans. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155; either OCEAN 202 or OCEAN 210. Offered: A.

OCEAN 401 Special Topics in Chemical Oceanography (3) NW

OCEAN 410 Marine Geology and Geophysics (4) NW Sedimentological and petrologic processes that determine the geologic record. Prerequisite: either ESS 101, ESS 101, ESS 210, GEOL 101, or GEOL 205. Offered: A.

OCEAN 411 Special Topics in Marine Geology and Geophysics (3) NW

OCEAN 420 Physical Processes in the Ocean (4) NW Physical properties and processes of the ocean: methods of describing ocean currents, waves, tides and mixing and their effect on movement of water parcels. Prerequisite: either PHYS 116 or PHYS 123; either MATH 126, MATH 129, MATH 146, or Q SCI 293; either OCEAN 202 or OCEAN 210. Offered: W.

OCEAN 421 Special Topics in Physical Oceanography (3) NW

OCEAN 422 Ocean Dynamics (3) NW Equations of motion governing flow of sea water. Conservation of mass, tracers, heat and momentum. Energy and vorticity balance. Buoyancy and rotational effects. Scale analysis. Applications to upper ocean dynamics, surface and internal waves, and wind-driven currents in the ocean. Prerequisite: MATH 126; PHYS 123; OCEAN 420.

OCEAN 423 Ocean Circulation and Climate (3) NW Quantitative treatment of ocean basin to global scale ocean circulation systems and their interaction with climate variability. Prerequisite: PHYS 123; either MATH 126 or MATH 129; OCEAN 401.

OCEAN 430 Biological Oceanography (4) NW Marine organisms, their quantitative distribution in time and space and their interactions with the ocean. Prerequisite: either BIOL 102, BIOL 203, or BIOL 220; either OCEAN 202 or OCEAN 210. Offered: W.

OCEAN 431 Special Topics in Biological Oceanography (3) NW

OCEAN 442 Oceanography of the Puget Sound (3) NW Explores the role of oceanography in regional issues. Field opportunities and active investigation of applied oceanographic problems. Lectures, research trip, student co-teaching, discussion. Prerequisite: either CHEM 221, BIOL 203, BIOL 220, ESS 210, or GEOL 205; OCEAN 433. Offered: A.

OCEAN 443 Design of Oceanographic Field Experiments (3) NW Case histories, presentations, and class exercises used to teach methods of formulating a research problem and proposal writing. Methods of data analysis, presentation, error estimation, library resource and data base use; web page implementation and design. Principles of cruise planning. Prerequisite: OCEAN 400; OCEAN 410; OCEAN 420; OCEAN 430; OCEAN 442. Offered: W.

OCEAN 444 Advanced Field Oceanography (5) NW Conduct field experiment (designed in OCEAN 443) during a week-long cruise aboard a research vessel. Analyze samples data and present results in a series of drafts and a final term paper. Results are presented at a two-day-long public research symposium and on the students' individual Web sites. Prerequisite: OCEAN 443. Offered: Sp.

OCEAN 450 Climatic Extremes (4) NW Course examines earth history for extreme climatic conditions to predict future climate changes. Numerical climate models use PC-based computer programs to identify processes and feedbacks that control climate. Prerequisite: MATH 125, MATH 145, or Q SCI 292; and PHYS 115 or PHYS 122.

OCEAN 451 Fluid Dynamics Laboratory (4) NW Individual projects in experimental fluid dynamics with applications to practical problems. Experimental design, visualization, and measurement techniques applied to a problem selected by each student. Prerequisite: PHYS 123.

OCEAN 452 Spatial Information Technologies in Ecosystem Sciences (3) NW *Logsdon* Introduction to the use of GPS, GIS, and Remote Sensing in the ecosystem sciences. Integrates these technologies in an applied research setting. Two overnight weekend field trips required. Offered: jointly with FISH 453; A.

OCEAN 499 Undergraduate Research (1-12, max. 24) Research on assigned topics that may involve laboratory work, fieldwork, or literature surveys. Offered: AWPpS.

Courses for Graduates Only

OCEAN 500 Current Problems in Oceanography (1) Discussion of research topics that are currently being investigated within the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AW.

OCEAN 501 Estuarine Circulation and Mixing (3) Observed patterns of currents, mixing, and stratification from deep fjords to shallow coastal plain estuaries. Physical understanding of basic processes, such as tides, wind stress, topographic effects on turbulence, sill hydraulics, and exchange flow. Vertical mixing and residence times important to biological and pollution studies. Prerequisite: permission of instructor.

OCEAN 506 Interdisciplinary Seminar in Oceanography (1-3, max. 12) Lectures, discussions, and work on selected problems of an interdisciplinary nature. Prerequisite: permission of instructor.

OCEAN 509 Seminar (1) Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: AWPpS.

OCEAN 510 Physics of Ocean Circulation (5) Structure of ocean basins; physical properties of seawater and the equation of state; heat, salt, fresh water budgets; tidal potential; Coriolis effect and geostrophic balance; major current systems and water masses; mixing, stirring in the ocean; simple waves; modern experimental methods in physical oceanography. Prerequisite: permission of instructor. Offered: A.

OCEAN 511 Introduction to Fluid Dynamics (4) Eulerian equations for mass-motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress-strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high-low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with AMATH/ATM S 505; A.

OCEAN 512 Geophysical Fluid Dynamics I (4) Dynamics of rotating stratified fluid flow in the atmosphere/ocean and laboratory analogues. Equations of state, compressibility, Boussinesq approximation. Geostrophic balance, Rossby number. Poincare, Kelvin, Rossby waves, geostrophic adjustment. Ekman layers. Continuously stratified dynamics: Inertia-gravity waves, potential vorticity, quasigeostrophy. Prerequisite: OCEAN 511 or ATM S/AMATH 505. Offered: jointly with ATM S 509; W.

OCEAN 513 Geophysical Fluid Dynamics II (3) Theories, models of large-scale dynamics of oceans, atmospheres. Potential vorticity, Q principles; Rossby waves, ray tracing, Green's function, setup of general circulation; atmospheric "channels" versus ocean "basins"; wave-mean flow interaction, mountain drag, internal momentum flux; "Lagrangian" motion of particles, tracers; cascades, eddy flux of heat, moisture, Q. Prerequisite: OCEAN 512. Offered: Sp.

OCEAN 514 Waves (3) Application of marine hydrodynamics principles to wave motion in oceans. Offered: W.

OCEAN 515 Ocean Circulation: Observations (3) Modern large- and mesoscale ocean observations, interpreted in terms of contemporary circulation theories. Spectrum of temporal variability; eddies and eddy fluxes; ventilation; advection and diffusion in the abyss; transports of heat and salt; climatic scale of variability; modern methods for determining circulation. Prerequisite: OCEAN 510 or permission of instructor. Offered: Sp.

OCEAN 516 Ocean Circulation: Theories (3) Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite: OCEAN 512 or permission of instructor.

OCEAN 517 Methods and Measurements in Physical Oceanography (2) Principal instruments and experimental methods of physical oceanography. Devices and systems that measure pressure, temperature, electrical conductivity, sea state, and velocity. Prerequisite: permission of instructor. Offered: alternate years.

OCEAN 520 Marine Chemistry (5) Processes controlling the chemical composition of seawater. Chemical distributions in the ocean, marine physical chemistry, chemical equilibrium, and concepts of mass balance. Mechanisms and models used to explain distributions of stable and radioactive isotopes, gases, trace metals, and biochemicals in the world's oceans. Offered: A.

OCEAN 521 Aquatic Chemistry (3) Application of physical chemistry and thermodynamics to processes that control chemical composition of natural waters. Equilibrium approach. Acid/base chemistry, the carbonate system, dissolution and precipitation, metal ions in solution, oxidation-reduction chemistry, silicate mineral reactions. Prerequisite: OCEAN 520 or permission of instructor. Offered: A.

OCEAN 522 Marine Organic Geochemistry (3) Sources, reactions, and fates of organic molecules in the marine environment along with the stable isotope geochemistry of marine organic substances. Prerequisite: CHEM 237 and CHEM 239 or permission of instructor.

OCEAN 523 Geochemical Cycles (4) Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with CHEM 523/ATM S 508.

OCEAN 524 Environmental Chemical Modeling (3) *Benjamin, Murray* Physical/chemical principles controlling the fate and distribution of environmental pollutants, and use of models to apply those principles. Includes modeling of physical transport in conjunction with chemical equilibrium and reaction kinetics. Applications include acid mine drainage, acid deposition, and groundwater and lake water contamination. Offered: jointly with CEE 550.

OCEAN 529 Seminar on Chemical Oceanography (*, max. 9) Lectures, discussions, and readings on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWPpS.

OCEAN 530 Biological Oceanography: Bacteria and Protozoa (3) Bacteria in the marine environment; fate of organic carbon in the ocean and the interrelationship of the carbon cycle with other biogeochemical cycles. Prerequisite: permission of instructor. Offered: W.

OCEAN 531 Biological Oceanography: Phytoplankton (3) Phytoplankton in the marine environment: ecology, primary productivity, and physiology. Phytoplankton growth and photosynthetic patterns; spatial and temporal distributions of phytoplankton; methods for determining distributions and rates of production and growth. Prerequisite: permission of instructor. Offered: W.

OCEAN 532 Biological Oceanography: Zooplankton (3) Distribution and abundance of pelagic animals in space and time; analysis of their interactions. Small-scale distributions and behavior, population dynamics and energetics, trophic structure and dynamics, pelagic community structure, models of populations and food chains, secondary production and biogeography. Prerequisite: permission of instructor. Offered: Sp.

OCEAN 533 Biological Oceanography: Benthos (3) Analysis of marine benthic communities; new research questions and method; ecologically important physics of benthic boundary layer; theories, mechanics, and observations of deposit feeding; succession as consequence of physical processes and biological interactions. Environments include deep-sea, continental shelves, estuaries, and intertidal, focusing on soft substrata. Prerequisite: permission of instructor. Offered: Sp.

OCEAN 535 Biological Oceanography for Physical Scientists (5) Principles and practice of biological oceanography for students with strong background in physical sciences but little recent exposure to biology. Ecological principles at individual, population, and community levels; overview of discipline of biological oceanography; case studies of interdisciplinary problems shared with the physical sciences. Prerequisite: permission of instructor. Offered: W.

OCEAN 539 Seminar in Biological Oceanography (*, max. 9) Lectures, discussions, and work on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWPpS.

OCEAN 540 Marine Geological Processes (5) Principles of thermodynamics, heat and mass transfer, fluid mechanics, continuum mechanics, and time-series analysis applied to marine geological and geophysical data. Applications to thermal balance of the oceanic lithosphere; Pleistocene sedimentation and global climate change; and sediment transport in high energy environments. Prerequisite: permission of instructor. Offered: W.

OCEAN 541 Marine Sedimentary Processes (5) Erosion, transportation and deposition of sediment in estuarine, beach, continental shelf and slope, and deep sea environments. Development of equations characterizing boundary shear flows, initiation of grain motion, bedload and suspended load transport. Evolution of primary bed forms, processes of sedi-

ment accumulation, and measurement techniques. Prerequisite: permission of instructor.

OCEAN 542 Sediment Dynamics and Boundary-Layer Physics (4) *Parsons* Theoretical descriptions of sediment transport processes constrained by laboratory demonstrations. The physics of boundary layers, initiation of motion, suspended load, bedload, bedforms, and continua transport (turbidity currents, debris flows, and suspensions) and its application to the geological record. Offered: jointly with ESS 526; W.

OCEAN 544 Geochemical Evolution of Oceanic Lithosphere (3) Chemical principles of magmatic evolution and hydrothermal interaction as they apply to the formation and evolution of the oceanic lithosphere. Comparisons of theoretical models with field studies conducted using submersibles and deep ocean drilling. Prerequisite: permission of instructor.

OCEAN 545 Physics of the Oceanic Lithosphere I (3) Physical processes responsible for the formation and evolution of the oceanic lithosphere. Thermodynamic mechanisms of mantle creep; fluid dynamics of mantle flow, decompressional melting, formation of oceanic crust, and cooling of the oceanic lithosphere. Prerequisite: either ESS 511 or GPHYS 501; either ESS 514 or GPHYS 504; or permission of instructor. Offered: jointly with ESS 568.

OCEAN 549 Seminar in Geological and Geophysical Oceanography (*, max. 9) Lectures, discussions, and field and laboratory work on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

OCEAN 559 Advanced Seminar on Mid-Ocean Ridge Processes (*, max. 9) Lectures, discussions, and practical work on selected topics of current interest in mid-ocean ridge research. Prerequisite: permission of instructor.

OCEAN 560 Atmosphere/Ocean Interactions (3) Observations and theory of phenomena of the coupled atmosphere-ocean system. El Niño/Southern Oscillation; decadal tropical variability; atmospheric teleconnections; midlatitude atmosphere-ocean variability. Overview of essential ocean and atmospheric dynamics, where appropriate. Credit/no credit only. Prerequisite: ATM S 509 or OCEAN 512. Offered: jointly with ATM S 560; alternate years; Sp.

OCEAN 569 Topics in Physical Oceanography (1-4, max. 9) Lecture series on topics of major importance in physical oceanography. Offered: AWSp.

OCEAN 572 Zooplankton Ecology (1-3, max. 9) Life history strategies, dynamics and production of populations, vertical migration, interspecific interactions and community structure, models of complex assemblages of zooplankton, sampling methods and analysis, spatial heterogeneity. Prerequisite: OCEAN 532 or permission of instructor. Offered: alternate years.

OCEAN 573 Benthic Biological Processes (1-3, max. 9) Processes characteristic of soft-bottom benthic environments; areas and methods of rapid cur-

rent progress; open research questions; deposit feeding; passive larval recruitment; physical, chemical, geological, and biological feedbacks in ecological succession; scaling of laboratory systems. Prerequisite: OCEAN 533 or permission of instructor. Offered: alternate years.

OCEAN 574 Principles and Applications of Molecular Methods (3) Techniques of molecular analysis with emphasis on DNA methods, including PCR, DNA sequencing, RFLP, RAPD and VNTR analysis and cloning. Applications of these techniques to fisheries, aquaculture, oceanography, population and evolutionary studies, and other areas of science. Prerequisite: permission of instructor. Offered: jointly with FISH 542; A.

OCEAN 575 Molecular Techniques (4) Laboratory on DNA methods. Experiments analyzing genetic variation at the intra- and interspecific level, including one experiment of student's own design. Techniques include DNA extraction and quantitation, PCR, DNA sequencing, RFLP analysis and cloning. Prerequisite: FISH 542 or OCEAN 574 or permission of instructor. Offered: jointly with FISH 543; W.

OCEAN 578 Advanced Topics in Biological Oceanography (*, max. 18) Specialized research areas. Topic varies each year. Offered at Friday Harbor Laboratories. Prerequisite: permission of director of Friday Harbor Laboratories. Offered: S.

OCEAN 580 Aquatic Kinetics (3) Reaction rates and mass transport in water. Theories of chemical kinetics; experimental results from: CO₂ hydrolysis, Fe, Mn, and H₂S oxidation, stable isotope fractionation, mineral dissolution; homogeneous, heterogeneous, microbial catalysis; reaction and transport at air-water, sediment-water, and O₂/H₂S interfaces. Prerequisite: permission of instructor.

OCEAN 582 River Basin Biogeochemistry (3) The function of rivers and river basins in transporting materials to the oceans and their importance in biogeochemical cycles. Origin of water and water routing within drainage basins, sources and modification of dissolved and particulate materials in transport, ecological theory, and estuarine mixing zone transformations. Prerequisite: permission of instructor.

OCEAN 583 Isotope Biogeochemistry (3) The use of stable isotopes to study biogeochemical cycles in the oceans and atmosphere; specifically carbon, nitrogen, and sulfur cycles. Isotopic effects during photosynthesis, respiration, organic matter degradation. CaCO₃ dissolution, methanogenesis, nitrification/denitrification, and sulfate reduction. Prerequisite: permission of instructor.

OCEAN 585 Paleooceanography (3) History of environmental changes on earth over the past 100 million years as reconstructed from records in deep-sea sediments, ice sheets, and other ocean/terrestrial substrates. Examination of isotopic, geochemical, micropaleontological, and dating techniques. Role of the ocean in climate change. Prerequisite: permission of instructor.

OCEAN 586 Current Research in Climate Change (2, max. 20) Weekly lectures focusing on a particular aspect of climate (topic to change each year) from invited speakers (both UW and outside), plus one or two keynote speakers, followed by class discussion. Offered: jointly with ATM S 586/ESS 586.

OCEAN 587 Climate Dynamics (3) *Hartman, Thompson* Examines Earth's climate system; distribution of temperature, precipitation, wind, ice, salinity, and ocean currents; fundamental processes determining Earth's climate; energy and constituent transport mechanisms; climate sensitivity; natural climate variability on interannual to decadal time scales; global climate models; predicting future climate. Offered: jointly with ATM S 587/ESS 587; A.

OCEAN 588 The Global Carbon Cycle and Climate (3) *Quay* Oceanic and terrestrial biogeochemical processes controlling atmospheric CO₂ and other greenhouse gases. Records of past changes in the earth's carbon cycle from geological, oceanographic and terrestrial archives. Anthropogenic perturbations to cycles. Develop simple box models, discuss results of complex models. Offered: jointly with ATM S 588/ESS 588; W.

OCEAN 589 Paleoclimatology: Data, Modeling and Theory (3) *Battisti, Emerson, Steig* Evidence for past changes in land and sea surface temperature, in precipitation and atmospheric dynamics, and in ocean circulation: both long and interannual timescales. Paleoclimate modeling and theory. Time series analysis and climate noise. Rapid climate change. Statistical reconstruction of interannual variability. Offered: jointly with ATM S 589/ESS 589; Sp.

OCEAN 590 Advanced Topics in Oceanography (9-18, max. 18) Advanced topics examining specialized and interdisciplinary areas of oceanographic research. Offered at Friday Harbor Laboratories. Prerequisite: permission of Director of Friday Harbor Laboratories. Offered: S.

OCEAN 591 Marine Science in the Coastal Zone (4) Major oceanic and nearshore processes, conditions, and their influence on human activities in coastal zone. Methods of understanding and accessing the accumulated knowledge on marine processes and its applications to decision-making process. Lectures and discussions of biological, chemical, geological, and physical oceanography. Generation and use of data bases as interpretative tools. Offered: jointly with SMA 591; A.

OCEAN 600 Independent Study or Research (*) Offered: AWSpS.

OCEAN 700 Master's Thesis (*) Offered: AWSpS.

OCEAN 800 Doctoral Dissertation (*) Offered: AWSpS.

School of Pharmacy

Dean

Sidney D. Nelson

Associate Deans

Nanci L. Murphy
Stanley S. Weber



General Catalog Web page:
www.washington.edu/students/gencat/academic/School_Pharmacy.html



School Web page:
depts.washington.edu/pha/

Established in 1894, the University of Washington School of Pharmacy is proud of its strong commitment to excellence and the recognition given to its faculty and graduates for their outstanding educational, research, and service activities. The School's Dean's Office and three departments—Medicinal Chemistry, Pharmaceutics, and Pharmacy—are located in the H-Wing of the Health Sciences Building.

The School of Pharmacy offers a four-year professional program leading to the Doctor of Pharmacy (Pharm.D.) degree. The curriculum is designed to provide students with the scientific background and clinical skills necessary to render pharmaceutical care in a changing health care system. Instructional methods strive to enhance the critical-thinking and problem-solving skills necessary to provide rational drug therapy, promote healthy lifestyles and disease prevention, enhance patient compliance, reduce medication-related problems, and improve health outcomes. The School aspires to foster a commitment to life-long learning and provide an environment where students develop the knowledge, attitudes, and skills consistent with the profession's high standards.

Students have the opportunity to pursue elective choices to design a program compatible with individual areas of interest. Dual degree options include the Pharm.D./Ph.D. programs in pharmaceutics and medicinal chemistry, the Pharm.D./M.S. program in pharmaceutical outcomes research and policy, and the Pharm.D./Physician Assistant program. Students also have the option of earning the Geriatric Certificate in Pharmacy Practice, the Retail Management Certificate, and the Biomedical Regulatory Affairs Certificate concurrently with their degree. In the final year of the program students complete experiential training at a variety of practice settings. The School of Pharmacy is a member of the American Association of the Colleges of Pharmacy and its programs are accredited by the American Council on Pharmaceutical Education (www.acpe-accredit.org).

Consideration for admission to the professional program requires a minimum of two years of prepharmacy training. An applicant who is admissible to the University is not assured admission to the School of Pharmacy. Admission is competitive and based on a number of factors. Academic preparedness, motivation, oral and written communication skills, critical-thinking ability, and decision-making skills are among the criteria used to determine a candidate's aptitude for the pharmacy program. An on-site interview and writing assignment are required as part of the admission process. Further details on admission require-

ments, application procedures, and program content may be obtained from the School's Office of Academic and Student Programs or its Web site at depts.washington.edu/pharminf/.

The School also seeks to promote the life-long learning of pharmacists by offering opportunities for post-graduate education and continuing-education seminars. An external Pharm.D. program is available for those pharmacists who would like to pursue an advanced degree beyond the baccalaureate degree. Continuing-education programs are provided throughout the year to meet the needs of the community.

To foster the interests of students who seek to engage in creative discovery and research, the School also offers graduate education in the pharmaceutical sciences. Graduate school information may be obtained from the individual departments offering the advanced degrees.

Medicinal Chemistry



General Catalog Web page:
www.washington.edu/students/gencat/academic/Medicinal_Chem.html



Department Web page:
depts.washington.edu/medchem/

Graduate Program

Graduate Program Coordinator
H164 Health Sciences, Box 357610
206-543-2224
medchem@u.washington.edu

The Department of Medicinal Chemistry offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy. The primary mission of the program is to train versatile scientists for careers in the pharmaceutical and medical sciences. To this end, graduates of the program acquire a broad knowledge base in medicinal chemistry, pharmacology, and biochemistry, which is important in the rapidly evolving, multidisciplinary biomedical arena. The department further offers diverse opportunities for research at the interface between biology and chemistry, with emphasis on issues of biomedical importance.

Graduates of the program acquire the skills necessary to develop quantitative and qualitative methodologies necessary for the study of biochemical processes that occur at the cellular and subcellular levels. These include the elucidation of biochemical transformations and interactions using techniques such as protein engineering, molecular modeling and dynamics as well as a broad array of supportive spectroscopic techniques including mass spectrometry and NMR.

One major area of research interest is the role of biotransformation processes in the toxification and detoxification of drugs and environmental contaminants. A second area of interest is the determination of protein and small ligand structure and function using computational methods, NMR, mass spectrometry, and other biophysical techniques. Issues of biomedical importance include elucidation of mechanisms of drug-induced cell toxicity, drug-drug and drug-herbal interactions, identification of enzyme attributes that dictate substrate specificity and catalytic mechanism, pharmacogenetics, structural immunology in vaccine design, biotherapeutics, protein folding in disease states and structural characterization of bacterial toxins.

Most students proceed directly to the doctoral degree program. Successful completion of a series of cumu-

lative examinations and at least two quarters of teaching experience are among the requirements for completion of the doctoral program.

Admission Requirements

Students who intend to work toward the 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 Medicinal Chemistry.

Special Requirements

Students with undergraduate degrees in pharmacy or in the biological or physical sciences are accepted for graduate study in medicinal chemistry. Undergraduates who plan to pursue graduate study are encouraged to expedite their programs by selection of pertinent electives. Although the choice of electives varies with the student's ultimate goals, graduate study in medicinal chemistry requires an adequate background in biological and physical sciences.

Master of Science

A student in the master's degree program must present at least 27 credits of course work, inclusive of thesis and non-thesis research. The student also must complete a research project, prepare an acceptable thesis, and pass a final examination.

Doctor of Philosophy

A student in the doctoral program must present a minimum of 45 credits of course work, inclusive of dissertation and non-thesis research. 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. Satisfactory completion of departmental cumulative examinations precedes scheduling of the General Examination. The student must complete a research project, prepare an acceptable dissertation and pass a Final Examination. Research for the doctoral degree must be done at the UW.

Financial Aid

Financial support in the form of research assistantships and fellowships may be available to students in good standing throughout their graduate careers. Availability of financial support varies from year to year, and prospective applicants should contact the graduate program coordinator for additional information.

Faculty

Chair

Allan Edward Rettie

Professors

Baillie, Thomas A. * 1981, (Affiliate); PhD, 1973, University of Glasgow (UK), MSc, 1973, University of London (UK); medicinal chemistry.

Elmer, Gary W. * 1971; PhD, 1970, Rutgers University; pharmacognosy.

Kharasch, Evan D. * 1984, (Adjunct); PhD, 1983, MD, 1984, Northwestern University; clinical pharmacology of anesthetic agents, drug metabolism, and drug interactions.

Nelson, Sidney D. * 1977; PhD, 1974, University of California (San Francisco); medicinal chemistry, chemical toxicology.

Nelson, Wendel * 1965; PhD, 1965, University of Kansas; medicinal chemistry.

Rettie, Allan E. * 1984; PhD, 1983, University of Newcastle-on-Tyne (UK); drug metabolism: biochemical, analytical, mechanistic, and genetic aspects.

Trager, William F. * 1972; PhD, 1965, University of Washington; medicinal chemistry, bioanalytical chemistry drug metabolism.

Associate Professors

Atkins, William M. * 1991; PhD, 1988, University of Illinois; protein engineering.

Daggett, Valerie D. * 1993; PhD, 1990, University of California (San Francisco); molecular modeling studies of peptides and proteins.

Kunze, Kent * 1989; PhD, 1981, University of California (San Francisco); medicinal chemistry and drug metabolism.

Assistant Professors

Bruschi, Sam 1997, (Research); PhD, 1988, Adelaide University (Australia); molecular and cellular toxicology, chemically induced cell death, the cellular responses to stress.

Campbell, Patricia A. * 1998; PhD, 1991, University of Alberta (Canada); protein and peptide solution state in NMR spectroscopy.

Hackett, Murray * 1995; MS, 1987, Oregon State University, PhD, 1991, University of Nevada; biological mass spectrometry, applications in microbial pathogenesis; high resolution separations.

Pharmaceutics

 *General Catalog Web page:*
www.washington.edu/students/genecat/academic/Pharmaceutics.html

 *Department Web page:*
depts.washington.edu/pceut/

Graduate Program

Graduate Program Coordinator
H272 Health Sciences, Box 357610
206-543-9434
pceut@u.washington.edu

The Department of Pharmaceutics offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy.

Program Description

The program provides research training in the fundamental aspects of drug disposition, drug delivery, and drug action in animals and man. Drug disposition includes the phenomena of absorption, distribution, and elimination. Pharmacokinetics is the study of the time course of these processes and the time course of pharmacological effects. Drug delivery includes targeting of drugs to tissues or specific cells to improve their therapeutic effect. These areas of research have a wide range of applications, particularly in the pharmacological characterization of new drug molecules in pharmaceutical development. Graduates of this program possess expertise in a variety of analytical techniques and the elaboration

of mathematical models to describe drug disposition and pharmacological processes.

During the first two years of study, students take courses in medicinal chemistry, pharmacology, physiology, biochemistry, mathematics, computer science, biostatistics, and pharmacokinetics.

The department's research program includes seven NIH-funded laboratories addressing a variety of fundamental and clinical problems pertaining to drug transport, metabolism, and toxicity associated with several diseases (AIDS, cystic fibrosis, leukemia, epilepsy), as well as pain management and transplantation. Most projects involve collaborative arrangements with investigators from other departments in the University or at the Fred Hutchinson Cancer Research Center. The collaborative relationship of the faculty of the Departments of Pharmaceutics and Medicinal Chemistry in the field of drug metabolism has received worldwide recognition.

Thesis research can involve experimental animal work, in vitro studies, clinical investigation, or a combination of approaches. Graduate students are given the opportunity to participate in interdisciplinary research, providing an added dimension to their training.

A wide range of career paths are available to graduates of this program. Opportunities include research in the pharmaceutical industry; research in hospitals, institutes, and foundations; teaching and research in academic institutions; and positions with government regulatory agencies.

Admission Qualifications

Students with undergraduate degrees in pharmacy, chemistry, or in the biological sciences are accepted for graduate study in pharmaceutics. Undergraduates who plan to pursue graduate study may expedite their programs by selection of pertinent electives. This information can be obtained from the graduate program coordinator.

Financial Aid

All students in the program receive financial support in the form of research assistantships, Public Health Service predoctoral training fellowships and other fellowships such as the William E. Bradley Graduate Fellowship and those from the American Foundation for Pharmaceutical Education and from several pharmaceutical companies.

Faculty

Chair

Rene H. Levy

Professors

Anderson, Gail * 1981, (Adjunct); PhD, 1987, University of Washington; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma.

Gibaldi, Milo * 1978; PhD, 1963, Columbia University; critical analysis of literature on drug discovery and development.

Hu, Shiu-Lok 1988; PhD, 1978, University of Wisconsin; virus-host interactions, AIDS vaccines and pathogenesis of primate lentivirus infection.

Levy, Rene H. * 1970; PhD, 1970, University of California (San Francisco); metabolic interactions among antiepileptic drugs and between cytokines and drugs.

Shen, Danny D. * 1984; PhD, 1975, State University of New York (Buffalo); CNS pharmacokinetics and pharmacodynamics of opioid analgesics and anti-convulsants.

Slattery, John T. * 1978; PhD, 1978, State University of New York (Buffalo); pharmacokinetics/pharmacodynamics of alkylating agents, oncology/bone marrow transplant.

Thummel, Kenneth E. 1989; PhD, 1987, University of Washington; the metabolism of drugs by human liver and intestine.

Unadkat, Jashvant D. * 1985; PhD, 1982, University of Manchester (UK); mechanisms of transport of anti-HIV drugs across placenta, CSF-blood barrier, and intestine.

Associate Professors

Ho, Rodney J. Y. * 1990; PhD, 1987, University of Tennessee; maternal-fetal transmission of HIV.

Kunze, Kent * 1989, (Adjunct); PhD, 1981, University of California (San Francisco); medicinal chemistry and drug metabolism.

Assistant Professor

Wang, Joanne 2000; PhD, 1998, University of California (San Francisco); drug transport and targeting.

Pharmacy

 *General Catalog Web page:*
www.washington.edu/students/genecat/academic/Pharmacy.html

 *Department Web page:*
depts.washington.edu/pharma/

Graduate Program

Graduate Program Coordinator
H375 Health Sciences, Box 357630
206-543-6788

The Department of Pharmacy offers graduate training leading to the Doctor of Philosophy degree.

Program Description

The graduate program in pharmaceutical outcomes research in the Department of Pharmacy provides M.S.- and Ph.D.-level training with a focus on economic evaluation of pharmaceuticals, pharmacoepidemiology, and drug-policy evaluation. Pharmaceutical outcomes research is the study of the health and cost consequences of pharmaceuticals and pharmaceutical-related policies on individuals and populations. Graduates of this program are trained to assess the use, outcomes, and cost of pharmaceuticals and pharmaceutical policies and practices. Students are prepared for careers in (1) teaching and research in colleges and universities; (2) pre- and post-marketing efficacy and safety; (3) policy analysis for industry, health insurance, and governmental agencies; and (4) drug-use management and evaluation within managed health-care organizations.

Successful completion of a doctoral preliminary examination, comprehensive examination, teaching assistantships, and research experience are necessary requirements prior to advancement to candidacy.

Admission Requirements

Students with undergraduate or graduate degrees in a health-science discipline or those with sufficient experience in pharmaceutical outcomes and policy research will be considered for admission. Applicants must apply to the Graduate School and the Department of Pharmacy and meet the admission criteria outlined in the Graduate School section of this catalog. Applications materials can be obtained by contacting the graduate program coordinator in the Department of Pharmacy or by visiting the graduate program Web page at depts.washington.edu/porpp/gradprog.htm.

Financial Aid

Financial support in the form of research assistantships, teaching assistantships, and fellowships may be available to prospective and continuing students. Availability of financial aid is limited, typically to the first and second academic year. Prospective students should contact the graduate program coordinator for more information on financial support.

Faculty

Chair

Danny D. Shen

Professors

Anderson, Gail * 1981; PhD, 1987, University of Washington; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma.

Bauer, Larry * 1980; PharmD, 1980, University of Kentucky; clinical pharmacokinetics and drug metabolism, drug interactions.

Ellsworth, Allan J. 1981; PharmD, 1977, Philadelphia College of Pharmacy and Science; primary care, family medicine.

Gibaldi, Milo * 1978, (Adjunct); PhD, 1963, Columbia University; critical analysis of literature on drug discovery and development.

Hansten, Philip D. 1989; PharmD, 1968, University of California (San Francisco); drug interactions.

Horn, John R. * 1978; PharmD, 1977, University of Cincinnati; pharmacotherapeutics, with emphasis on drug interactions.

Patrick, Donald L. * 1987, (Adjunct); MS, 1968, PhD, 1972, Columbia University; health status and quality of life, end of life, adolescents.

Shen, Danny D. * 1984; PhD, 1975, State University of New York (Buffalo); CNS pharmacokinetics and pharmacodynamics of opioid analgesics and anticonvulsants.

Sullivan, Sean * 1992; PhD, 1992, University of California (Berkeley); health economics, pharmaceutical outcomes research and health policy.

Associate Professors

Black, Douglas J. 1981; PharmD, 1983, University of Washington; infectious diseases.

Downing, Donald F. 1982, (Clinical); BS, 1975, University of Washington; medical devices, innovative pharmaceutical care services.

Gardner, Jacqueline S. * 1990; PhD, 1980, University of Washington; pharmacoepidemiology, drug therapy use and effects, pharmacist practice patterns.

Gray, Shelly L. 1995; PharmD, 1989, University of Michigan; geriatric pharmacy.

Hebert, Mary F. 1996; PharmD, 1987, University of California (San Francisco); transplantation, immunology pharmacotherapeutics.

Heckbert, Susan R. * 1990, (Adjunct); MD, 1981, Case Western Reserve University, MPH, 1987, PhD, 1990, University of Washington; clinical and cardiovascular epidemiology, pharmacoepidemiology, pharmacogenetics.

Kwok, Karl 1982, (Clinical); PharmD, 1984, University of Washington.

Lippert, Michaelene 1988, (Clinical); BS, 1970, University of Wisconsin; substance abuse, community health care.

Paun, Dorothy Ann * 1993, (Adjunct); PhD, 1993, University of Oregon; financial performance analyses; international countertrade; business-to-business relationships.

Ramsey, Scott D. * 1990, (Adjunct); MD, 1990, University of Iowa, PhD, 1994, University of Pennsylvania; economics in medicine.

Somani, Shabir M. 1994; MS, 1982, MBA, 1992, University of Minnesota; hospital pharmacy administration.

Weber, Stanley S. 1996; PharmD, 1975, University of Cincinnati; psychiatric pharmacy practice, pharmacy distance learning.

Assistant Professors

Awan, Asaad B., (Clinical); PharmD, 1992, University of Washington.

Blough, David K. 1994, (Clinical); PhD, 1982, Iowa State University; biostatistics applications; generalized linear models; time series analysis.

Capoccia, Kam Lee 2000, (Clinical); PharmD, 1999, University of Colorado (Denver).

Devine, Emily E. 1999, (Research); PharmD, 1978, University of the Pacific, MBA, 1999, University of California (San Francisco).

Hazlet, Thomas K. * 1996; DPH, 1991, University of California (Berkeley); pharmaceuticals policy, outcomes and bioethics.

Johnson, Eric S. 1992; PhD, 1999, University of Washington; evaluate drug safety; describe burden of disease/clinical outcomes.

Joseph, Jutta C. 1997; PharmD, 1988, University of Michigan; child wellness, teen health, asthma, and development of culturally sensitive patient education.

McCune, Jeannine S. 1998; PharmD, 1995, University of North Carolina; drug metabolism.

Veenstra, David 1997; PhD, 1996, University of California (San Francisco), PharmD, 1996, University of California (San Francisco); economic modeling and cost-effectiveness analysis in health care.

Senior Lecturers

Dawson, Karan N. 1976; MS, 1978, University of Washington; psychotropics, geriatrics, teaching methods.

Odegard, Peggy Soule 1986; PharmD, 1990, University of Washington; clinical practice, pediatrics.

Lecturers

Hammer, Dana 2001; MS, 1995, PhD, 1999, Purdue University; student professional development and assessment.

Lam, Annie Y. 1996; PharmD, 1997, University of Washington; drug disposition and age, long-term-care pharmacy.

Murphy, Nanci L. 1989; PharmD, 1997, University of Washington; pharmacy education, geriatric practice and community pharmacy practice.

O'Sullivan, Teresa 1990; PharmD, 1990, University of Minnesota; cystic fibrosis, general medicine, practice-related education, medical literature evaluation.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Medicinal Chemistry

MEDCH 400 Fundamental Concepts in Medicinal Chemistry (3) *Hackett* Principles of physical organic chemistry; chemical bonding, stereochemistry, acids/bases, and reaction mechanisms relevant to processes such as drug distribution, specificity, and metabolism. Prerequisite: either CHEM 239 or CHEM 337. Offered: A.

MEDCH 401 Immunizing and Antimicrobial Agents (4) *Daggett, Elmer* Chemical and biologic properties of agents used to prevent or treat infectious diseases, including diagnostic, prophylactic, and therapeutic uses of immunizing biologicals and spectrum, action mechanisms, resistance patterns, toxicity, and therapeutic applications of antibiotics, antifungals, and antivirals. Prerequisite: MICROM 301, MICROM 302, MEDCH 450, or equivalent, PharmD major, or permission of instructor. Offered: Sp.

MEDCH 402 Medicinal Chemistry (3) *Elmer, S. Nelson* 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. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam; CHEM 239; CONJ 403. Offered: A.

MEDCH 403 Medicinal Chemistry (3) *W. Nelson, Rettie* 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. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam; CHEM 239; CONJ 403. Offered: W.

MEDCH 404 Medicinal Chemistry (3) *Atkins, W. Nelson* 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. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam; CHEM 239; CONJ 403. Offered: Sp.

MEDCH 420 Alternative and Complementary Medicines (2) *Elmer* Study of popular alternative and complementary medicines used in the United States. Focus on herbal products with some coverage of homeopathic and other non-nutritional dietary supplements. Demonstration of resources for current objective information on these controversial medicines. Credit/no credit only. Offered: A.

MEDCH 435 Diagnostic Medicinal Chemistry (3) *S. Nelson* Examination of clinical diagnostic tests with

regard to the chemical or biochemical rationale of the testing method, interpretation of test results, and major factors influencing test values with special emphasis on the effects of medications. Clinical laboratory data from patients considered in light of these factors. Prerequisite: MEDCH 451 or BIOC 406 or equivalent, or permission of instructor. Offered: W.

MEDCH 450 Medicinal Biochemistry I (3) *Campbell, Kunze* Introduction to biochemistry for Pharm.D. students with an emphasis on those aspects of biochemistry which are particularly relevant to understanding human disease and therapeutic intervention strategies. Offered: W.

MEDCH 451 Medicinal Biochemistry II (3) *Campbell, Kunze* Continuation of discussions of those aspects of biochemistry which are particularly relevant to understanding human disease and therapeutic intervention strategies. Offered: Sp.

MEDCH 495 Special Studies in Medicinal Chemistry (*, max. 6) Opportunity to expand the breadth and depth of understanding in specific areas. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 499 Independent Study/Research (*, max. 24) Research problems in medicinal chemistry. Prerequisite: cumulative GPA of 2.50 and permission of instructor. Offered: AWSpS.

MEDCH 501 Advanced Medicinal Chemistry (4) *Elmer, S. Nelson* Advanced 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. Prerequisite: permission of instructor. Offered: AWSp.

MEDCH 502 Advanced Medicinal Chemistry (4) *W. Nelson, Rettie* Advanced 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. Prerequisite: permission of instructor. Offered: AWSp.

MEDCH 503 Advanced Medicinal Chemistry (4) *Atkins, W. Nelson* Advanced 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. Prerequisite: permission of instructor. Offered: AWSp.

MEDCH 520 Seminar (1, max. 15) *Campbell* Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Credit/no credit only. Offered: jointly with PCEUT 520; AWSpS.

MEDCH 521 Advanced Medicinal Chemistry (3) *Atkins, W. Nelson* Application of integrated data from the physical and biological sciences to problems of chemotherapy, including transport of drugs to site of action, biotransformation of drugs, interaction of drugs with enzyme systems, and recent advances in drug design. Prerequisite: CHEM 457, CHEM 531, and BIOC 442, or permission of instructor. Offered: Sp.

MEDCH 527 Drug Metabolism (3) *Rettie, Thummel* Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Includes reaction mechanisms, ultrastructural considerations, induction mechanisms, methodology, kinetics of inhibition and activation, steroid and amine metabolism. Offered: jointly with PHCOL 527; odd years; W.

MEDCH 528 Proteins in Therapy and Disease (3) *Atkins, Daggett* Examination of enzyme catalysis and of protein structure and dynamics. Principles applied to topics of therapeutic relevance including: peptides and proteins as drugs, structure-based drug design, drug metabolism, protein engineering, and role of mutant or incorrectly folded proteins in disease states. Prerequisite: comprehensive course in biochemistry or consent of instructor. Offered: even years; W.

MEDCH 530 Mass Spectrometry of Drugs, Toxicants, and Metabolites (3) *Hackett* Current approaches to the combination of liquid chromatography with mass spectrometry for small molecules. Mass spectrometry of drugs, toxicants, metabolites. Emphasis on interpretation skills, with problem sets each week. Introduction to LC/MS instrumentation. Ionization methods appropriate for small molecules. Capillary LC/MS and capillary electrophoresis. Offered: odd years; Sp.

MEDCH 541 Macromolecular Mass Spectrometry (3) *Hackett* Emphasis on problem sets designed to teach basic interpretation skills with respect to proteins and peptides. Basics of mass spectrometry instrumentation for large molecules, including electrospray and MALDI-TOF. Classical techniques in protein chemistry, including Edman chemistry and amino acid analysis. Prerequisite: permission of instructor; recommended: concurrent registration in CHEM 520. Offered: even years; Sp.

MEDCH 550 Mechanistic Studies in Medicinal Chemistry (1) *S. Nelson* Discussion of research strategies and methods used to carry out studies of mechanisms of drug action, metabolism, and toxicities. Emphasis is on problem solving through theoretical and experimental approaches and on data analysis and interpretation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 551 Flavin and Heme-Containing Monooxygenases (1) *Rettie* Discussion of research strategies and methodologies concerning the structure, function, and polymorphic expression of human monooxygenases, especially the cytochrome P450s and flavin-containing monooxygenases. Emphasis placed on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 552 Medicinal Chemistry Aspects of Drug Action and Drug Metabolism (1) *W. Nelson* Discussion of research strategies, methodologies, and literature concerning the mechanisms of drug action and drug metabolism, particularly as these apply to opiate drugs and beta blockers. Emphases placed on problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 553 Structure and Function of Macromolecular Protein Assemblies (1) *Atkins* Discussion of research strategies, methods, and current literature concerning macromolecular self-assembly processes and protein-protein interactions as they relate to biological specificity. Emphasis on experimental approaches used in current literature. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 554 The Mechanism of Action and Pharmacokinetics of Biotherapeutic Agents and Other Natural Products (1) *Elmer* Discussion of the literature, research possibilities, and questions that need to be addressed in the area of the application of microorganisms and other natural products for therapeutic purposes. Emphases on problem solving, research strategies, literature evaluation, and

data analysis. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 555 Current Topics in Biological Mass Spectrometry (1) *Hackett* Emphasis on applications in the area of protein toxins, bioactive peptides, and microbial diseases and on current developments in the use of small scale separations with mass spectrometry. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 556 Mechanistic Aspects of Drug Metabolism (1) *Trager* Discussion of research strategies methodologies and new approaches with regard to elucidating the chemical mechanisms and enzymology of metabolic reactions catalyzed by cytochrome P-450. Emphasis on trying to develop in vitro techniques which are predictive of in vivo drug behavior. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 557 Molecular Modeling Studies of Medicinal Chemistry (1) *Daggett* Discussion of research strategies, simulation methodologies, and literature concerning protein and peptide structure, function, dynamics, and folding. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 558 Human Cytochrome P-450 Biochemistry (1) *Kunze* Presentation and discussion of research strategies and methodologies related to current problems in human drug metabolism by cytochrome P-450 enzymes. Emphasis on hypothesis testing and experimental problem solving in the areas of enzyme kinetics and mechanism. Credit/no credit only. Prerequisite: permission of instructor. Offered: even years; AWSpS.

MEDCH 559 Protein NMR Spectroscopy (1) *Campbell* Combines a comprehensive theoretical treatment of high resolution NMR spectroscopy with a practical description of the experimental techniques applicable to proteins and other biological macromolecules. Offered: AWSpS.

MEDCH 582 Topics in Medicinal Chemistry (1, max. 10) *W. Nelson, Rettie* Discussion of pertinent articles from current literature. Offered: AWSp.

MEDCH 590 Doctor of Pharmacy Thesis (1) Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

MEDCH 599 Cumulative Exams for Medicinal Chemistry (1) Quarterly cumulative examinations for graduate students. Credit/no credit only. Offered: AWSpS.

MEDCH 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

MEDCH 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

MEDCH 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Pharmaceutics

PCEUT 331 Pharmaceutical Formulation: Principles and Dosage Forms (4) *Ho, Lee, Unadkat* Physicochemical principles involved in formulating stable dosage forms suitable for human administration. Hands-on laboratory experience with formulating extemporaneous preparations routinely encountered in community and hospital pharmacies. Offered: A.

PCEUT 402 Drug Therapy and the Media (2) *Gibaldi* Review of media to provide a perspective on disease

and drug therapy. Elements include drug discovery and development, clinical trials, the pharmaceutical industry, regulatory agencies, and socioeconomic consideration. Preparation of written and oral summaries of media reports. Offered: jointly with PHARM 402; W.

PCEUT 405 Clinical Pharmacokinetics (5) *Anderson, Levy* Basic principles of pharmacokinetics and their application to the clinical setting, including: single-dose intravenous and oral kinetics, multiple dosing, nonlinear pharmacokinetics, metabolite kinetics, pharmacogenetics, and the role of disease in drug clearance and dose requirements, and kinetics of drug-drug interactions. Prerequisite: PCEUT 331. Offered: W.

PCEUT 406 Biopharmaceutics and Drug Delivery (3) *Ho, Levy, Slattery, Undakat* Principles and assessment of drug product bioavailability and bioequivalence, drug-drug and food-drug interactions for orally administered drugs, drug delivery via non-oral routes, and the systemic delivery of biotechnology drugs. Prerequisite: PCEUT 405. Offered: Sp.

PCEUT 493 Current Biomedical Literature (1, max. 6) *Gibaldi* Discussion of current biomedical literature with emphasis on drug therapy. Credit/no credit only. Offered: AWSp.

PCEUT 495 Special Studies in Pharmaceutics (*, max. 6) Opportunity to expand the breadth and depth of understanding in specific areas. Credit/no credit only. Prerequisite: Permission of instructor. Offered: AWSpS.

PCEUT 499 Undergraduate Research (1-6, max. 12) Research problems in drug disposition, drug targeting, and drug development. Prerequisite: Cumulative GPA of 2.5 and permission of the instructor. Offered: AWSpS.

PCEUT 501 Advanced Pharmacokinetics I (5) *Ho, Shen, Slattery, Undakat* Drug absorption, distribution, excretion, metabolism, and effects in mammalian systems. Compartmental model and model-independent approaches examined. Drug disposition studied in a physiologically realistic context taking nonlinear events into account. Aimed at development of innovative methods for data analysis and evaluation in biological systems. Prerequisite: PCEUT 405 or PCEUT 506, or permission of instructor. Offered: Sp.

PCEUT 502 Pharmacokinetics of Drug Metabolism (4) *Kunze, Levy, Thummel* Advanced study of drug metabolism pharmacokinetics. Topics emphasize linear and nonlinear metabolic clearance kinetics, metabolite kinetics, in vitro-in vivo predictions, and drug-drug interaction kinetics. Prerequisite: PCEUT 506. Offered: A; odd years.

PCEUT 503 Drug transport and delivery (4) *Ho, Hu, Shen, Undakat, Wang* Provides advance knowledge of the physico-chemical and biological concepts underlying in vivo transport and delivery of drugs. Prerequisite: PCEUT 506. Offered: Sp; odd years.

PCEUT 506 Pharmacokinetic Principles (2) *Levy, Shen, Thummel* Advanced study of pharmacokinetic concepts. Topics emphasize the physiological basis for mathematical models of drug distribution, clearance, and effect. Material presented in a didactic format with additional interactive discussions. Offered: W.

PCEUT 507 Drug Therapy Discussion Group (1, max. 12) *Gibaldi* New and important findings and trends in pharmacokinetics, biopharmaceutics, drug metabolism, and drug toxicity, with particular emphasis on clinical significance and applicability. Credit/no credit only. Offered: AWSp.

PCEUT 509 The Pharmaceutical Industry: Culture, Economics, and Regulation (2) *Gibaldi* Presents an

overview of the culture, economics, and regulation of the pharmaceutical industry. Offered: Sp.

PCEUT 510 Pharmacokinetics of Drug Interactions (3) *Shen* Common pharmacokinetic mechanisms underlying the clinically important interactions between drugs. Interactions involving gastrointestinal absorption, serum drug protein binding, excretory and metabolic clearance processes are discussed. Prerequisite: PCEUT 405 or equivalent. Offered: A.

PCEUT 513 Basic Concepts in Pharmacogenetics and Toxicogenomics (3) *Eaton, Thummel* Addresses current DNA sequencing and genotyping approaches, and basic concepts of pharmacogenetics and toxicogenomics. Emphasis placed on applications of genomic technologies to the understanding of "gene-environment interactions" that cause diseases of public health importance, including cancer, chronic neurological diseases, and adverse drug reactions. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H 513/PHG 513; A.

PCEUT 520 Seminar (1, max. 15) *Undakat* Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Credit/no credit only. Offered: jointly with MEDCH 520; AWSpS.

PCEUT 534 Pharmaceutical Analysis (3) *Kalhorn* Methods of drug and metabolite analysis from biologic matrices. Emphasis on practical aspects of assay design, optimization, and validation. Approaches to troubleshooting both assay methodology and instrumentation problems are also covered. Credit/no credit only. Offered: W.

PCEUT 583 Topics in Pharmaceutics (1, max. 15) *Ho* Discussion of pertinent articles from current literature and recent laboratory results. Credit/no credit only. Offered: AWSp.

PCEUT 584 Pharmacokinetic Discussion Group (2) *Slattery* Student initiated discussions of pharmaceutics concepts in relation to current literature. Preparatory to departmental cumulative examinations. Credit/no credit only. Offered: S.

PCEUT 586 Pharmaceutical Biotechnology (3) *Ho* Applications of biotechnology in designing therapeutic products, with emphasis on research and development of biopharmaceuticals. Consideration of molecular cloning, high throughput screening, production, physical stability, delivery systems of protein therapeutics in relation to pharmacokinetic and therapeutic responses. Prerequisite: PCEUT 331; concurrent registration in MEDCH 450 or permission of instructor. Offered: A.

PCEUT 590 Doctor of Pharmacy Thesis (1) Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

PCEUT 598 Independent Research (*, max. 24) Basic and clinical research problems in drug disposition and effect. Prerequisite: 2.5 GPA and permission of instructor. Offered: AWSpS.

PCEUT 599 Cumulative Exams for Pharmaceutics (1) Quarterly cumulative examinations for graduate students. Credit/no credit only. Offered: AWSpS.

PCEUT 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

PCEUT 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

PCEUT 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Pharmacy

PHARM 301 Self-Care Products and Practices (2) *Dawson, Murphy* Addresses a broad range of health concerns including how to identify common conditions amenable to self-care, select appropriate treatment options ranging from non-prescription to non-drug therapies, prevent adverse effects from the use of medications, adopt strategies encouraging healthier lifestyle habits, and learn the rationale behind conventional and alternative/complementary therapies. Offered: Sp.

PHARM 304 Profession of Pharmacy (3) *Awan* Overview of the profession of pharmacy emphasizing practice opportunities and specialization. Introduction to clinical and ethics case evaluation techniques using the Pharmacist's Workup of Drug Therapy format. Off-site pharmacy visitation required. Credit/no credit only. Prerequisite: PHARM 309.

PHARM 305 Introductory Pharmacy Practicum (3) *O'Sullivan* Preparation and dispensing of prescriptions at Rubenstein Memorial Pharmacy in Hall Health Center or other selected community pharmacies. Designed for Pharm.D. students with little or no experience in pharmacy. Under direct supervision of clinical faculty and other licensed pharmacy preceptors. Credit/no credit only.

PHARM 309 Quantitative Methods I (3) *O'Sullivan* Instruction in methods essential for conducting pharmacy calculations, interpreting and evaluating data and literature related to pharmacy, and responding to drug information inquiries from health professionals and patients. Introduction to statistical concepts necessary for pharmacy course work.

PHARM 334 Pharmacy Practice (3) *Hammer* Focuses on principles of contemporary pharmacy practice with emphasis on preparation and dispensing of the top 100 prescription drugs and related nonprescription therapies. Laboratory exercises in patient assessment and counseling, preparation of sterile products, and use of technology for dispensing medications and maintaining patient records. Prerequisite: PCEUT 331.

PHARM 335 Dispensing Practicum (2/4, max. 4) *O'Sullivan* Under preceptor supervision, students master competencies necessary for distributional responsibilities in the institutional and ambulatory care pharmacy practice settings. Credit/no credit only.

PHARM 402 Drug Therapy and the Media (2) *Gibaldi* Review of media to provide a perspective on disease and drug therapy. Elements include drug discovery and development, clinical trials, the pharmaceutical industry, regulatory agencies, and socioeconomic consideration. Preparation of written and oral summaries of media reports. Offered: jointly with PCEUT 402.

PHARM 403 Chemical Dependency Concepts (1) *Lippert* Genesis of addiction: harm reduction strategies, legal and ethical considerations, medication management in the substance-abusing population, impaired pharmacist rehabilitation, community resources. Course offered to Pharm.D. professional students. Credit/no credit only.

PHARM 409 Applied Pharmacokinetics (2) *Bauer* Pharmacokinetics of specific drugs. Influence of age, weight, sex, and disease states on patient-specific dosage regimens emphasized. Advanced kinetic concepts are discussed and put into applied context. Prerequisite: PCEUT 405.

PHARM 411 Medical Devices for Home Health Care (3) *Downing, Zolotu* Study of medical devices commonly provided by pharmacists to their patients, including their selection and adaptation for specific

patient needs. Lectures include display and demonstration of actual devices.

PHARM 412 Nonprescription Drug Therapeutics (3) *Ellsworth* Overview of common classes of nonprescription drug therapeutics with an emphasis on case examples, patient assessment, non-drug adjunct therapy, product selection, and patient advice. Oral presentation required. Computer (internet) case discussion mandatory. Enrollment restricted to 2nd, 3rd, and 4th year Pharm.D. students.

PHARM 436 Pharmacoeconomics, Genetics, and Healthcare (2) *Veenstra* Provides an introduction to outcomes research and economic evaluation related to pharmaceuticals and genetic technologies. Covers cost-effectiveness analysis and quality of life evaluation. Discusses the use of economic evaluation in healthcare to affect policy decisions.

PHARM 437 Chemical Dependency Issues in Practice (3) *Lippert* Emphasis on drug classes, pharmacologic management of abstinence and withdrawal, drug testing, drug use in pregnancy, treatment options and recovery, codependency and legal and ethical considerations. Credit/no credit only. Prerequisite: PHARM 403.

PHARM 438 Gerontological Communication Skills Seminar (2) *Dawson* Addresses special communication needs of the elderly, ranging from individualized patient counseling to patient advocacy through development and provision of pharmacy services. Communication techniques applicable to teaching, developing innovative services, supervising, motivating, conflict resolution, and interdisciplinary interactions are explored in lecture and laboratory. Credit/no credit only.

PHARM 439 Community Outreach Service (1) Work in assigned community services setting for a minimum of two hours per week to explore root causes of disability, cultural differences, professional values, community resources, and quality of life issues. Weekly seminars assist students in applying observations and experiences to pharmaceutical care.

PHARM 440 Pharmaceutical Care Systems I (3) *Dawson* Focuses on how human behavior and communication influence the pharmacist's activities in designing, delivering, and managing patient-focused pharmaceutical care. Writing, listening, interviewing, teaching, and critical thinking as applied to pharmacy practice are emphasized.

PHARM 445 Pharmacy-Based Immunization Programs (1) *Gardner* Provides didactic training in the epidemiology and prevention of vaccine preventable diseases and the implementation of community-based immunization programs; practical training in vaccine administration and management; and a community practicum in vaccine administration. Credit/no credit only. Prerequisite: MEDCH 401.

PHARM 446 Community-based Screening (1) *Downing, Odegard, Walker-Roe* Examines the practical application of cholesterol, hypertension, bone density, body composition, and wellness assessment techniques and counseling for health behavior modification. Following didactic and laboratory training, students will obtain practice by conducting a screening at a community location. Course offered following their first professional year. Credit/no credit only.

PHARM 447 Overview of Contraceptive Management (1) *Gardner, Walker-Roe* Didactic overview of contraceptive methods, fertility interventions, and medical abortions. Establishes forum for interactive discussion. Includes patient screening criteria and selection and monitoring outcomes of currently available barrier and hormonal methods of contraception and medical abortions. Offered to students following their first professional year, as well as other health science professional students.

PHARM 452 Contemporary Problems (1) Discussion of current trends affecting the role of pharmacy in health-care delivery. Credit/no credit only.

PHARM 460 Principles of Professional Practice Management (3) Emphasizes the major issues and barriers of providing pharmaceutical care, managing human resources, evaluating workflow and facility design, complying with legal and safety standards, managing drug distribution services, implementing effective systems of payment for services, and marketing pharmaceutical care services of a community pharmacy.

PHARM 468 Case Studies in Pharmaceutical Care (3, max. 9) *Dawson* Small groups of students work with an instructor to review cases illustrating various aspects of specific diseases: pathophysiology, clinical features, psychosocial factors, therapeutic interventions with emphasis on drug therapies, and community resources. Analytic reasoning, self-study skills, and knowledge are emphasized.

PHARM 479 Quantitative Methods II (4) *Blough* Introduction to basic biostatistical concepts in the field of pharmacy. Prerequisite: PHARM 309.

PHARM 483 Institutional and Healthcare Systems Pharmacy Practice (2) *Somani* Presentation of topics regarding current contemporary institutions pharmacy practice. Discussion of new systems technology, home care programs, managed care, computer applications, budgeting, formulary systems, drug information services, intravenous admixture programs, quality assurance process, and patient oriented services.

PHARM 488 Elective Advanced Practicum (1-16, max. 40) *Plein* Advanced-level geriatric clinical pharmacy experience in institutional (hospital, nursing home, long-term-care facility) and ambulatory patient-care facilities under direct supervision of a clinical preceptor.

PHARM 490 Fluid and Electrolytes and Parenteral Nutrition (2) *Awan, Edwards* Principles of fluid and electrolyte therapy, including saline, water, and acid-base balance, carbohydrate, protein, lipid, vitamin, and mineral requirements in parenteral nutrition. Nutritional assessment, complications of parenteral nutrition, stability and compatibility of intravenous solutions, modifications of parenteral nutrition in pediatrics and specific disease states are also covered.

PHARM 491 Cancer Pharmacotherapeutics (2) *Kwok, McCune, Takekuchi, Takemoto, Winter* Pharmacotherapy of cancer, covering supportive care (antibiotics, antiemetics, analgesics, nutrition) to the antineoplastic agents themselves. Specialists in each area serve as guest lecturers.

PHARM 492 Pharmaceutical Services for Long-Term Care (2) *Lam* Scope of pharmaceutical services for long-term care (LTC) and systems for services. Responsibilities of the pharmacist for distributive, administrative, and clinical pharmacy services for nursing homes and other long-term-care facilities. Economic considerations in provision of LTC pharmaceutical services, role of the consultant pharmacist for home-health-care organizations. Pharmaceutical services for independently living elderly.

PHARM 495 Special Studies in Pharmacy (*, max. 6) Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific areas. Students undertake independent study under the individual direction of a faculty member.

PHARM 497 Drug Therapy for the Elderly (3) *Gray* Current knowledge of the effects of aging on the clinical use of drugs for older patients. Emphasizes selection and monitoring of therapy for common conditions of the older adult with multiple medical condi-

tions. Prerequisite: nurse practitioner students or permission of instructor.

PHARM 499 Independent Study/Research (*, max. 6) Applied pharmaceutical research problems. Credit/no credit only.

PHARM 502 Neonatal Drug Therapy (3) *Blackburn, Joseph* Clinical applications of drugs used with acute and chronically ill preterm and term neonates. Review of neonatal pharmacotherapeutics. Examination of selected therapeutic agents in relation to indications, efficacy, therapeutic and adverse effects, monitoring parameters, and dosing principles in the neonate.

PHARM 509 Medical Literature Evaluation (2) *Gibaldi, Harvey, Lavigne, Odegard, O'Sullivan, Watkins* Introduction to the processes involved in the assessment of primary and tertiary medical literature. Students are required to read and critique medical literature. Classes are conducted in a journal club format.

PHARM 510 Current Topics in Infectious Disease Pharmacotherapy (3) *Bauer, Black* Specialty topics of infectious disease pharmacotherapeutics, emphasizing the optimum use of antibiotic therapy. Discussion format using primary medical literature. Topics chosen for discussion reflect contemporary issues. Prerequisite: PHARM 560.

PHARM 511 Current Topics in Immunology and Immunotherapeutics (2) *Hebert* Overview of the immune system and pharmacologic agents which modulate the immune response. Credit/no credit only. Prerequisite: second-, third-, or fourth-year Pharm.D. student or permission of instructor.

PHARM 512 Clinical Applications of Drug Interactions (2) *Hansten, Horn* Discussion of the clinical evaluation and management of drug-drug interactions using patient situations. Focus on patient- and drug-related factors that predispose patients to adverse drug interactions, as well as clinical management of patients found to be at risk. Credit/no credit only. Prerequisite: third- or fourth-year Pharm.D. student.

PHARM 514 Primary Care Pharmacotherapeutics (3) *Acker, Anderson, Black, Hanster, Joseph, Kirkness, McCune, O'Sullivan* Explores clinical applications and therapeutic issues for selected drug categories commonly used in primary care settings and across age groups. Selected drug categories defined by pharmacokinetics, indications for use, efficacy, therapeutic and adverse effects, monitoring parameters, dosing principles, common drug interactions. Patient education, socioeconomic, and behavioral factors emphasized.

PHARM 515 Pharmacotherapeutics for Acute/Critical Illness (3) *Landis* Analysis of issues that impact the assessment, prescription, and evaluation of pharmacotherapeutic regimens for patients who are acutely or critically ill. Current research, clinical contextual considerations, and pharmacotherapeutic principles are emphasized as the basis for decisions relevant to the management of pharmacotherapy in acute care clinical practice.

PHARM 516 Certificate Program in Biomedical Regulatory Affairs (3) *Hazlet* Comprehensive overview of the knowledge and skills necessary to be an effective regulatory affairs and compliance specialist overseeing the design, development, testing, and production of drugs, biotechnology-derived therapeutics, and medical devices. Credit/no credit only.

PHARM 517 Certificate Program in Biomedical Regulatory Affairs (3) *Hazlet* Comprehensive overview of the knowledge and skills necessary to be an effective regulatory affairs and compliance specialist overseeing the design, development, testing,

and production of drugs, biotechnology-derived therapeutics, and medical devices. Credit/no credit only.

PHARM 518 Certificate Program in Biomedical Regulatory Affairs (3) *Hazlet* Comprehensive overview of the knowledge and skills necessary to be an effective regulatory affairs and compliance specialist overseeing the design, development, testing, and production of drugs, biotechnology-derived therapeutics, and medical devices. Credit/no credit only.

PHARM 532 Methods in Pharmaceutical Policy Analysis (4) *Hazlet, Sullivan* Introduction to the tools used in and the framework and dominant contexts for pharmaceuticals policy development and analysis. Methods reviewed in a series of sessions presenting a specific method and case analyses involving pharmaceuticals development. Project and in-class presentation required. Prerequisite: graduate standing in pharmacy or permission of instructor.

PHARM 533 Pharmacoepidemiology (3) *Heckbert, Johnson* Overview of pharmacoepidemiology including drug development and approval; application of epidemiologic methods to study drug safety and effectiveness; exploration of the interplay between research and public policy; introduction to resources for information about drugs; introduction to pharmacology principles pertinent to pharmacoepidemiology. Prerequisite: Graduate student or with permission. Offered: jointly with EPI 533.

PHARM 534 Economic Evaluation in Health and Medicine (3) *Patrick, Sullivan, Veenstra* Methods and techniques for evaluating costs and cost-effectiveness of health, medical, and pharmaceutical interventions. Emphasis on economic evaluation, decision analysis, and modeling techniques for resource allocation and decision making. Applications to technology assessment, health policy, clinical practice, and resource allocation. Prerequisite: permission of instructor. Offered: jointly with HSERV 583; A.

PHARM 535 Evaluating Cost and Outcomes in Health and Medicine 2 (3) *Patrick, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis, pharmacoecconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with HSERV 584.

PHARM 536 Publishing and Presenting with Style (3) *Blough, Johnson* Introduces how to publish and present pharmaceutical research. Familiarizes students with methodological principles for writing and graphing. Projects and computer sessions train in preparation of scholarly work.

PHARM 541 Health Care and Society (3) *Sullivan* Interdisciplinary introduction to health services

designed for future health care practitioners. Examines the history, organization, and effectiveness of the U.S. health care system. Stresses the student's ability to adopt a broad perspective across health care disciplines and traditional boundaries. Offered: jointly with HSERV 515.

PHARM 543 Pharmacy Laws and Ethics (4) *Hazlet* Study of the laws regulating the practice of pharmacy. Professional liability, warranties, and contracts are discussed. Case studies of ethical considerations of pharmacy practice.

PHARM 550 Pharmacotherapeutics for Older Adults (4) *Gray* Clinical use of drugs for older adults. Age-related pharmacokinetics, pharmacodynamics, and pharmacotherapeutics as applied to selecting and monitoring drug regimens for elderly patients. Problem solving regarding drugs of choice for older people with multiple pathologies. Prerequisite: fourth-year Pharm.D. student or permission of instructor.

PHARM 560 Therapeutics I (10) *Black, Hansten* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

PHARM 561 Therapeutics II (9) *Bauer, Horn* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

PHARM 562 Therapeutics III (9) *Anderson, McCune* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

PHARM 573 Laboratory and Functional Assessment: Geriatrics (1) *Lam* Application of laboratory data and functional assessment in planning care for older adults. Case study/seminar format in which students recommend appropriate tests, interpret test results, and gain experience in performing tests of function. Recommended: MEDCH 435 or permission of instructor.

PHARM 574 Clinical Introductory Practicum (1) *O'Sullivan* Students spend three days in a patient care setting, under the guidance of preceptors or advanced students, as an introduction to the practicum experience. Credit/no credit only.

PHARM 575 Institutional Clinical Practicum (5, max. 15) *O'Sullivan* Under faculty supervision, fourth-year students provide pharmaceutical care in an inpatient environment. Credit/no credit only.

PHARM 576 Ambulatory Care Clinical Practicum (5, max. 15) *O'Sullivan* Under faculty supervision, fourth-year students provide pharmaceutical care in an outpatient environment. Credit/no credit only.

PHARM 577 Advanced Practicum (5, max. 40) *O'Sullivan* Under faculty supervision, fourth-year stu-

dents gain experience in practice settings of their choice. Credit/no credit only.

PHARM 578 Advanced Elective Practicum (1-10, max. 20) *O'Sullivan* Faculty-supervised practica either in areas of traditional practice or in innovative practice plans designed by faculty and student. Objectives, activities, schedules, and lengths are site- and preceptor-specific. Credit/no credit only.

PHARM 586 Clinical Case Conference (2) *Bauer, Horn* Weekly pharmacotherapy case conference emphasizing current therapeutics and clinical decision making. Credit/no credit only.

PHARM 590 Doctor of Pharmacy Thesis (1) Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

PHARM 595 Special Studies in Pharmacy (1-6, max. 24) Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific pharmaceutical areas. Students may undertake independent study under the individual direction of a faculty member. Credit/no credit only.

PHARM 596 Seminars in Pediatric Pharmacotherapy (2) *Joseph* Overview of drug disposition and medication utilization as it applies to the pediatric patient. Specific emphasis on neonatology and ambulatory pediatrics. Prerequisite: third-year Pharm.D. student or permission of instructor.

PHARM 597 Graduate Seminar (1) *Blough, Gardner, Hazlet, Johnson, Sullivan, Veenstra* Interactive discussion of topical issues, methods, or analytic techniques. Topics vary. Credit/no credit only. Prerequisite: graduate program student.

PHARM 598 Case Conference: Geriatrics (1) *Plein* Students taking geriatric pharmacy clerkships in various clinical settings meet with faculty to present case studies of elderly patients requiring complex drug therapies. Credit/no credit only. Prerequisite: Pharm.D. fourth-year practicum in geriatrics or general medicine.

PHARM 599 Independent Study/Research (1-6, max. 24) Applied pharmaceutical research problems. Credit/no credit only.

PHARM 600 Independent Study or Research (*) Credit/no credit only.

PHARM 700 Master's Thesis (*) Credit/no credit only.

PHARM 800 Doctoral Dissertation (*) Credit/no credit only.

Daniel J. Evans School of Public Affairs

Acting Dean

Paul T. Hill

208E Parrington Hall

Associate Dean

William M. Zumeta

231 Parrington Hall



General Catalog Web page:

www.washington.edu/students/gencat/academic/PubAffairs.html



School Web page: evans.washington.edu

The Daniel J. Evans School of Public Affairs is a graduate professional school providing education and research for the public service. The school confers the Master of Public Administration (M.P.A.) degree with day, Peace Corps Master's International, and evening program options. The Evans School's program of study is designed to train highly skilled managerial leaders and policy analysts for a wide range of careers in the public and nonprofit sectors. The academic and professional orientation of the degree program gives Evans School students the knowledge and skills necessary to make significant contributions to regional, national and international policy.

Graduates hold leadership positions such as mayors and city managers; local and regional government administrators; foreign service officers; senior military and public safety positions; assistants to elected officials; analysts with budget offices, legislative staff units, and city councils; directors of social service agencies; leaders and staff of nonprofit organizations and administrators of arts organizations. In addition, a number of alumni are employed in private sector positions involving substantial contact with public agencies.

Graduate Program

Graduate Program Coordinator
109 Parrington Hall, Box 353055
206-543-4900
evansuw@u.washington.edu

Master of Public Administration

Day Program

The M.P.A. program is designed for present and future leaders of the public and nonprofit sectors. The program emphasizes broad-based public policy analysis and management knowledge, while students pursue one or more specialized policy fields known as Gateways. The core devotes considerable time to mastering the basic analytic and managerial skills needed by good analysts and managers. The curriculum draws upon the wide range of academic disciplines throughout the University of Washington.

Full-time day students complete 60 credit hours of course work, encompassing the core requirements,

an internship and a degree project. They generally take two academic years (six quarters) to complete the degree program. Part-time and Evening Degree students typically take three or more academic years to complete the M.P.A.

The M.P.A. program has five major components:

- the Required Core Curriculum;
- concentrated study in the three curricular areas of study: Economics, Analysis, and Values;
- specialized plan of study chosen from one or more of the following gateways: Education and Social Policy, Environmental Policy, International Affairs, Nonprofit Management, or Urban and Regional Affairs;
- a final degree project; and
- an internship.

Concurrent Degree Programs

In addition to the day M.P.A. program, the Evans School offers five concurrent M.P.A. degree programs: Master of Arts in International Studies (M.A.I.S.), Master of Urban Planning (M.U.P.), Master of Science in Forest Resources (M.S.), Juris Doctor (J.D.), and Master of Public Health (M.P.H.).

Peace Corps Master's International

Peace Corps Master's International (PCMI) students undertake a concentrated 51-credit curriculum, including a full tour of Peace Corps service. The required course work can be completed in a total of four or five quarters. One year of course work must be completed prior to leaving for Peace Corps service. While on assignment overseas, students remain in touch with their faculty adviser and a returned volunteer from the Evans School. PCMI participants return to the Evans School for one term at the end of their international service to complete their course work and final project report.

Mid-career Evening Degree Program

Mid-career professionals with seven to ten years of progressively responsible work experience in the public, nonprofit or private sectors are offered the Master of Public Administration degree through the Evening Degree Program. This program enables these students, typically midlevel managers, to work full-time while developing the leadership and analytic tools needed to attain higher leadership positions within their organization or field. The Evening Degree Program blends academic and professional perspectives to engender a practical orientation to the theories, values and managerial skills critical to success in public life.

Mid-career students must successfully complete 54 credits of graduate coursework to receive the M.P.A. degree. Degree requirements are divided between the integrated core sequence, electives, and leadership seminars. Students usually take two evening courses each quarter and graduate in three years. Mid-career students do not have an internship or degree project requirement. Although summer attendance is not required, some students take electives during the summer quarter to reduce academic year course loads.

The Evening Degree Program features three distinct components:

Core Sequence (21 credits)

The core sequence is a series of integrated management and analysis courses required of all students. Since the materials in these courses build upon each other, these classes must be taken in sequence. The integrated core curriculum is designed by a team of

Evans School faculty and distinguished practitioners. Important core concepts (e.g., human resource management, microeconomics, policy analysis, political management) are presented in an integrated way that best reflects the actual practice of public management and policy analysis.

Electives (26 credits)

Mid-career students have great flexibility in designing a course of study that best suits their professional needs and interests. Students may mix their elective courses in substantive policy areas such as environmental or social welfare policy with more practice-based management courses. Students may choose their elective courses from any department within the University in consultation with their advisor. One elective must be a course on ethics or values.

Leadership Seminar (7 credits)

Mid-career students take three leadership seminars during their program. The Evening Degree Program places special emphasis upon the development of managerial leadership. The seminars create a forum in which professionals can relate their workplace roles and challenges to the theories and skills examined in the M.P.A. curriculum. In an effort to foster a professional and academic support network among mid-career students, the seminar is open only to evening degree candidates.

The first leadership seminar focuses upon the personal aspects of leadership, the second focuses on analysis skills and abilities needed by leaders. The final leadership seminar integrates the lessons of the previous seminars and is taken during the third year of study. These seminars replace the degree project requirement of full-time day students.

Admission Requirements

The Daniel J. Evans School of Public Affairs admits students on an annual basis, for summer or autumn quarter only. The application deadline for either quarter is February 1.

The prospective student must hold a baccalaureate degree from an accredited college or university in the United States, or its equivalent from a foreign institution. The student's academic record should be a strong one, with a minimum GPA of 3.00 on the last 90 (quarter) or 60 (semester) credits of undergraduate work. Scores on the Graduate Record Examination (GRE) general test are also required for admission. GRE and TOEFL scores are required for international students only.

The primary criterion for admission to the school is the applicant's demonstrated ability to complete the graduate program while sustaining a high level of achievement. The Evans School's admissions committee considers grades and test scores, and gives considerable weight to professional experience, volunteer work, letters of recommendation and the applicant's writing skills as demonstrated in a personal essay.

Applicants for the Evening Degree Program must demonstrate seven to ten years of progressively responsible administrative experience. If prospective students have spent most of their careers in the private sector, they will need to demonstrate an active interest in, and contact with, public issues.

Concurrent degree applicants must apply through and be accepted into both respective programs.

Although the Evans School requires no specific prerequisite courses for admission, the school's core courses in economics and quantitative methods assume that entering students have been exposed to these subjects at the undergraduate level. Ideally new students will possess an academic or profes-

sional background in governmental processes, excellent writing skills and academic preparation in microeconomics and statistics. Students lacking sufficient preparation in these areas may be required to demonstrate aptitude prior to admission, or may be asked to take preparatory course work in addition to the basic M.P.A. degree requirements.

Financial Aid

Evans School Scholarships

The Evans School offers several scholarships to entering students each year from the school's endowed fellowship funds. These typically consist of \$4000-\$5000 stipends awarded primarily on the basis of academic achievement and/or excellence in public service.

The Daniel J. and Nancy Evans Fellowship honors former U.S. Senator, Washington State Governor, and current University Regent Daniel J. Evans and his wife Nancy. The fellowship supports students who aspire to excellence in public service.

The Henry M. Jackson Fellowship, given in honor of the late U.S. Senator Henry M. "Scoop" Jackson, supports students pursuing careers in environmental policy and natural resources management.

The Brewster C. Denny Fellowship, named for former Dean Brewster Denny, supports students who are committed to excellence in public service.

The Robert J. Lavoie Fellowship provides funds to outstanding students who are preparing to work in public service. Mr. Lavoie served as a Deputy Mayor of Seattle.

The Hubert G. Locke Fellowship, established in honor of former Dean Hubert Locke, provides support for students pursuing internships in nonprofit organizations devoted to social justice issues.

The William Shelton Fellowship is funded by the Scottish Rite Foundation of Washington and supports students with a demonstrated commitment to the values of public service.

The George A. Shipman Fellowship offers support to outstanding students pursuing careers in public service. Professor George Shipman was the founder of public administration education at the University of Washington.

Applicants interested in departmental scholarships must submit the Evans School Financial Aid Form with their Evans School application.

Assistantships

The Evans School offers approximately 20 to 30 research, teaching, and staff assistantship positions each year. These positions are typically 10 to 20 hours per week and may include tuition waivers. Hiring for assistantships is a competitive process. Announcements are posted as the positions become available.

Research assistantships are open to first and second year students. First year students are eligible upon their arrival at the school. Students typically work on grant-funded studies, special conferences, and public policy colloquia series sponsored by the school's research centers. Research assistants are exposed to a wide range of policy issues, including regional growth management, international trade, state and federal entitlement programs, health-and-human-services delivery and environmental protection. In addition, up to four research fellowships are offered each year to highly qualified applicants during the admissions process. These fellowships guarantee a paid research assistantship for the first year of study and tuition support.

Teaching and staff assistantships are reserved for second year students only. Teaching assistants are hired for the Evans School's core courses and computer lab. Staff assistantships include such positions as Hubert Humphrey Fellows Coordinator, Peer Advisor, Evening Degree Program Recruitment Coordinator and Internship Coordinator.

Work-Study Status

When hiring research assistants, preference is often given to students possessing work-study status. Work-study status is one of several forms of aid granted by the University of Washington Financial Aid Office based on information provided in a student's FAFSA. Financial aid applicants should highlight any financial change expected on the FAFSA.

Research Facilities

The culture of the Evans School promotes the integration of extensive applied research into the academic program. Students participate in independent research work related to their degree projects. In addition to supporting the independent research of its faculty members, the school houses the Forum at the Evans School and several research and policy centers.

The Forum at the Evans School

The Forum was established in the fall of 1998 under a three-year grant from the Henry M. Jackson Foundation. As the outreach arm of the Evans School, the Forum brings combined strength in its capacity for civic engagement and the depth and breadth of policy research at the school and throughout the University.

The Forum draws on the expertise of faculty, research staff, and students, focusing on three program areas: Leadership and the New Governance, Engaged Citizens and Engaged Communities, and Meeting the Challenges of Growth and Change.

Guests of the Forum address the process of change, the role of institutions in influencing change, and the importance of targeting policies and programs. In each of these areas, the Forum promotes diverse, credible, and reasoned discussions between and among citizens and leaders from the public, private, and nonprofit sectors. Through partnerships with print and broadcast media organizations, the Forum seeks to expand resources for broad public discussion of critical policy issues.

Cascade Center for Public Service

The Cascade Center for Public Service is the executive education arm of the Evans School. Established in 1984, the center offers two-, three-, and five-day courses as well as two-week advanced programs for leaders and managers in the public and nonprofit sectors. Cascade courses are held in Everett, Leavenworth, Olympia, Seattle, the Tri-Cities, Vancouver, and Wenatchee, and can count as credit toward an M.P.A. degree.

Electronic Hallway

The Electronic Hallway, www.hallway.org, is an internationally recognized resource for public affairs teaching and curriculum development. It supports the Evans School teaching mission and distributes cases and skill exercises to educators in public policy and management worldwide.

Human Services Policy Center

The mission of the Human Services Policy Center (HSPC) is to foster effective, integrated services to children and families, based upon the collaborative efforts of faculty in professional schools of the University of Washington. Achieving this mission entails supporting communication among policy ana-

lysts (academic, public, and private), policymakers, practitioners, community/civic leaders, and the media. Combining interdisciplinary applied research with effective communication allows HSPC to help focus and add depth to consideration of critical policy issues in the state of Washington. The center conducts most of its applied research in partnership with organizations engaged in direct services, governance, or policy advocacy in order to achieve direct applicability of research efforts. HSPC's current areas of focus are financing early childhood care and education, communications and public policy, comprehensive community initiatives, statistical monitoring of child and family well-being, and program evaluation and outcomes-based planning.

Center on Reinventing Public Education

The Center on Reinventing Public Education seeks to develop and evaluate methods of public oversight that can allow schools to be focused, effective and accountable. The center, established in 1993, pursues a national program of research and development on proposals such as charter schools, school contracting choice and school system decentralization. It also conducts research into reform initiatives in Washington and the Seattle public schools. The center seeks to inform community leaders, policy makers, school and school system leaders, and the research community.

Northwest Policy Center

The Northwest Policy Center (NPC) is dedicated to enhancing opportunities for people in need, fostering community well-being, improving the vitality of key sectors in a changing economy, and advancing equitable budget policies. NPC conducts research on the regional economy; works with policy makers and practitioners to develop and implement innovative economic, workforce, and community development strategies; and evaluates and shares lessons learned.

Urban Health Initiative

The purpose of the Urban Health Initiative (UHI) is to work closely for a period of up to ten years with five U.S. cities-Baltimore, Detroit, Oakland, Philadelphia and Richmond-to improve the health and safety of children living in these areas. Because each city is encouraged to try innovative approaches, a major responsibility of UHI is to document and share strategies that work over time, as well as those that prove less fruitful. UHI's National Program Office is a joint program of the Evans School and the School of Public Health and Community Medicine (SPHCM). UHI's National Program Director, Charles Royer, is the former mayor of Seattle (1978-1990). Mr. Royer and Deputy Director Cynthia Curreri have taught and lectured in both the Evans School and SPHCM.

Faculty

Professors

Dobel, J. Patrick * 1985; PhD, 1976, Princeton University; political theory, ethics and public policy, organizational theory.

Gloyd, Stephen S. * 1985, (Adjunct); MD, 1973, University of Chicago, MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.

Gordon, Andrew * 1988; PhD, 1970, Columbia University; information policy and organizational dynamics.

Gordon, Margaret T. * 1988; PhD, 1972, Northwestern University; news media and public policy; urban policy; women's issues.

Hill, Paul T. 1993, (Research); PhD, 1972, Ohio State University; politics and reform of K-12 education; business and public policy; urban politics.

Hyman, Barry * 1975; PhD, 1965, Virginia Polytechnic Institute and State University; engineering design, energy systems and policy, technology and public policy.

Karr, James * 1991, (Adjunct); PhD, 1970, University of Illinois; stream and watershed ecology, tropical forest ecology, conservation biology, environmental policy.

Locke, Hubert G. * 1976, (Emeritus); MA, 1962, University of Michigan; criminal justice, urban policy, race and ethnic relations.

May, Peter J. * 1979, (Adjunct); PhD, 1979, University of California (Berkeley); policy processes; policy design and implementation; environmental regulation.

Miles, Edward L. * 1974; PhD, 1965, University of Denver; international law and organization; science, technology, and international relations; marine policy.

Plotnick, Robert D. * 1984; MA, 1973, PhD, 1976, University of California (Berkeley); economics of poverty, labor and social welfare policy.

Thompson, Richard J. 1994, (Affiliate); JD, 1968, University of Washington.

Watts, Carolyn A. * 1975, (Adjunct); MA, 1974, PhD, 1976, Johns Hopkins University; health economics and policy.

Williams, Walter * 1970, (Emeritus); PhD, 1960, Indiana University; high-level policy decision making, policy implementation.

Wofle, Dael L. * 1982, (Emeritus); PhD, 1931, Ohio State University; science and public policy, development of human talent.

Zerbe, Richard O. * 1975; PhD, 1969, Duke University; law and economics, cost-benefit analysis, economic history, environmental regulation.

Zumeta, William M. * 1985; MPP, 1973, PhD, 1978, University of California (Berkeley); public policy analysis, higher education policy and finance, education and workforce policy.

Associate Professors

Adams, Jacob E. 2001, (Research); PhD, 1993, Stanford University; policy, policy implementation, school finance, public agency accountability.

Anderson, C. Leigh 1997; PhD, 1989, University of Washington; institutional economics, international trade and environmental policy, international development.

Brock, Jonathan 1982; MBA, 1973, Harvard University; public management, negotiation and mediation, labor relations, managing people.

Campbell, Nancy M. 1994, (Affiliate); MA, 1977, State University of New York (Albany).

Cullen, Alison * 1995; DSc, 1992, Harvard University; environmental policy, environmental health risk assessment, decision analysis, information and uncertainty analysis.

Dively, Dwight D. 1988, (Affiliate); MPA, 1982, Princeton University.

Klawitter, Marieka * 1990; MPP, 1982, University of Michigan, PhD, 1992, University of Wisconsin; family and employment policy, women's studies, sexual orientation discrimination.

Miller, Ernest G. * 1965, (Emeritus); PhD, 1959, Princeton University; management and organizational development, organization theory, administrative behavior.

Smith, Steven Rathgeb 1996; MSW, 1978, Washington University, PhD, 1988, Massachusetts Institute of Technology; nonprofit and public management, state and local government, health and social policy.

Waddell, Paul A. * 1997; PhD, 1989, University of Texas (Dallas); urban policy, regional planning, growth management, land use, transportation, GIS.

Assistant Professors

Gugerty, Mary Kay 2001; PhD, 2001, Harvard University; nonprofit and public management; international development, community organizations and development.

Kleit, Rachel G. 1999; PhD, 1999, University of North Carolina; urban politics, public housing, urban planning.

Layton, David F. 2001; PhD, 1995, University of Washington; environmental and natural resource policy.

Page, Stephen B. 1999; PhD, 1999, Massachusetts Institute of Technology; public management, interagency collaboration, U.S. social policy.

Ryan, Clare * 1997; PhD, 1996, University of Michigan; natural resource policy and administration, environmental conflict management, water policy.

Senior Lecturers

Boehrer, John 1999; BA, 1965, Harvard University; faculty development, teaching skills, case teaching and writing, communication skills.

Carlson, Daniel L. 1988; MCP, 1972, University of California (Berkeley); urban policy, public service clinics.

Cormick, Gerald W. 1975; PhD, 1971, University of Michigan; mediation and negotiation.

Donaldson, Susan K. 2000; JD, 1979, University of Washington; urban politics, gender and leadership issues.

Harrison, David S. 1986; MPA, 1979, Harvard University; regional economic development; policy and program design.

Madison, John J. 1995; MS, 1981, American University, PhD, 1994, George Mason University; politics of public policy, technology policy.

McIntire, James L. 1987; MPP, 1978, University of Michigan, PhD, 1993, University of Washington; housing policy, state tax policy, labor market policy.

Royer, Charles T. 1994; LLD, 1983, Antioch College; urban policies, health policy.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

PB AF 499 Topics in Public Policy (3-5, max. 6) I&S
Examines selected issues of importance in all areas of public policy. Focus on in-depth analysis of vital public policy issues and the integration of economic, political, and administrative perspectives on them. Offered: jointly with POL S 404.

PB AF 500 General Seminar (1, max. 9)

PB AF 501 Legislative Relations (3) Studies role of legislative bodies in American public policy making. Builds on case studies and focuses on tactics, constraints, and options involved in working within a legislative process to achieve public policy goals.

PB AF 502 Political Management of Policy Process (3) Analyzes the issues which public managers address when they seek to make and implement public policy and programs. Pays particular attention to the institutional and political constraints on policy making and the skills needed to address them.

PB AF 503 Administrative and Executive Leadership (3) Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities. Offered: jointly with POL S 572.

PB AF 504 Leadership Ethics (3) Addresses the moral challenges facing leaders in the public and nonprofit sectors. Examines the values and virtues important to sustained ethical leadership as well as strategies to build strong institutional cultures and support ethical practices in institutions.

PB AF 505 The Law of Public Administration (3) Legal framework of public administrative action in the United States, emphasizing constitutional requirements; operation of the administrative process; management of personnel, funds, and contracts; and judicial review of administrative activity.

PB AF 506 Ethics and Public Policy (3) Teaches students to identify moral issues in public life. Special focus on the integration of moral concerns into public discussion in a manner which contributes to good policy and does not polarize issues. Discusses moral and political theory by focusing on contemporary cases and issues.

PB AF 507 Mediation and Negotiation as Instruments of Public Management and Policy-Making (3) Possibilities offered by mediation and negotiation methods using a mixture of cases, readings, discussions, lectures, and guest speakers. Use of negotiation and mediation techniques to resolve disputes and disagreements over public-policy issues.

PB AF 508 Management Approaches to Service Delivery (3) Examines how services can be delivered in a way that is responsive to the needs of those being served and maximizes the effective utilization of resources. Topics addressed include: needs assessment, process analysis, service strategy, sustaining the service organization, case management, and services integration.

PB AF 509 Managing People in Public and Nonprofit Agencies (3) Emphasizes the role of the program manager rather than that of the personnel officer. Managing people within a variety of programmatic, bureaucratic, and political settings. Case studies form basis of class discussion, assignments.

PB AF 510 Foundations of American Democracy (1) Discusses the role of public service in the United States through examination of historical and institutional foundations of the U.S. political regime. Pays special attention to the structures of government and constitutional values and conflicts at the heart of the political system. Offered: A.

PB AF 511 Public Management I (3) Examines broad aspects of organizational life and orients students to key internal and external challenges and opportunities of managing public and nonprofit organizations. Main topics include organizational mission, values, communication, culture, organizational environment and the policy process, legislative-executive relations, interest group advocacy, and media relations. Offered: A.

PB AF 512 Public Management II (3) Addresses questions of organizational design, personnel, and operations management to equip students with skills to perform effectively in mission-driven organizations. Core topics include organizational design, inter-organizational networks, human resources and staff management, improving service delivery and production flows, measuring and managing for performance, and ethical leadership. Offered: Sp.

PB AF 513 Public Policy Analysis (3) Production and use of analysis to support public policy decisions. Defining problems, devising alternative solutions, clarifying stakes in choices, predicting impacts of choices. Skills developed by working on specific policy problems. Assumes familiarity with statistics, microeconomic theory, and institutions and processes of American government. Prerequisite: PB AF 516 or permission of instructor. Offered: a.

PB AF 514 Policy Implementation (3) Presents set of analytic skills for anticipating and diagnosing implementation problems. Primarily for students who plan to become public-sector policy analysts or managers. Mastery of basic literature and its application to solving problems of public policy, including estimating feasibility of policy alternatives and identifying sources of implementation failure, is expected.

PB AF 515 Decision Making for Public Managers (3) Considers decision making from normative, prescriptive, and descriptive perspectives. Emphasizes individual decision making, with some discussion of organizational decision practice. Focuses on decision analysis; presents tools for structuring decisions; and considers the role of analysis as a basis for negotiation.

PB AF 516 Microeconomic Policy Analysis (3) Ways in which microeconomic analysis can contribute to the analysis of public sector issues. Supply and demand, consumer and firm behavior, competitive and monopoly markets, income distribution, market failure, government intervention. Policy applications of theory. Prerequisite: elementary economics. Offered: A.

PB AF 517 Economics of the Public Sector (3) Methods of analyzing effects of public expenditures and taxes on behavior of individuals and firms, on economic efficiency, and on equity and distribution of income. Theory and practice of intergovernmental fiscal relations. Application of theory to formulation of public policy. Prerequisite: PB AF 516.

PB AF 519 Law and Economics (4) Offered: jointly with LAW A 561.

PB AF 520 Intergovernmental Relations (3) Comparative study of the issues involved in implementing government programs across multiple jurisdictions. Issues of accountability, feasibility, politics, and constitutional limits are examined by focusing upon various methods used to implement programs across federal, state, regional, and international jurisdictions.

PB AF 522 Public Management: Budgeting (3) Budgeting as a management process. Study of formulation and administration of government budgets, including role of budgeting in policy processes, approaches to budget formulation and analysis, development of the PPB approach, and aspects of budget administration, such as revenue estimating,

allotment control, cost accounting. Prerequisite: PB AF 516 or permission of instructor. Offered: W.

PB AF 523 Financial Management in the Public Sector (3) Exploration of the managerial uses of accounting and other processes of financial management in the public sector. Topics covered include: financial planning and control, fund accounting, cost accounting, asset accounting, internal controls, auditing, financial analysis, and financial reporting. Prerequisite: permission of instructor.

PB AF 525 Organizational Development in Public Agencies (3) 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 of instructor.

PB AF 526 Program Evaluation (3) Theory, practice, and politics of evaluation, from simple feedback mechanisms to evaluation of large-scale ongoing programs and social experiments. Emphasis on applications of experimental and quasi-experimental evaluation. Case studies illustrate various types of evaluation. Prerequisite: background in quantitative methods.

PB AF 527 Quantitative Analysis; Quantitative Analysis for Public Managers (3) Two-quarter sequence explores how to formulate research questions, gain experience with conducting research, and learn how to assess which statistical tools or research methods are appropriate to answer different types of policy or management questions. Covers probability, descriptive statistics, hypothesis testing, and confidence intervals. Prerequisite: graduate status in School of Public Affairs or permission of instructor. Offered: W.

PB AF 528 Quantitative Analysis; Quantitative Analysis for Public Managers (3) Second quarter of a two-quarter sequence aimed at helping students become informed users and critical consumers of research and statistical analysis. Combines material on research design and data collection methods with tools for multivariate analysis. The multivariate analysis methods include correlation and an introduction to multivariate regression. Prerequisite: PB AF 527. Offered: Sp.

PB AF 530 International Affairs (3) Provides a broad understanding of international issues and United States policy. Students explore U.S. foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with POL S/SIS 534.

PB AF 531 Development Management in the 21st Century (3) Addresses organization, administration and evaluation in governmental and non-governmental agencies involved in development efforts. Students examine development strategies, alternative management approaches, and management skills such as budgeting, finance, human resource development and program evaluation. Other topics include communication, expatriate/local power imbalances, decentralization, community involvement, culture, and personnel issues.

PB AF 532 Managing Policy in a Global Context (3) Examines different policy environments leaders must address to achieve policy in comparative and international settings. Includes strategies, tactics, and frameworks needed to initiate and sustain policy dealing with authoritarian, democratic, liberal, and one-party states. Focuses on pressures from the

international system and issues such as globalization.

PB AF 533 Economics of International Development (3) Introduction to sustainable international development and its physical, human, social, and natural capital components. Students examine the new growth theories and evidence, and their relationship to democracy, trade, and other policies and institutions. Topics include income distribution, poverty, and the environment.

PB AF 537 Topics in International Affairs (3, max. 12) Examines topics of interest and import in foreign policy and international affairs. Focuses on the in-depth analysis of issues and the integration of economic, institutional, and political dimensions.

PB AF 538 International Organizations and Ocean Management (3) Survey of the manner in which international organizations attempt to manage and regulate the uses of the ocean. Primary emphasis on the analysis of processes that support or constrain these organizations and on the search for alternative policies and organizations. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with SMA 507.

PB AF 540 Integrated Public Management Sequence (3) Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Offered: A.

PB AF 541 Integrated Public Management Sequence (3) Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Prerequisite: PB AF 540. Offered: W.

PB AF 542 Integrated Public Management Sequence (3) Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Prerequisite: 541. Offered: Sp.

PB AF 543 Public Leadership Seminar (3) Focus on the societal context of managerial life. Credit/no credit only. Prerequisite: permission of instructor. Prerequisite: graduate standing in Public Affairs Evening Degree Program. Offered: A.

PB AF 544 Public Leadership Seminar (1-3, max. 3) Integrated use of analytic and management concepts in the making of policy. Prerequisite: PB AF 543. Offered: W.

PB AF 545 Public Leadership Seminars (3) Provides a forum to reflect on the major dimensions of modern managerial leadership at the end of the program. Includes a team project working with outside clients or organizations. Prerequisite: PB AF 544.

PB AF 550 Management of Not-for-Profit Organizations (3) Focuses upon the roles played by not-for-profit organizations in meeting the public good. Examines internal management issues such as structure, budget, and operations; and external issues such as board functions, legal status, marketing, media relations, and fund-raising.

PB AF 551 Public Management: Program Planning and Design (3) Policy context of planning and programming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation.

PB AF 552 Public Arts Policy and Management (3) Role of government in arts. Range of public support at federal, state, and local levels; reasons for its

development and viability. Nature, evolution, functions of public arts agencies in implementing arts policy; relation of such agencies to their constituencies. Seattle, King County, and Washington State serve as case studies.

PB AF 554 Nonprofit Organizations and Public Policy (3) Examines the changing role of nonprofit organizations in American society. Selected policy topics include privatization, for-profit/nonprofit competition, public-private partnerships, tax policy, and new sources of revenues.

PB AF 555 Topics in Nonprofit Management (3, max. 12) Examines various topics of public importance in nonprofit management. Integrates the political, managerial, and economic dimensions of these issues.

PB AF 560 Urban Affairs (3) Explores national/local urban policy concerning the major problems confronting cities and metropolitan regions today. Economic globalization, income inequality, and metropolitan decentralization shape the urban agenda, the context for urban policy, and the analytic focus of the course. A project allows the exploration of strategies for intervention. Offered: jointly with URBDP 560.

PB AF 561 Urban Economics and Public Policy (3) Examines the rationale for and consequences of public intervention in urban land, housing, and transportation markets through land use regulations such as zoning and urban growth boundaries, infrastructure investments, and fiscal policies to manage urban development and traffic. Prerequisite: PB AF 516 or equivalent. Offered: jointly with URBDP 561.

PB AF 562 Introduction to Neighborhood Planning and Community Development (3) Provides introduction to basic practices in neighborhood planning and community development, including theoretical/historical bases; developing neighborhood plans/projects; indicators and evaluation of neighborhood quality; community participation; institutional framework, ethical dilemmas, and professional roles. Addresses current issues, including Seattle's experience, NIMBYism, security, neighborhood character, housing segregation, environmental racism. Offered: jointly with URBDP 562.

PB AF 563 Seminar in Urban Planning and Policy (1) Seminar for students in the MPA/MUP concurrent degree program. Explores topics that intersect urban planning and policy, through exchange with faculty and professionals working in this arena. Focuses on developing thesis topics that explore this intersection. Offered: jointly with URBDP 563.

PB AF 565 Topics in Urban Affairs (3, max. 12) Examines various topics of public importance in urban policy. Integrates the political, managerial, and economic dimensions of these issues.

PB AF 569 Race and Public Policy (3) Analyzes the way in which the persistent problem of race is expressed in the formation and implementation of social and public policy.

PB AF 570 Social Policy Analysis and Management (3) Examines major institutions and programs in the human resources policy area: education, regulation of labor market, health care, income maintenance, social services. Discusses alternative policy instruments, analytic perspectives, intergovernmental issues, and management issues arising across policy areas. Explores challenges of linking services and clients across separate agencies.

PB AF 571 Education, The Workforce, and Public Policy (3, max. 6) Examination of policy issues involving education, training, the economy, and the development of the nation's human resources. Relationship between education, training, and work, underutilized workers, race and gender discrimination issues, and

the role of education and training in economic development. Offered: jointly with EDLPS 563.

PB AF 573 Topics in Education and Social Policy (3, max. 12) Examines various issues of public importance in the areas of education and social policy. Focuses on in-depth analysis of relevant issues and the integration of the economic, administrative, and political dimensions of these issues.

PB AF 575 Public Policy Processes (5) Political science frameworks, approaches, and theories concerning development and implementation of public policies within American political systems. Governmental behaviors and processes, including rational, political, and bureaucratic models of governmental decision making; agenda-building processes; and normative perspectives concerning role of governmental entities. Offered: jointly with POL S 575.

PB AF 581 Information Technology and the Policy-Making Process (3) Demystifies information base for policy making in democracies. Examines theoretical and practical issues associated with information processing in the public sector. Considers role of new technologies in collecting, analyzing, and disseminating information with special attention to the relationship between these technologies and effective government service, public participation, and organizational accountability.

PB AF 582 News Media and Public Policy (3) Explores impacts of news coverage on public policy. Exposure to journalists' approaches to coverage of public affairs, as well as to strategies used by leaders of public/non-profit agencies to attract favorable coverage and minimize damaging coverage. Students learn techniques for assessing impacts of news coverage.

PB AF 583 Seminar in Science and Public Policy (3) Issues and problems relating to the interaction of science and scientists with the public policy-making process. Science versus the nature and values of political processes, and the continuing tensions between the two. The evolving interaction between scientific and technical knowledge and political power; scientific versus ethical judgments. Role of science in the establishment of national goals. Plans and proposals for increasing governmental competence to deal with public policy issues involving science and technology.

PB AF 586 International Science and Technology Policy (3) Seminar is designed: first, to analyze the relationships between research and development policy, capabilities, and national technological strategies for advanced industrial and less-developed countries; second, to deal with the international implications of particular technologies as countries try to make policy for them in regional and global organizations. Examples of specific technologies are chosen from such fields as space telecommunication, weather and climate modification, airline transportation, nuclear energy, and seabed exploitation.

PB AF 589 Risk Assessment for Environmental Health Hazards (3/4) Context, methodologies, types of data, uncertainties and institutional arrangements for risk assessment. Both qualitative and quantitative approaches to the identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with CEE 560/ENV H 577.

PB AF 590 Environmental Policy Processes (3) Presents background to establish the need for environmental policy. Explores in a comparative manner, examining both successes and failures, various strategies that have been used or proposed to protect the environment. Offered: jointly with CFR 592.

PB AF 591 Seminar in Resource Policy and Management (1) Introduction and orientation for concurrent degree program between the Evans School of Public Affairs and the College of Forest Resources. Examines research and literature on contemporary issues related to the integration of natural resource science, policy, and management, through discussion among faculty, students, and invited speakers. Offered: jointly with CFR 591.

PB AF 592 Policy Analysis Design (5) Study based on understanding of the actors, arenas, issues, and policy communities that form the context for policy development and implementation. Exploration of approaches to policy inquiry. Considers implications for both policy and management. Students develop a study design for course project. Offered: jointly with F M 571.

PB AF 593 United States Energy Policy (3) Energy policy formulation and implementation with emphasis on post-1973 developments. Energy conservation programs; changing roles of oil, coal, gas, nuclear, and solar energy; institutional, environmental and equity considerations; government research and development programs.

PB AF 594 Environmental Policy Analysis: Risks and Values (3) Emphasizes institutions involved in environmental policy including the government, environmental organizations, and private business. Examines ways in which the nature of these institutions affects the substance and ultimate effect of the environmental policy implemented.

PB AF 595 Topics in Environmental Policy and Management (1-3, max. 12) Examines various topics of public importance in environmental policy and management. Integrates the political, managerial, and economic dimensions of these issues.

PB AF 596 Ethics and Values in Environmental and Natural Resource Policy (3) *Zerbe* Explores environmental values and ethics and their relationship to the policy process. Includes content on value foundation of economic efficiency and its relationship to fairness, legal entitlements, duty to other creatures, and incommensurabilities in valuing goods. Current policy controversies are addressed.

PB AF 598 Administrative and Policy Skills Workshop (1-3, max. 3) Teaches practical administrative, leadership, and analytic skills commonly required of managers and analysts in the public and non-profit sectors. The workshops emphasize hands-on problem resolution, simulations, and actual practice.

PB AF 599 Special Topics (1-6, max. 6) Study and analysis of special topics in public affairs. Topics vary each quarter depending on curricular needs and interests of students and faculty. Prerequisite: permission of instructor.

PB AF 600 Independent Study or Research (*)

PB AF 605- Degree Project ([1-6]-, max. 6)

PB AF 606- Public Service Clinic (3-) *Carlson, Madison, Page* Serves to meet the degree project requirement as part of the Evans School curriculum. Students work in a supportive environment facilitated by peer and faculty to connect the research, organizational change, and capacity-building needs of community organizations and public agencies.

PB AF -607 Public Service Clinic (-3) *Carlson, Madison, Page* Serves to meet the degree project requirement as part of the Evans School curriculum. Students work in a supportive environment facilitated by peer and faculty to connect the research, organizational change, and capacity-building needs of community organizations and public agencies.

School of Public Health and Community Medicine

Dean

Patricia W. Wahl

F350 Health Sciences



General Catalog Web page:
www.washington.edu/students/genecat/academic/School_Hlt.html



School Web page:
depts.washington.edu/sphcm/

The School of Public Health and Community Medicine (SPHCM) is composed of five departments: Biostatistics, Environmental Health, Epidemiology, Health Services, and Pathobiology. The School offers graduate programs leading to the degrees of Master of Public Health (M.P.H.), Master of Health Administration (M.H.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.). Admission requirements vary by degree and field and are described in the sections of each department.

SPHCM also offers undergraduate degree and undergraduate minor programs, which are described in the undergraduate volume of the *General Catalog*, or visit the *General Catalog* online at www.washington.edu/students/genecat/.

Graduate Programs

Master of Public Health Degree: The M.P.H. is a professional degree that provides broad training in public health and prepares public health practitioners. Each track or program provides additional training in a particular area. Graduates often work in public health practice settings, academia, or research. The M.P.H. degree is offered in biostatistics, environmental health, epidemiology, and health services. Students earning the M.P.H. may emphasize biostatistics, community medicine, community-oriented public health practice, environmental/occupational medicine, epidemiology, international health, maternal and child health, nutritional sciences, public health genetics, or social and behavioral sciences. The M.P.H. degree in public health genetics and nutritional sciences are offered through the Department of Epidemiology. The M.P.H. in public health genetics involves faculty from throughout the University.

Master of Science and Doctor of Philosophy Degrees: M.S. and Ph.D. programs in biostatistics, environmental health, epidemiology, health services, and pathobiology prepare students for academic or research careers. M.S. and Ph.D. programs in public health genetics are offered through the Department of Epidemiology. The M.S. and Ph.D. programs in nutritional sciences are administered in the School, although the degrees are awarded through the Graduate School's interdisciplinary group structure.

The M.S. programs in biostatistics, environmental health, epidemiology, health services, pathobiology, and genetic epidemiology (pending approval for 2002), and the interdisciplinary M.S. program in nutritional sciences, offer focused research training in specific disciplines. Graduates of these programs often assume positions as senior technical staff in laboratories or other organizations, as research project coordinators, or pursue further graduate training. The M.S. program differs from the Ph.D. programs in that more of the courses emphasize the concepts underlying methodological approaches rather than the ability to independently design a major research program.

The doctoral programs in biostatistics, environmental health, epidemiology, health services, pathobiology, public health genetics (pending approval for 2002), and the interdisciplinary Ph.D. program in nutritional sciences train future academicians, as highly qualified independent investigators and teachers, and as well-trained practitioners. The doctoral programs are distinct from the M.S. programs by the addition of advanced coursework and the nature and scope of the dissertation research project.

Special and Conjoint Programs: The Extended M.P.H. Program allows mid-career public health professionals to pursue the M.P.H. degree in health services or health education while continuing their employment.

Conjoint programs with the School of Business Administration, the Graduate School of Public Affairs, and the School of Nursing offer programs that lead to concurrent M.H.A.-M.B.A., M.H.A.-M.P.A., and M.H.A.-M.N. degrees, respectively. SPHCM and the schools of Business Administration and Public Affairs offer these degree programs during both day and evening times. The purpose of the M.H.A. curriculum is to integrate the knowledge, skills, and experience that encompass health services management, planning, and policy analysis. Students develop knowledge and skills that enable them to better understand and manage change, analyze information and make decisions, and manage organizations and the people in them in order to develop professionally and grow as leaders.

A special program offered by the School of Public Health and Community Medicine and the Henry M. Jackson School of International Studies offers students the opportunity to earn concurrent M.P.H.-M.A.I.S. degrees. Conjoint with the School of Social Work, students may earn concurrent M.P.H.-M.S.W. degrees in maternal and child health and human services. Graduate students in the School of Nursing may pursue concurrent M.P.H.-M.N. degrees in community health care or in parent and child nursing. Medical students may earn concurrent M.P.H.-M.D. degrees, and law students may earn an M.P.H.-J.D. degree (pending approval in 2002).

The school offers a new Public Health Informatics Graduate Certificate Program. The Department of Health Services offers a Certificate Program in Health Information Administration (HIA), a Certificate Program in Medical Management, and a Certificate Program in Public Health. A Certificate Program in Public Health Genetics is offered by the Department of Epidemiology.

Residency Programs: The School offers a residency in occupational medicine. Physicians also are welcome to apply to any of the School's graduate programs.

Biostatistics



General Catalog Web page:
www.washington.edu/students/genecat/academic/Biostatistics.html



Department Web page:
depts.washington.edu/biostat/

Graduate Program Coordinator
 F664 Health Sciences, Box 357232
 206-543-1044
bioadmit@u.washington.edu

The Department of Biostatistics offers Master of Science, Master of Public Health, and Doctor of Philosophy degrees in quantitative methods applied to the medical and biological sciences. Biology, medicine, and health services are undergoing major changes in their development as quantitative sciences. As 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 now woven into the fabric of the life sciences, thereby providing exciting new opportunities in research and teaching.

Many universities have instituted programs relating mathematics or statistics to one particular biological field. The goal of the biostatistics graduate program is to equip students to develop and apply the quantitative techniques of mathematics, statistics, and computing appropriate to medicine, biology, and health services.

Because of the quality of the faculty and their involvement in a diversity of statistical applications, as well as the quality of the students, students receive an excellent education. Students are recruited from undergraduate programs in mathematics, statistics, and biology and are selected on the basis of outstanding quantitative ability.

Admission Requirements

Students may enter the program from an undergraduate major in mathematics, statistics, or a biological field. Applicants from other fields with the prerequisites will also be considered. An applicant must have completed or be in the process of completing two years of calculus (to include one year of advanced calculus), one course in linear algebra, and one course in probability theory.

In addition to fulfilling graduate admission requirements, an applicant must submit all transcripts of prior, post-secondary education; three letters of recommendation from persons competent to evaluate the applicant's abilities; a narrative statement concerning the applicant's purpose and interest in entering the program; and official Graduate Record Examination, TOEFL, and TSE score reports, as applicable. Recommendation for selection of candidates is made by a faculty admissions committee, with review of applicants beginning in January for autumn-quarter admission.

Early application for financial aid is advantageous; support is offered throughout the process and may not be available for late applicants. The application deadline for both admission and financial aid is the first week of January; please visit the Web site for specific dates each year.

Master of Science

Students working for the Master of Science degree must complete required course work, demonstrate proficiency in a computer language, write a thesis, take a consulting class, and pass the first-year theo-

ry examination. This examination is offered at the conclusion of a student's first year, and, if a student does not pass, it can be retaken the next year. A Ph.D. student may receive a non-thesis Master of Science degree by successfully passing the first- and second-year qualifying examinations and all of the second-year course work.

Students completing an M.S. in Biostatistics will have learned a variety of statistical methods and applications useful to a career as a data analyst in biomedical or public health research or practice. The degree also provides preparation for individuals who plan doctoral work in a biomedical field but who want more methodological training.

Master of Public Health

The M.P.H. program provides quantitative research training to persons holding a doctoral-level degree in another field (M.D., Ph.D., J.D.). Program requirements include credits from Biostatistics, Epidemiology, Pathobiology, Health Services, and Environmental Health courses to provide both breadth and depth. Additional requirements include a consulting class, a practicum experience, and a thesis.

Students obtaining an M.P.H. in Biostatistics will receive broad training in public health with specific training in biostatistics, learning a range of statistical methods and applications. The degree is designed for individuals who have a doctorate in another field who seek more methodological training.

Doctor of Philosophy

Students earning the Ph.D. degree develop statistical theory and applications particular to the health sciences.

Students in the Ph.D. program must complete required course work, write a dissertation, complete a consulting class, and demonstrate proficiency in a computer language. Students must also pass the Ph.D. statistical theory and applied theory qualifying examinations, a biology project, and pass the General and Final Examinations.

A graduate of the Biostatistics doctoral program will be able to use appropriate statistical techniques to analyze a wide variety of data, provide rigorous proofs characterizing the properties of standard statistical methods, develop expertise in an area of biostatistical methodology, read and provide critical summaries of biomedical literature, and design and carry out biostatistical research studies that propose new biostatistical methods or provide new information about the properties of existing methods. This program trains future academicians, highly qualified as independent investigators and teachers, and well-trained practitioners of biostatistics.

Faculty

Chair

Thomas Richard Fleming

Professors

Barlow, William E. * 1989; MS, 1982, PhD, 1986, University of Washington; survival analysis, residuals, and evaluation of screening programs.

Breslow, Norman E. * 1967; PhD, 1967, Stanford University; clinical trials, epidemiology, survival and categorical data.

Conquest, Loveday L. * 1976, (Adjunct); PhD, 1975, University of Washington; statistics in forestry, fisheries, and environmental pollution monitoring.

Crowley, John, Jr. * 1982; MS, 1970, PhD, 1973, University of Washington; survival analysis, cancer clinical trials.

Davis, Kathryn A. B. * 1974, (Affiliate); MS, 1966, University of Michigan, PhD, 1974, University of Washington; density estimation, cardiovascular data analysis, clinical trials.

De Rouen, Timothy * 1975; PhD, 1971, Virginia Polytechnic Institute and State University; applications of biostatistics to clinical epidemiology of oral and infectious diseases.

Diehr, Paula K. * 1970; MS, 1967, University of California (Los Angeles), PhD, 1970, University of California (Los Angeles); health services, small-area analysis, health status.

Emerson, Scott S. * 1995; MD, 1981, University of Virginia, PhD, 1988, University of Washington; clinical trials, sequential testing, survival analysis, categorical data.

Fisher, Lloyd D. * 1966, (Emeritus); MA, 1965, PhD, 1966, Dartmouth College; cardiovascular data analysis, clinical trials, multivariate statistics, longitudinal data analysis.

Fleming, Thomas Richard * 1984; MA, 1974, PhD, 1976, University of Maryland; survival analysis, cancer clinical trials, AIDS research, sequential analysis.

Green, Stephanie J. * 1984, (Affiliate); MA, 1973, Indiana University, PhD, 1979, University of Wisconsin; censored survival, data analysis, clinical trials, cancer research.

Hallstrom, Alfred * 1975; MSc, 1961, PhD, 1968, Brown University; clinical trial methodologies in cardiovascular research and emergency medical services applications.

Kopecky, Kenneth J. * 1978, (Affiliate); MS, 1975, PhD, 1977, Oregon State University; clinical trials design and survival data analysis, epidemiologic methodology, goodness of fit.

Kronmal, Richard A. * 1964; PhD, 1964, University of California (Los Angeles); nonparametric density estimation, computer algorithms, cardiovascular data analysis.

McKnight, Barbara * 1981; PhD, 1981, University of Wisconsin; statistical methods in epidemiology, human genetics and animal carcinogenicity testing.

Moolgavkar, Suresh H. * 1984, (Adjunct); MBBS, 1965, Bombay University (India), PhD, 1973, Johns Hopkins University; cancer epidemiology, development of quantitative methodology.

Pepe, Margaret * 1982; MS, 1984, PhD, 1986, University of Washington; survival analysis, medical decision making, correlated data methods, child health issues.

Peterson, Arthur V. * 1975; MS, 1971, PhD, 1975, Stanford University; survival data methodology, competing risks, design of disease prevention trials.

Prentice, Ross L. * 1974; MSc, 1968, PhD, 1970, University of Toronto (Canada); failure time analysis, disease prevention trials, epidemiologic methods, dietary factors and disease.

Self, Steven G. * 1984; MS, 1977, California State University, Long Beach, PhD, 1981, University of Washington; longitudinal data analysis, survival time models, cancer prevention, HIV vaccine evaluation.

Storer, Barry E. * 1996, (Affiliate); PhD, 1984, University of Washington; statistical methods in clinical trials and epidemiology.

Thompson, Elizabeth A. * 1985; PhD, 1974, Cambridge University (UK); statistical analysis of human genetic data, population genetics, conservation and computational biology.

Van Belle, Gerald * 1974; MA, 1964, PhD, 1967, University of Toronto (Canada); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication.

Wahl, Patricia W. * 1971; PhD, 1971, University of Washington; multivariate statistical techniques, especially regression analysis applied to cardiovascular data.

Wellner, Jon A. *; PhD, 1975, University of Washington; large-sample theory, asymptotic efficiency, empirical processes.

Wijsman, Ellen M. * 1987; PhD, 1981, University of Wisconsin; human quantitative and population genetics.

Associate Professors

Anderson, Garnet L. * 1983, (Affiliate); MA, 1983, State University of New York (Binghamton), PhD, 1989, University of Washington; clinical trial methodology, survival analysis, women's health, ovarian cancer screening.

Benedetti, Jacqueline K. * 1980; PhD, 1974, University of Washington; statistical methodology in infectious disease research, cancer clinical trials.

Etzioni, Ruth B. * 1991, (Affiliate); MS, 1987, PhD, 1990, Carnegie Mellon University; statistical methods in cancer screening, Bayesian methods in biostatistics.

Feng, Ziding * 1990, (Affiliate); MS, 1985, PhD, 1990, Cornell University; correlated data methods, mixture models, cancer prevention.

Heagerty, Patrick J. * 1995; MS, 1991, State University of New York (Albany), PhD, 1995, Johns Hopkins University; longitudinal and dependent data analysis.

Hughes, James P. 1981; MS, 1980, University of Washington, PhD, 1993, University of Washington; statistical methods in STD/AIDS research, longitudinal methods, Markov models.

Kooperberg, Charles L. * 1991, (Affiliate); PhD, 1991, University of California (Berkeley); splines, density estimation, image reconstruction, spatial statistics, function estimation.

Le Blanc, Michael * 1987; MA, 1984, University of Waterloo (Canada), PhD, 1989, University of Washington; tree-based models, survival analysis, clinical trials, adaptive statistical methods.

Leroux, Brian * 1991; MSc, 1985, PhD, 1989, University of British Columbia (Canada); mixed models, correlated data, statistical applications in dentistry, toxicology, and psychology.

Polissar, Nayak Lincoln * 1980, (Affiliate); PhD, 1974, Princeton University; statistical consulting, community surveys, clinical trials, demography, epidemiology, environment.

Sheppard, Lianne * 1989; MSc, 1985, Johns Hopkins University, PhD, 1992, University of Washington; aggregate data, survival analysis, biostatistical methods in environmental health.

Temkin, Nancy R. * 1977; PhD, 1976, State University of New York (Buffalo); clinical trials, recovery models, statistical modeling of epileptic phenomena, survival analysis.

Thompson, Mary Lou * 1989; PhD, 1979, Georg-August Universität (Germany); filtered point processes, diagonal methods, longitudinal reference ranges, maternal/child health.

Thornquist, Mark Daniel * 1985, (Affiliate); MS, 1982, PhD, 1985, University of Wisconsin; ordinal/categorical response, repeated measures data, chemoprevention, group-randomized trials.

Wakefield, Jonathan Clive * 1999; PhD, 1992, University of Nottingham (UK); Bayesian data analysis, statistics in epidemiology, spatial epidemiology pharmacodynamic models.

Yanez, Norbert David, III * 1993; MS, 1989, PhD, 1993, Arizona State University; generalized linear models, overdispersion, measurement error models.

Zhao, Lue-Ping * 1985, (Affiliate); PhD, 1989, University of Washington; methods for genetic epidemiology, family studies of breast and colorectal cancers.

Assistant Professors

Brumback, Babette 1999; MA, 1992, University of California (Berkeley), PhD, 1996, University of California (Berkeley); functional data analysis, causal inference, epidemiology, statistical applications.

Cai, Tianxi 2000; ScD, 1999, Harvard University; semi-parametric regression and estimation, survival analysis, ROC curve analysis.

Emond, Mary Jane * 1987, (Research); MS, 1989, University of Washington, PhD, 1993, University of Washington; semiparametric models; statistical issues in GI cancer screening and surveillance.

Gooley, Theodore A. * 1993, (Affiliate); PhD, 1990, University of Arizona; design and analysis of clinical trials in bone marrow transplantation.

Hsu, Li * 1996, (Affiliate); MS, 1991, PhD, 1994, University of Washington; genetic epidemiology and biostatistics.

Kerr, M. Kathleen 2001; PhD, 1999, University of California (Los Angeles); statistical genetics, design/analysis of gene expression microarray experiments; experimental design.

Lumley, Thomas S. * 1995; PhD, 1998, University of Washington; statistical methods applied to public health, medicine and environmental science.

Mancl, Lloyd A. * 1995, (Adjunct Research); MS, 1988, PhD, 1992, University of Washington; statistical methodology in periodontal disease, TMD, and correlated data.

Monks, Stephanie 1999; MS, 1996, PhD, 1999, North Carolina State University; statistical genetics, permutation tests, sampling design of genetic studies.

Richardson, Barbara Ann 1993, (Research); MS, 1989, University of California (Los Angeles), PhD, 1993, University of California (Los Angeles); statistical methods for data from AIDS/STD clinical trials.

Rossini, Anthony J. * 1998, (Research); ScD, 1994, Harvard University; statistical computing, statistical issues in HIV/AIDS research, and the analysis of graphs.

Rutter, Carolyn * 1996, (Affiliate); MS, 1988, PhD, 1991, University of California (Los Angeles); evaluation of diagnostic tests, ROC curve analysis and correlated data problems.

Tosh, Martin * 1996, (Research); PhD, 1996, Harvard University; causal inference for observational studies, bayes theory, meta-analysis.

Wang, Ching-Yun * 1993, (Affiliate); MS, 1985, National Taiwan University, PhD, 1993, Texas A&M University; case-control study, missing data, measurement error, kernel smoothing.

Yasui, Yutaka * 1996, (Affiliate); PhD, 1994, Johns Hopkins University; statistical and epidemiological issues in cancer prevention research.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

BIOST 499 Undergraduate Research (*) Supervised reading programs; library and field research; special projects. Credit/no credit only.

Courses for Graduates Only

BIOST 502 Introduction to Statistics in Health Sciences (4) Description and examples of common concepts in biostatistics. Probability, point and confidence interval estimation, hypothesis testing including two-sample and paired t and chi-square tests, introduction to simple linear regression. Examples in health sciences stressed. Offered: S.

BIOST 503 Application of Statistics to Health Sciences (4) Standard statistical techniques presented with examples drawn from the health sciences literature. Critical interpretation of research results, and introduction to the computer for data processing and statistical analysis. Prerequisite: BIOST 502 or equivalent. Offered: S.

BIOST 509 Special Emphases in Biostatistics (3-5, max. 5) Introduction to concepts and methods of descriptive and inferential statistics, with applications in specific disciplines emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, nonparametric methods, linear regression and correlation. Different sections target specific student populations.

BIOST 510 Biostatistics in Dentistry (3) Introduction to concepts and methods of descriptive and inferential statistics with applications in dentistry emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, non-parametric methods, linear regression, and correlation. Prerequisite: enrollment in School of Dentistry or permission of instructor. Offered: jointly with DPHS 568.

BIOST 511 Medical Biometry I (4) Presentation of the principles and methods of data description and elementary parametric and nonparametric statistical analysis. Examples are drawn from the biomedical literature, and real data sets are analyzed by the students after a brief introduction to the use of standard statistical computer packages. Statistical techniques covered include description of samples, comparison of two sample means and proportions, simple linear regression and correlation. Offered: AS.

BIOST 512 Medical Biometry II (4) Multiple regression, analysis of covariance, and an introduction to one-way and two-way analyses of variance: including assumptions, transformations, outlier detection, dummy variables, and variable selection procedures. Examples drawn from the biomedical literature with computer assignments using standard statistical computer packages. Prerequisite: either BIOST 511 or BIOST 517, or equivalent. Offered: W.

BIOST 513 Medical Biometry III (4) Analysis of categorical data including two sample methods, sets of 2 x 2 tables, R x C tables, and logistic regression. Classification and discrimination techniques. Survival analysis including product limit estimates and the Cox proportional hazards model. Prerequisite: BIOST 512 or permission of instructor. Offered: Sp.

BIOST 514 Biostatistics I (4) Mathematically sophisticated presentation of principles and methods of data description; graphics; point, confidence interval estimation; hypothesis testing; relative risk; odds ratio; Mantel-Haenszel; chi-square test (matrix algebra required). Examples drawn from biomedical literature; real-data sets analyzed using statistical computer packages. Prerequisite: biostatistics majors or permission of instructor. Offered: A.

BIOST 515 Biostatistics II (4) Mathematically sophisticated introduction to linear models; multiple regression, correlation; residual analysis; dummy variables; analysis of covariance; one-, two-way analysis of variance; randomized blocks; fixed, random effects (repeated measure, factorial designs); multiple comparisons (matrix algebra required). Real biomedical data sets analyzed. Prerequisite: BIOST 514, biostatistics major, or permission of instructor. Offered: W.

BIOST 516 Statistical Methods in Genetic Epidemiology (3) Theory and application of statistical techniques used in genetic epidemiology. Includes discussion of association studies, linkages and segregation analyses. Examples stressed with reference to assumptions and limitations. Prerequisite: either BIOST 513 or BIOST 518; PHG 511/EPI 517, or permission of instructor. Offered: jointly with EPI 516/PHG 519.

BIOST 517 Applied Biostatistics I (4) Introduction to the analysis of biomedical data. Descriptive and inferential statistical analysis for discrete, continuous, and right censored random variables. Analytic methods based on elementary parametric and non-parametric models for one sample; two sample (independent and paired), stratified sample, and simple regression problems. Offered: A.

BIOST 518 Applied Biostatistics II (4) Multiple regression for continuous, discrete, and right censored response variables, including dummy variables, transformations, and interactions. Introduction to regression with correlated outcome data. Model and case diagnostics. Computer assignments using real data and standard statistical computer packages. Prerequisite: BIOST 517 or permission of instructor. Offered: W.

BIOST 519 Topics in Epidemiologic Methods (3) *Davis* Introduces advanced methodologic methods, including recursive partitioning, developing clinical prediction rules, analyses of community-level associations or interventions, case-crossover and case-only designs, propensity scores, two-stage sampling, and missing data imputation. Prerequisite: EPI 512; EPI 513. Offered: jointly with EPI 515. A.

BIOST 521 Biostatistics for Experimentalists (4) Statistical aspects of design, data analytic models appropriate to classes of experiments most commonly employed in biomedical sciences. One-, two-way analyses of variance; factorial, crossed, nested, repeated measures designs. Clean, messy real-data sets analyzed using standard statistical computer packages. Prerequisite: either BIOST 511 and BIOST 512, or BIOST 517 and BIOST 518, or equivalent. Offered: alternate years; Sp.

BIOST 524 Design of Medical Studies (3) Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations, stratification, and ethics. Suitable for graduate students in biostatistics and for research-oriented graduate students in other scientific fields. Prerequisite: BIOST 511 or equivalent, and one of BIOST 513, BIOST 518, STAT 421, STAT 423, STAT 512, or EPI 512; or permission of instructor. Offered: jointly with STAT 524; Sp.

BIOST 529 Sample Survey Techniques (3) Design and implementation of selection and estimation pro-

cedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: either STAT 421, STAT 423, STAT 504, QMETH 500, BIOST 511, or BIOST 517, or equivalent or permission of instructor. Offered: jointly with CS&SS 529/STAT 529.

BIOST 533 Classical Theory of Linear Models (3) Introduction to one-, two-way analysis of variance; randomized blocks; fixed, random effects, multiple comparisons. Statistical distribution theory for quadratic forms of normal variables. Fitting of the general linear model by least squares. Prerequisite: BOST 515, STAT 421 or STAT 423; and STAT 513; and a course in matrix algebra. Offered: jointly with STAT 533; Sp.

BIOST 534 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 534; Sp.

BIOST 535 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 535; A.

BIOST 536 Categorical Data Analysis in Epidemiology (4) Summary of univariate categorical data analysis; introduction to multivariate analysis of categorical epidemiologic data using multiplicative models. Experience at interpretation; familiarity with available programs gained by analysis of bona fide data, critiques of analyses appearing in literature. Prerequisite: BOST 515; or EPI 514 and either BOST 513 or BOST 518; or permission of instructor. Offered: jointly with EPI 536; A.

BIOST 537 Survival Data Analysis in Epidemiology (4) Introduction to multivariate analysis of survival data using multiplicative models. Application to epidemiologic studies. Familiarity with interpretation and available computer programs gained by analysis of bona fide sets of data and critiques of analyses appearing in the literature. Prerequisite: BOST 536 or permission of instructor. Offered: jointly with EPI 537; W.

BIOST 538 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 538; W.

BIOST 540 Correlated Data Regression (3) Introduction to regression modeling of longitudinal and clustered data from epidemiology and health sciences. Interpretation and familiarity with available programs gained by analysis of *bona fide* data; critiques of analyses appearing in literature. Prerequisite: Either BOST 513, BOST 515, BOST 518, BOST 536, or permission of instructor. Offered: Sp.

BIOST 550 Statistical Genetics I: Mendelian Traits (3) *Thompson* Mendelian genetic traits. Population genetics; Hardy-Weinberg, allelic variation, subdivision. Likelihood inference, information and power;

latent variables and EM algorithm. Pedigree relationships and gene identity. Meiosis and recombination. Linkage detection. Multipoint linkage analysis. Prerequisite: STAT 390 and STAT 394, or permission of instructor. Offered: jointly with STAT 550; A.

BIOST 551 Statistical Genetics II: Quantitative Traits (3) *Manks* Statistical basis for describing variation in quantitative traits. Decomposition of trait variation into components representing genes, environment and gene-environment interaction. Methods of mapping and characterizing quantitative trait loci. Prerequisite: STAT/BIOST 550; STAT 423 or BOST 515; or permission of instructor. Offered: jointly with STAT 551; W.

BIOST 552 Statistical Genetics III: Medical Genetics Studies (3) *Wjisman* Overview of probability models, inheritance models, penetrance. Association and linkage. The lod score method. Affected sib method. Fitting complex inheritance models. Design mapping studies; multipoint, disequilibrium, and fine-scale mapping. Ascertainment. Prerequisite: STAT/BIOST 551; GENET 371; or permission of instructor. Offered: jointly with STAT 552; Sp.

BIOST 570 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 512, 513; BOST/STAT 533 or STAT 421 and STAT 423, and a course in matrix algebra. Offered: jointly with STAT 570.

BIOST 571 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: BOST 570. Offered: jointly with STAT 571.

BIOST 572 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: BOST 571. Offered: jointly with STAT 572.

BIOST 573 Statistical Methods for Categorical Data (3) Advanced topics in generalized linear models and the analysis of categorical data: overdispersion, quasi-likelihood, parameters in link and variance functions, exact conditional inference, random effects, saddlepoint approximations. Credit/no credit only. Prerequisite: BOST 571 and STAT 582. Offered: jointly with STAT 573; alternate years; Sp.

BIOST 574 Multivariate Statistical Methods (3) Use of multivariate normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisite: BOST 570 or permission of instructor. Offered: jointly with STAT 574; alternate years.

BIOST 576 Statistical Methods for Survival Data (3) Statistical methods for censored survival data arising from follow-up studies on human or animal populations. Parametric and nonparametric methods, Kaplan-Meier survival curve estimator, comparison of survival curves, log-rank test, regression models including the Cox proportional hazards model, competing risks. Prerequisite: STAT 581 and either BOST

515, STAT 473, or equivalent. Offered: jointly with STAT 576.

BIOST 577 Advanced Design and Analysis of Experiments (3) Concepts important in experimental design: randomization, blocking, confounding. Application and analysis of data from randomized blocks designs, Latin and Graeco-Latin squares, incomplete blocks designs, split-plot and repeated measures, factorial and fractional replicates, response surface experiments. Prerequisite: BOST 570 or STAT 421 (minimum 3.0) or permission of instructor. Offered: jointly with STAT 577.

BIOST 578 Special Topics in Advanced Biostatistics (*, max. 3) Advanced-level topics in biostatistics offered by regular and visiting faculty. Prerequisite: permission of instructor. Offered: jointly with STAT 578; AWSpS.

BIOST 580 Seminar in Biostatistics (*, max. 9) Presentation and discussion of special topics and research results in biostatistics. Speakers include resident faculty, visiting scientists, and advanced graduate students. Offered: AWSpS.

BIOST 586 Martingales: Survival Analysis (3) Theory of counting processes and martingales to provide unified study of survival analysis methods. Focus on survival distribution estimators, censored data rank statistics, regression methods with censored survival data. Development of small samples moments, asymptotic distributions, and efficiencies. Prerequisite: STAT 521 or STAT 583 or permission of instructor; recommended: STAT 576. Offered: jointly with STAT 586; alternate years; W.

BIOST 590 Biostatistical Consulting (*) Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitative investigation of a problem. With experience, independent associations of student and research worker are encouraged, with subsequent review by faculty of resulting design and analysis. Prerequisite: permission of instructor. Offered: AWSpS.

BIOST 593 Cancer Prevention Research Laboratory (3) *White* Research experience for pre- and postdoctoral students working on cancer prevention projects at the Fred Hutchinson Cancer Research Center. Credit/no credit only. Offered: jointly with EPI 593; AWSpS.

BIOST 595 Biostatistics Master's Practicum (1-12, max. 12) Supervised practice experience providing students an opportunity to learn how biostatistics is applied in a public health setting and in the formation of public health policy. Prerequisite: 514; 515; 536; 537.

BIOST 598 Techniques of Statistical Consulting (1) Seminar series covering technical and non-technical aspects of statistical consulting, including skills for effective communication with clients, report writing, statistical tips and rules of thumb, issues in survey sampling, and issues in working as a statistical consultant in academic, industrial, and private-practice settings. Prerequisite: entry code. Offered: jointly with STAT 598; ASp.

BIOST 600 Independent Study or Research (*) Offered: AWSpS.

BIOST 700 Master's Thesis (*) Offered: AWSpS.

BIOST 800 Doctoral Dissertation (*) Offered: AWSpS.

Environmental Health



General Catalog Web page:
www.washington.edu/students/gencat/academic/Environmental_Hlth.html



Department Web page:
depts.washington.edu/envhlth/

Graduate Program

Graduate Program Coordinator
 F461 Health Sciences, Box 357234
 206-543-3199

The Department of Environmental Health offers three graduate degrees: Master of Science, Master of Public Health, and Doctor of Philosophy. The areas of emphasis are environmental and occupational hygiene (Ph.D.) industrial hygiene and safety (M.S.), toxicology (Ph.D./M.S.), environmental health technology (M.S.), and occupational and environmental medicine or general environmental health (M.P.H.).

The Ph.D. in Environmental and Occupational Hygiene option focuses on the assessment of exposures, health effects, and control strategies in community and work environments. The program emphasizes expertise in exposure assessment to evaluate human health risks from chemical, physical, and biological agents. Research opportunities include: laboratory and field investigations of environmental exposures and health outcomes; air, soil and water pollution monitoring; ambient, indoor, and personal exposure modeling; evaluation of biomechanical stress factors and organization of the work environment; development of new instruments, biomarkers, and novel methods for assessing human exposures; and evaluation of effective control strategies for the prevention or reduction of illness and injury.

The M.S. in Industrial Hygiene and Safety option focuses on the recognition, evaluation and control of workplace hazards that cause occupational illness and injury. Research opportunities include laboratory and field investigations of exposure to health and safety hazards such as toxic chemicals, radiation, and biomechanical stress. Students may elect one of two program options: industrial hygiene, emphasizing assessment of exposures to chemical and physical agents; or safety/ergonomics, emphasizing assessment, evaluation and design of the work environment and the tools used.

The M.S. and Ph.D. in Toxicology focus on research and application of basic scientific principles toward a better understanding of the health effects of toxic substances in the workplace and general environment. Students who select the toxicology option participate in laboratory research investigating molecular and biochemical processes involved in regulating chemically induced toxic responses such as soft-tissue (e.g., brain, lung, kidney, and liver) damage, birth defects, cancer, and nervous-system impairment.

The M.S. in Environmental Health Technology focuses on community exposures to biological and chemical agents in commonly encountered environmental media including air, water, food, and soil. Research involves environmental sampling and analysis, assessment of pathways and routes of exposure, and evaluation of the significance of particular environmental agents in a regulatory context. Student thesis projects may encompass one or more of these areas of investigation and involve field or laboratory activities or both.

The M.P.H. in General Environmental Health provides an opportunity for students to focus on the recognition, assessment, and control of environmental and occupational hazards, the impact of these hazards on health and society, and approaches to regulations, enforcement, and policy development. It emphasizes development of skills essential to science-based public health practice. In addition to coursework, students complete a field practicum and research in any of the department's research facilities or in a field setting.

The M.P.H. in Occupational and Environmental Medicine is for individuals with an earned doctorate. The goal of the program is to provide training in the public health sciences with a focus on occupational and environmental health. The program provides didactic instruction and participation in field studies. Research efforts focus on understanding, preventing, and managing environmental and occupational disease, injury, and disability. Physicians also have the option of applying for a concurrent fellowship or residency in occupational and environmental medicine.

The concurrent M.P.H./M.P.A. or M.S./M.P.A. degree programs with the Daniel J. Evans School of Public Affairs seek to educate students who will bring substantive public health knowledge and a strong policy and management orientation to their professional careers. This collaboration makes it possible to complete the two degrees in three years rather than four, with faculty from both schools involved in teaching, advising, and research. Applicants must apply separately to each program.

Admission Requirements

Prerequisites for admission to the M.S. graduate programs in industrial hygiene and safety, toxicology, and environmental health technology include a Bachelor of Science or equivalent degree in environmental health, a physical science, a biological science, or engineering, and submission of Graduate Record Examination scores.

Prerequisite for admission to the M.P.H. Occupational and Environmental Medicine program is a doctoral degree.

Prerequisites for admission to the M.P.H. General Environmental Health program or M.P.H./M.P.A. concurrent degree program include a Bachelor of Science or equivalent degree in environmental health, a physical science, a biological science, or engineering, and submission of Graduate Record Examination scores.

Prerequisites for admission into the Ph.D. program in either environmental and occupational hygiene or toxicology include a Bachelor of Science degree in science or engineering with adequate preparation in physics, chemistry, mathematics, and biology. Selection of an applicant will also be based upon an honors-level GPA, a statement of personal goals consistent with the program, supportive letters of reference, and high scores on the Graduate Record Examination.

Graduation Requirements

The M.S. and M.P.H. graduate programs are designed for seven quarters of study, including field applications and research, and require completion of departmental and program-specific courses, and submission of an acceptable thesis.

The Ph.D. program has a strong research focus, and requires completion of departmental and program-specific courses. A dissertation of original research suitable for publication in an appropriate peer-reviewed journal is required. For an entering student with a Bachelor of Science or engineering degree, the program of study can be expected to take approximately four to five years. A student entering

with a Master of Science degree in a relevant area may complete the degree in less time.

Financial Aid

Support is available for many students in the form of traineeships or research assistantships, which include tuition. This support comes from federal and private sources awarded to the department or School.

Research Facilities

Specialized laboratories exist for research in industrial hygiene chemistry, optical remote sensing of chemicals, industrial ventilation, ergonomics, trace organics and heavy metals, environmental microbiology, electron microscopy, controlled exposure to environmental agents, and toxicology (including toxicogenomics and analytical cytology). Field research is facilitated through an extensive consultation-service program conducted by this department for labor and industry in Washington state.

Faculty

Chair

David A. Kalman

Professors

Checkoway, Harvey * 1987; MPH, 1975, Yale University, PhD, 1978, University of North Carolina; occupational and environmental epidemiology.

Costa, Lucio Guido * 1983; PharmD, 1977, University of Milan (Italy); neurotoxicology; developmental and molecular mechanisms/biological markers of neurotoxicity.

Covert, David S. * 1975, (Adjunct Research); MS, 1971, PhD, 1974, University of Washington; atmospheric chemistry; aerosol physics, chemistry, optics, and instrumentation.

Eaton, David L. * 1979; PhD, 1978, University of Kansas; biochemical and environmental toxicology, aflatoxin carcinogenesis, metabolism of toxic chemicals.

Fantel, Alan G. * 1973, (Adjunct Research); PhD, 1974, University of Washington; embryology, teratology.

Faustman, Elaine M. * 1981; PhD, 1980, Michigan State University; developmental toxicology, risk assessment methodologies, toxicology of N-nitroso compounds.

Fenske, Richard A. * 1990; MA, 1976, University of California (Berkeley), MPH, 1978, PhD, 1984, University of California (Berkeley); human exposure and health risk assessment, pesticide exposure.

Franklin, Gary M. * 1988; MD, 1969, George Washington University, MPH, 1982, University of California (Berkeley); occupational injury, neurological epidemiology, public health nutrition.

Jackson, Kenneth L. * 1963, (Emeritus); PhD, 1954, University of California (Berkeley); physiological and biochemical mechanisms in radiation biology.

Kalman, David A. * 1978; PhD, 1978, University of Washington; environmental chemistry, detection and fate of chemical hazards in natural and manmade environments.

Karr, James * 1991, (Adjunct); PhD, 1970, University of Illinois; stream and watershed ecology, tropical forest ecology, conservation biology, environmental policy.

Koenig, Jane Q. * 1974; MS, 1961, PhD, 1963, University of Washington; respiratory physiology, health effects of air pollutants, lung response of susceptible groups.

Larson, Timothy * 1970, (Adjunct); PhD, 1976, University of Washington; airborne particles, air quality modeling, and instrument development.

Luchtel, Daniel L. * 1972; PhD, 1969, University of Washington; electron microscopy and cell biology, lung anatomy/pathophysiology, fiber toxicology.

Morgan, Michael S. * 1974; DSc, 1972, Massachusetts Institute of Technology; applied respiratory, physiology and inhalation toxicology.

Mottet, N. Karle * 1959, (Emeritus); MD, 1952, Yale University; effects of trace elements, especially methylmercury and arsenic, on growth and development.

Van Belle, Gerald * 1974; MA, 1964, PhD, 1967, University of Toronto (Canada); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication.

Woods, James S. * 1982; PhD, 1970, University of Washington, MPH, 1978, University of North Carolina; biochemical toxicology of trace metals; biological markers of metal exposure.

Associate Professors

Barnhart, Scott * 1979; MD, 1979, George Washington University; occupationally related lung disease.

Burbacher, Thomas M. * 1974; PhD, 1983, University of Washington; neurotoxicology, specializing in the behavioral effects of agents on the central nervous system.

Daniell, William E. * 1984; MD, 1979, Tufts University, MPH, 1986, University of Washington; noise-induced hearing loss; long-term disability associated with carpal tunnel syndrome.

Kaufman, Joel D. * 1988; MD, 1986, University of Michigan, MPH, 1990, University of Washington; occupational and environmental epidemiology; etiologic research and public health surveillance.

Kavanagh, Terrance J. 1985; MS, 1980, PhD, 1985, Michigan State University; free radical toxicology, glutathione metabolism, toxicology and aging.

Keifer, Matthew C. * 1982; MD, 1982, University of Illinois; the human health effects of pesticide exposure.

Kissel, John C. * 1990; MS, 1974, Harvard University, PhD, 1985, Stanford University; solid and hazardous waste management practice, human exposure assessment.

Leroux, Brian * 1991, (Adjunct); MSc, 1985, PhD, 1989, University of British Columbia (Canada); mixed models, correlated data, statistical applications in dentistry, toxicology, and psychology.

Martin, Thomas G. 1996, (Adjunct); MD, 1977, Pennsylvania State University; general internal medicine.

Seixas, Noah S. * 1992; MS, 1982, Harvard University, PhD, 1990, University of Michigan; exposure assessment methods for occupational/epidemiologic studies; small industrial plants.

Sheppard, Lianne * 1989; MSc, 1985, Johns Hopkins University, PhD, 1992, University of Washington; aggregate data, survival analysis, biostatistical methods in environmental health.

Yost, Michael G. * 1993; MS, 1984, University of California (Berkeley), PhD, 1989, University of California (Berkeley); worker exposures to physical agents, electromagnetic fields, noise and vibration.

Assistant Professors

Johnson, Peter W. 2001; PhD, 1992, University of California (Berkeley); ergonomics, bioengineering, office-workers' hazards, measurement tools for physical risk factors.

Liu, Lee-Jane Sally * 1998; MS, 1991, Harvard University, ScD, 1994, Harvard University; air pollution, exposure assessment, environmental epidemiology.

Meschke, John Scott 2002; PhD, 2001, University of North Carolina; pathogen survival, mobility, and detection in the environment; microbial risk assessment.

Samadpour, Mansour * 1987; MS, 1987, PhD, 1990, University of Washington; molecular epidemiology of microbial pathogens, bacterial population genetics and pathogenesis.

Xia, Zhengui * 1987; MS, 1985, Wuhan University (China), PhD, 1991, University of Washington; neuronal apoptosis, neuronal gene regulation.

Senior Lecturers

Camp, Janice E. 1982; MN, 1984, MS, 1984, University of Washington; workplace exposure assessment, evaluation of exposure, controls, program evaluation.

Morris, Sharon L. 1982; BA, 1965, Reed College; occupational safety and health policy, continuing education.

Treser, Charles D. * 1980; MPH, 1976, University of Michigan; administrative law and process in environmental health; housing; vector control.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsctat/.

ENV H 405 Toxic Chemicals in the Environment (3) *Kavanagh* Basic principles governing the behavior and effects of toxic chemicals released into the environment; sources, distribution, and fate of toxic chemicals in the environment; chemicals and cancer; chemicals and birth defects; government regulation of chemical hazards. Focus on human health impacts of chemicals found in the workplace and general environment. Prerequisite: 2.0 in BIOL 203; either 2.0 in CHEM 242 or 2.0 in CHEM 347. Offered: Sp.

ENV H 417 Non-ionizing Radiation and Electrical Safety (2) *Yost* Introduction to health hazards from UV, optical laser hazards, infrared radiation, radio-frequency radiation, heat stress, electrical shock, electric and magnetic fields. Application of current standards for these physical agents. Emphasis on occupational hazards with additional discussion of environmental exposures where appropriate. Offered: odd years; W.

ENV H 430 Methods in Environmental Sampling and Analysis (3) *Samadpour* Field sampling methods studied and selected laboratory analyses of food, drinking water, and waste waters conducted. Official methods for characterizing physical and chemical quality of water and wastes demonstrated.

Microbiological criteria emphasized for student participation, including: enumeration of subgroups in populations, selective inhibitor, characteristics of normal flora, rationale of "indicator" organisms. Prerequisite: 2.0 in MICROM 302. Offered: A.

ENV H 431 Environmental Health Sampling and Analysis II (3) *Samadpour* Methods for collection and analyses of environmental samples are examined or demonstrated, including official analytical procedures of FDA, USDA, EPA, and AOAC, as well as cutting edge developments. Criteria for wholesomeness, safety, and inhibition of spoilage of food and food products are examined. Prerequisite: ENV H 430. Offered: W.

ENV H 440 Water and Waste Sanitation (4) *Lenning* Study of health problems associated with drinking water and wastewaters and minimization of problems. Focus on drinking water quality and quantity requirements; water pollutants and impacts on environment; individual drinking water, onsite sewage facilities, related site selection criteria/regulations, regulatory agency activities. Field performance of environmental health specialist emphasized. Prerequisite: 2.0 in BIOL 203. Offered: A.

ENV H 441 Food Protection (3) *Easterberg* Study of identification and characteristics of chemicals and biological agents implicated in foodborne disease outbreaks and conditions or circumstances by which food contamination occurs. Examination of food protection activities conducted by local and state government at the retail level. Prerequisite: either 2.0 in CHEM 155 or 2.0 in both CHEM 160 and CHEM 161, or 2.0 in CHEM 162; 2.0 in MICROM 302. Offered: W.

ENV H 442 Vector Control (3) *Treser* Study of the impact and control of rodents and arthropod vectors of disease, including consideration of economic poisons used, their regulation, and safety measures. Prerequisite: 2.0 in BIOL 203. Offered: Sp.

ENV H 445 Solid Waste Management (3) Examination of the public health, environmental, economic, and materials conservation aspects of solid wastes management; amounts and sources of solid wastes, waste reduction and recycling, methods of storage, transportation and disposal, integrated waste management, identification of present problems and future needs. Prerequisite: 2.0 in CHEM 155, 2.0 in CHEM 160, or 2.0 in CHEM 162; either 2.0 in MATH 124, 2.0 in MATH 127, 2.0 in MATH 134, or 2.0 in MATH 144; recommended: PHYS 115. Offered: Sp.

ENV H 446 Hazardous Waste Management (3) *Kissel* Characterization of hazardous wastes and introduction to pertinent federal and state regulations. Discussion of exposure pathways and description of management options at pre-generation, pre-release, and post-release stages. Emphasis on public health significance. Supplemented with case studies. Prerequisite: either 2.0 in CHEM 155, 2.0 in CHEM 160, 2.0 in CHEM 162; either 2.0 in MATH 112, 2.0 in MATH 124, 2.0 in MATH 127, 2.0 in MATH 234, or 2.0 in MATH 144; recommended: MATH 125, CHEM 224, PHYS 115. Offered: W.

ENV H 449 Health Effects of Air Pollution (2) Structure and function of the respiratory system and the changes that may be produced by specific air pollutants, such as ozone, SO₂ and fine particles. Air quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Offered: even years; W.

ENV H 453 Industrial Hygiene (3) *Morgan* Introduction to the principles and scientific foundation of industrial hygiene. Examines the anticipation, recognition, evaluation, and control of work place hazards to health and safety. Focuses on the first three functions, but includes some consideration of control methods. Prerequisite: either BIOL 200 or

BIOL 202; CHEM 224; either PHYS 116 or PHYS 123. Offered: A.

ENV H 454 Industrial Hygiene Measurements (3) *Camp, Hahne* Series of lectures and laboratory demonstrations illustrate the use of a wide spectrum of industrial hygiene sampling equipment. Included are airflow calibration, chemical calibration, detector tubes, personnel sampling devices, both continuous and direct reading instruments. Instrumentation for noise and electromagnetic radiation. Prerequisite: 2.5 in ENV H 453. Offered: W.

ENV H 457 Industrial and Environmental Noise (3) *Yost* Survey of industrial and community noise problems, including sources, effects, measurement, control, and legislation. Prerequisite: 2.0 in PHYS 115. Offered: Sp.

ENV H 461 Air Pollution Control (4) *Pilat* Fundamental concepts of air pollution. Emission sources, atmospheric dispersion, ambient concentrations, adverse effects, governmental regulations, emission standards, air-quality standards, processes and equipment for controlling emissions. Offered: jointly with CEE 490; A.

ENV H 470 Environmental Health Practice: Administration and Management (2) *Osaki, Treser* Explores selected aspects of the management of environmental health programs in the community, including organization theory and practice, budgeting, personnel management, program planning and evaluation, and community relations. Prerequisite: ENV H 482. Offered: A.

ENV H 471 Environmental Health Regulation (3) *Treser* Introduction to administrative regulation and process. Authority, jurisdiction, and structure of environmental control programs and agencies; the regulatory process; agency acquisition and retention of information; administrative actions; enforcement of environmental health laws; major statutes and cases affecting programs. Prerequisite: ENV H 482. Offered: W.

ENV H 472 Environmental Risk and Society (3) *Fenske* Examines scientific determinations of environmental risks and explores how such determinations are evaluated by affected communities and society. Employs risk analysis to integrate technical knowledge in hazard identification and exposure assessment to provide a more rational basis for environmental policies. Role of public participation in risk-based decision making discussed. Offered: A.

ENV H 480 Environmental Health Problems (*, max. 6) *Treser* Individual projects involving library, laboratory, or field study of a specific environmental health problem. Offered: AWSpS.

ENV H 482 Environmental Health Internship (2-15, max. 15) *Treser* Assignment to an environmental health or environmental protection agency for supervised observation and experience in environmental health technology, program planning and utilization of community resources. Prerequisite: 2.5 in ENV H 311. Credit/no credit only. Offered: AWSpS.

ENV H 497 Environmental Health Special Electives (*) Offered: AWSpS.

ENV H 499 Undergraduate Research (*) Individual research on a specific topic in environmental health upon which specific conclusions, judgments, or evaluation can be made or upon which facts can be presented. Offered: AWSpS.

Courses for Graduates Only

ENV H 511 Environmental and Occupational Health (3) Effects of exposure to chemical, physical, and biological agents, embracing the community and workplace environments. Current issues, using specific cases from recent literature as basis for class-

room discussion and written assignments. Offered: W.

ENV H 512 Environmental Health Technology and Facilities (3) *De Walle* Survey of selected technological components of environmental health infrastructure via lecture and weekly field trips to full-scale facilities. Sites visited vary year to year, but may include paper and steel plants using reclaimed feedstock, cement kiln using waste as supplemental fuel, municipal wastewater treatment facility, and steam generation plant. Offered: S.

ENV H 513 Basic Concepts in Pharmacogenetics and Toxicogenomics (3) *Eaton, Thummel* Addresses current DNA sequencing and genotyping approaches, and basic concepts of pharmacogenetics and toxicogenomics. Emphasis placed on applications of genomic technologies to the understanding of "gene-environment interactions" that cause diseases of public health importance, including cancer, chronic neurological diseases, and adverse drug reactions. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H/PCEUT 513.

ENV H 514 Environmental and Occupational Toxicology I (3) *Omiecinski, Xia* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: A.

ENV H 515 Environmental and Occupational Toxicology II (3) *Luchtel* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: W.

ENV H 516 Environmental and Occupational Toxicology III (3) *Costa* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: Sp.

ENV H 531 Neurotoxicology (3) *Costa* Advanced discussions of the principles and methodological approaches to neurotoxicology (including behavioral toxicology), classes of neurotoxic agents, types and mechanisms of neurotoxic effects, as well as the role of neurotoxicology in toxicology and public health. Prerequisite: ENV H 514, ENV H 515, ENV H 516 or ENV H 405 or permission of instructor. Offered: even years; W.

ENV H 532 Reproductive and Developmental Toxicology (2) *Faustman* Investigates chemicals that can induce adverse reproductive and developmental outcomes. Discussion topics include identification and characterization of specific classes of toxic agents, mechanisms of action of these agents at the molecular and cellular level, and risk assessment and regulatory issues. Prerequisite: ENV H 514 and ENV H 515 or ENV H 405 or permission of instructor. Offered: even years; S.

ENV H 533 Molecular Toxicology (2) *Kavanagh, Omiecinski* Advanced discussion of molecular mechanisms whereby chemical, physical, and biological agents produce their harmful effects on biological tissues. Prerequisite: permission of instructor. Offered: jointly with PHCOL 533; even years; Sp.

ENV H 535 Inhalation Toxicology (3) *Koenig, Luchtel* Advanced course on the toxicology of air pollutants and the response of the respiratory system to inhaled gaseous and particulate toxicants. Issues and concepts covered include biology of the respiratory system, exposure technology, experimental design and methodological issues, health effects of air pollutants, and regulatory aspects. Prerequisite: ENV H 514-516, or ENV H 405 or permission of instructor. Offered: even years; A.

ENV H 545 Drinking Water and Health (3) *Samadpour* Principles, requirements of public water supply for protection of public health. Includes essential characteristics of water quality and sources, water treatment and distribution systems with associated health hazards; public health engineering, epidemiology, risk assessment; surveillance, regulatory needs to assure safe public water supplies. Prerequisite: ENV H 440 or CEE 351 or permission of instructor. Offered: A.

ENV H 546 Pesticides and Public Health (3) *Fenske, Keifer* Examines health risks and benefits associated with pesticide use in the United States and internationally; reviews exposure, toxicity, epidemiology, and regulation of pesticides, focusing on populations such as workers and children; discusses benefits derived from vector control, food production, and food preservation. Offered: odd years; W.

ENV H 550 Microscopy: Image Acquisition and Analysis (2) *Luchtel* Sample preparation methods, principles and practical aspects of light microscopy (bright-field, phase, differential interference, polarizing, and confocal), electron microscopy (transmission, scanning, electron diffraction, and energy dispersive x-ray analysis), photographic and digital imaging, computerized image analysis techniques. Student research project required. Prerequisite: permission of instructor. Offered: Sp.

ENV H 552 Environmental Chemistry of Pollution (3) *Kalman, Liu* Chemical and physical processes determining distribution and fate of chemical hazards, detection of low levels of hazardous compounds, and environmental evaluation and prediction. Fundamental chemical concepts and measurable properties of individual compounds to interpret and relate measurements. Prerequisite: admission to graduate program or permission of instructor. Offered: W.

ENV H 553 Instrumental Methods for Industrial Hygiene Measurement: Lecture (3) *Morgan* Strategy, methods, instrumentation, and theory of atmospheric sampling and analysis, emphasizing evaluation of potential occupational hazards and exposures to chemical agents. Prerequisite: ENV H 453 or permission of instructor. Offered: W.

ENV H 555 Instrumental Methods for Industrial Hygiene Measurement: Laboratory (3) *Monteith, Yost* Utilizes typical instrumental techniques and analytical methods for the evaluation of potential occupational exposures. Prerequisite: ENV H 453 and ENV H 553 or permission of instructor. Offered: Sp.

ENV H 556 Quantitative Occupational Exposure Analysis (3) *Morgan, Seixas* Exploration of industrial hygiene data to understand nature of airborne exposures in the occupational environment, and their interpretation for human health. Focus on reading and discussion of primary exposure assessment literature and statistical analysis of *real* dataset. Prerequisite: one quarter of statistics or biostatistics and basic industrial hygiene. Offered: W.

ENV H 557 Industrial Ventilation I (4) *Yost* Principles of exhaust ventilation systems, design for contaminant control in industry. Offered: W.

ENV H 559 Applied Industrial Hygiene, Safety, & Ergonomics (3) *Camp, Gleason, Johnson*

Application of occupational safety and health ergonomic principles through field investigations and classroom discussions. Teams conduct walkthrough evaluations, environmental sampling, review of health and safety programs, and development of control strategies to eliminate or reduce hazards at a local worksite. Prerequisite: ENV H 564 or 453 or equivalent. Offered: W.

ENV H 560 Organizing and Administering Industrial Safety and Health Programs (4) *Gleason* Explores industrial organization and methods of integrating safety and industrial hygiene programs with industrial operations. Philosophic issues related to industrial safety and health such as responsibility for safety, dependency on safe practice, and hierarchy of prevention are investigated. Contains numerous case problems and student involvement opportunities. Offered: A.

ENV H 562 Technical Aspects of Safety and Health (3) *Gleason* Explores specific hazards associated with major industries, as well as hazards common to all industries. Machine guarding, electrical safety, systems safety analysis, materials handling, and working at heights are among the subjects covered. Offered: W.

ENV H 564 Recognition of Health and Safety Problems in Industry (4) *Camp, Seixas* Develops skills in occupational health and safety hazard recognition in a variety of important northwest industries. Focuses on process understanding and hazard recognition skills during walk-through inspections of several local facilities, stressing a multidisciplinary approach. Offered: A.

ENV H 566 Introduction to Ergonomics (3) *Johnson, Stewart* Basic principles of ergonomics in work environment applied to problems of worker and management. Topics include measurement of physical work capacity, problems of fatigue and heat stress, applied biomechanics, worker-machine interactions and communication, design of displays and controls. Prerequisite: basic human physiology or permission of instructor. Offered: W.

ENV H 567 Mechanisms of Carcinogenesis (3) *Xia* Lectures/presentations of biochemical and molecular basis of carcinogenesis induced by environmental agents, including approaches to identification of carcinogens. Role of cell proliferation and cell death (apoptosis) in cancer formation and cancer treatment. Molecular mechanisms that regulate proliferation and apoptosis. Prerequisite: ENV H 516, ENV H 405, or permission of instructor. Offered: jointly with PHCOL 567; A.

ENV H 568 Molecular Epidemiology of Infectious Diseases (2) *Samadpour* Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: ENV H 511 or ENV H 512 or permission of instructor. Offered: jointly with EPI 568/PABIO 568; W.

ENV H 569 Occupational Biomechanics (4) *Johnson* Lectures and laboratories address human occupational biomechanical and physiological limits and measurement, analysis, and modeling techniques that are used by ergonomists for design of safe, healthful, and productive physical work. Prerequisite: ENV H 566 or permission of instructor. Offered: jointly with IND E 569; Sp.

ENV H 570 Occupational and Environmental Epidemiology (3) *Checkoway, Daniell* Research in occupational and environmental determinants of disease. Defining exposed populations, characterizing exposure levels, estimating disease risks relative to exposure. Cohort, case-control, cross-sectional designs for various health outcomes. Applications to

exposure standard setting and risk assessment. Prerequisite: EPI 511 or EPI 512, EPI 513 or permission of instructor. Offered: jointly with EPI 570; Sp.

ENV H 571 Neuroepidemiology and Environmental Risk Factors (3) Focus on neurologic diseases and etiology. Presentation of descriptive epidemiology, clinical features, and risk factors, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis, and other disorders. Discussion of NIH grantsmanship. Guest experts present some topics. Recommended: 511 or equivalent. Offered: jointly with EPI 571; odd years; W.

ENV H 572 Clinical Occupational Medicine (2) *Brodtkin* For clinicians in training, comprehensive overview of occupational disease principles, occupational history-taking, and the provider's role in workers' compensation. Epidemiologic evidence and pathophysiologic basis for occupational diseases reviewed, emphasizing organ system approach to diagnosis and management. Prerequisite: occupational medicine or preventive medicine residents/fellows, nursing students, or permission of instructor. Offered: S.

ENV H 573 Methods and Issues in Using Biological Measurements in Epidemiologic Research (3) Introduction to use of measurements from biological specimens in epidemiologic studies. Prepares epidemiology and laboratory science students for conduct of interdisciplinary human studies. Evaluation of biomarkers, preliminary studies, methodologic issues, quality control. Brief review of molecular biology. Applications and current literature discussed. Prerequisite: EPI 511 or EPI 512. Offered: jointly with EPI 573; W.

ENV H 574 Quantitative Methods for Environmental Exposure Assessment (3) *Kissel* Examination of methods used to predict human exposure to environmental contaminants. Emphasis on application to waste management strategies, site remediation, and land use. Development and use of probabilistic methods, comparison to deterministic approaches. Offered: Sp.

ENV H 577 Risk Assessment for Environmental Health Hazards (3/4) *Faustman* Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Prerequisite: ENV H 515 and BIOST 511 or permission of instructor. Offered: jointly with CEE 560/PB AF 589; A.

ENV H 580 Environmental Health Seminar (1, max. 6) Presentation of current environmental health research and environmental and public health issues. Credit/no credit only. Offered: AWSp.

ENV H 581 Environmental Health Reading I (1) *Koenig, Xia* Critical reading of selected basic and applied research publications on environmental health problems and programs. Offered: A.

ENV H 582 Environmental Health Reading II (1) Discussion of controversial and current issues facing public health and the environmental health professional. Offered: W.

ENV H 583 Environmental Health Reading III (1) Preparation and presentation of master's thesis proposal. Offered: Sp.

ENV H 584 Occupational Health and Safety: Policy and Politics (3) *Camp, Morris* Designed to provide a better understanding of the historical, political, and policy issues in occupational health and safety through selected readings and discussion with experts in the field. Particular emphasis on the Occupational Safety and Health Act. Students pres-

ent testimony in a mock congressional hearing on a health and safety issue. Offered: Sp.

ENV H 590 Selected Topics (1-6, max. 6) In-depth study of a current environmental health topic. For more information and permission, consult department program adviser. Offered: AWSpS.

ENV H 591 Current Topics in Toxicology (1, max. 6) *Kavanagh, Xia* Provides in-depth examination of current topics in environmental and occupational toxicology taken from recently published journal articles. Consists of presentations led by students, postdoctoral fellows, and faculty. Students expected to participate actively in discussion. Assigned weekly readings given according to the schedule of speakers and topics. Credit/no credit only. Offered: AWSp.

ENV H 593 Current Topics in Risk Assessment (1, max. 6) *Faustman* Examines current topics in risk assessment and risk communication with a focus on issues in environmental health. Consists of presentations led by students, postdoctoral fellows, and faculty. Students expected to participate actively in discussion. Credit/no credit only. Offered: AWSp.

ENV H 594 Current Topics in Environmental Health Technology (1, max. 2) Critical review and discussion of current scientific literature of particular relevance to the Environmental Health Technology program. Primary presentations rotate among faculty and students. Credit/no credit only. Offered: W.

ENV H 595 Research Rotation (3, max. 9) Research laboratory rotation for predoctoral graduate students. Students commit to a laboratory research project aimed at introducing the student to current methods in laboratory research, and to familiarize the student with specific faculty research interests. Prerequisite: graduate standing and permission of program director. Offered: AWSpS.

ENV H 596 Current Issues in Occupational and Environmental Medicine (2, max. 12) *Kaufman* Interdisciplinary seminar on current and emerging topics in the practice of environmental and occupational health. Faculty- and student-led presentations with an interdisciplinary focus, including occupational hygiene, nursing, and medical issues. Prerequisite: environmental health graduate student, occupational health nursing student, or permission of instructor. Offered: jointly with NURS 580; AWSp.

ENV H 599 Field Studies (2-6, max. 6) Assignment to an environmental research or service program to develop field research and evaluation skills. Credit/no credit only. Offered: AWSpS.

ENV H 600 Independent Study or Research (*) Prerequisite: permission of departmental adviser. Offered: AWSpS.

ENV H 700 Master's Thesis (*) Prerequisite: permission of departmental adviser. Offered: AWSpS.

ENV H 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of departmental adviser. Offered: AWSpS.

Epidemiology



General Catalog Web page:
www.washington.edu/students/gencat/academic/Epidemiology.html



Department Web page:
depts.washington.edu/epidem/

Graduate Program

Graduate Program Coordinator
 F262 Health Sciences, Box 357236
 206-685-1762
epi@u.washington.edu

The Department of Epidemiology offers three graduate degrees in the field of epidemiology for individuals intending to become academicians, highly qualified research specialists, or well-trained public health practitioners. The Master of Public Health degree requires course work in health services and environmental health in addition to epidemiology course work, thesis research, and a practicum. The Master of Science degree requires concentration on courses and research in epidemiology and biostatistics as preparation for technical specialization or as a prelude to the Doctor of Philosophy program. The Ph.D. course requirements differ from the M.S. program requirements primarily in the scope and complexity of research for the dissertation. Course work includes a basic series in epidemiology, biostatistics, and electives in chronic disease, infectious disease, and methodology. The department also offers postdoctoral research training.

Special Requirements

M.P.H. applicants who hold an M.D., D.V.M., D.D.S., or Ph.D.; possess a bachelor's degree and a health-related background; or seek a combined M.D./M.P.H. are considered. M.S. applications are welcomed from outstanding bachelor-level graduates, physicians, and other health professionals. Ph.D. applicants must have prior master's- or doctoral-level training in a health-related field, equivalent postbaccalaureate experience, or anticipate earning a joint M.D./Ph.D.

Financial Aid

Research training stipends are available on a limited basis. Opportunities for work on various research projects or as a teaching assistant may provide partial assistance.

Research Facilities

University facilities include well-equipped laboratories, an excellent library system, and access to computers. Various opportunities for field research are provided in Seattle and elsewhere in the state, including the Fred Hutchinson Cancer Research Center, Group Health Cooperative's Center for Health Studies, the Harborview Injury Prevention and Research Center, Public Health of Seattle-King County, and several other local hospitals and health institutions.

Faculty

Chair

Scott Davis

Professors

Alexander, E. Russell * 1990, (Emeritus); MD, 1953, University of Chicago; infectious disease epidemiology and infectious disease of children.

Austin, Melissa A. * 1988; PhD, 1985, University of California (Berkeley); genetic epidemiology of chronic diseases and public health genetics.

Becker, Thomas * 1995, (Affiliate); MA, 1976, University of New Mexico, MD, 1981, Case Western Reserve University, PhD, 1986, University of New Mexico; diagnosis and prevention of Native American cancer.

Beresford, Shirley A. * 1987; PhD, 1981, University of London (UK); nutritional epidemiology, folic acid, fruit and vegetables.

Boyko, Edward J. * 1989, (Adjunct); MD, 1979, University of Pittsburgh; epidemiology of inflammatory bowel disease and non-insulin-dependent diabetes mellitus.

Burke, Wylie 1984, (Adjunct); PhD, 1974, MD, 1978, University of Washington; ethical and policy implications of genetic information.

Checkoway, Harvey * 1987; MPH, 1975, Yale University, PhD, 1978, University of North Carolina; occupational and environmental epidemiology.

Connell, Frederick A. * 1978, (Adjunct); MD, 1972, New York University; child health, child health services research, Medicaid, community health assessment.

Daling, Janet R. * 1979; PhD, 1977, University of Washington; maternal and child health and cancer research.

Davis, Scott * 1980; PhD, 1980, University of Washington; radiation and cancer, circadian disruption and cancer, hematopoietic cancers, epidemiologic methods.

Drewnowski, Adam * 1998; PhD, 1977, Rockefeller University; taste and psychology of food choice in disease prevention.

Eisenberg, Mickey * 1978, (Adjunct); MD, 1971, Case Western Reserve University, PhD, 1978, University of Washington; sudden cardiac arrest and acute myocardial infarction.

Emanuel, Irvin * 1966, (Emeritus); MA, 1956, University of Arizona, MD, 1960, University of Rochester, MS, 1966, University of Washington; epidemiology of maternal and child health problems, growth and development.

Foy, Hjordis * 1967, (Emeritus); MD, 1953, Karolinska Institute (Sweden), PhD, 1968, University of Washington; epidemiology and control of infectious disease.

Gale, James L. * 1969; MD, 1961, Columbia University, MS, 1969, University of Washington; epidemiology and control of infectious disease, vaccine safety and public health practice.

Gates, George A. 1993, (Adjunct); MD, 1959, University of Michigan; otology/neurology, cochlear implantation.

Gloyd, Stephen S. * 1985, (Adjunct); MD, 1973, University of Chicago, MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.

Goldberg, Jack 2001, (Research); PhD, 1983, University of Illinois; chronic fatigue syndrome.

Grayston, J. Thomas * 1960; MD, 1948, MS, 1952, University of Chicago; infectious causes (Chlamydia pneumoniae) of atherosclerotic cardiovascular disease.

Handsfield, Hunter 1979, (Adjunct); MD, 1968, Columbia University; infectious diseases.

Henderson, Maureen M. * 1975, (Emeritus); MBBS, 1949, DPH, 1956, University of Durham (UK); epidemiology of chronic diseases, dietary prevention of disease.

Holmes, King K. * 1967, (Adjunct); MD, 1963, Cornell University, PhD, 1967, University of Hawaii; clinical epidemiology and pathogenesis of infectious diseases.

Kimball, Ann M. * 1992; MD, 1976, MPH, 1981, University of Washington; emerging infections, public health response to epidemic disease.

King, Mary-Claire * 1995, (Adjunct); PhD, 1973, University of California (Berkeley); genetic analysis of complex human phenotypes, human diversity and evolution.

Koepsell, Thomas D. * 1979; MD, 1972, Harvard University, MPH, 1979, University of Washington; injuries, neuroepidemiology, veterans health, epidemiologic methods, program and policy evaluation.

Koutsky, Laura A. * 1981; PhD, 1987, University of Washington; sexually transmitted diseases, HIV, etiology and natural history of cervical neoplasia.

Kristal, Alan R. * 1987; DPH, 1983, Columbia University; nutritional epidemiology, dietary behavior, nutrition intervention, and cancer control.

Kukull, Walter A. * 1981; PhD, 1984, University of Washington; neurological disease etiology, aging and methodology; focus on Alzheimer's disease.

Lacroix, Andrea Z. * 1989; PhD, 1984, University of North Carolina; older women's health, osteoporosis, cardiovascular disease, cancer prevention.

Longstreth, W. T., Jr. * 1981, (Adjunct); MD, 1975, University of Pennsylvania, MPH, 1982, University of Washington; neurology.

Marcuse, Edgar K. 1971, (Adjunct); MD, 1967, Stanford University, MPH, 1973, University of Washington; general pediatrics.

Martin, Diane P. * 1978, (Adjunct); MA, 1972, Temple University, PhD, 1979, University of Washington; research methods; health services quality, use, and outcomes.

Moolgavkar, Suresh H. * 1984; MBBS, 1965, Bombay University (India), PhD, 1973, Johns Hopkins University; cancer epidemiology, development of quantitative methodology.

Mueller, Beth A. * 1984; DPH, 1984, Tulane University; epidemiology of perinatal and reproductive diseases, cancer, and injury research.

Oberle, Mark W. 1988; MD, 1974, Johns Hopkins University; public health; Native American health.

Patrick, Donald L. * 1987, (Adjunct); MS, 1968, PhD, 1972, Columbia University; health status and quality of life, end of life, adolescents.

Perine, Peter L. * 1981; MD, 1966, University of Kansas, MPH, 1973, University of Washington; international health, sexually transmitted diseases.

Potter, John D. * 1995; MBBS, 1971, PhD, 1984, University of Queensland (Australia); colorectal cancer etiology, gene-environment interaction, early detection, molecular epidemiology.

Probstfield, Jeffrey L. 1993, (Adjunct); MD, 1967, University of Washington; cardiology.

Psaty, Bruce M. * 1984; PhD, 1979, MD, 1981, Indiana University; cardiovascular disease, coronary heart disease, hypertension, pharmacoepidemiology.

Rivara, Frederick P. * 1984, (Adjunct); MD, 1974, University of Pennsylvania; pediatric epidemiology and injury prevention and research.

Rosendaal, Frits R. * 1994, (Affiliate); MD, 1985, Erasmus University of Rotterdam (Netherlands), PhD, 1989, University of Leiden (Netherlands); clinical and genetic epidemiology of hemostasis and thrombosis.

Sever, Lowell E. * 1991, (Affiliate); PhD, 1973, University of Washington; perinatal epidemiology, particularly reproductive effects of occupational and environmental exposure.

Shy, Kirkwood K. * 1979, (Adjunct); MD, 1973, Wayne State University; epidemiologic applications to problems in obstetrics and gynecology.

Siscovick, David S. * 1987; MD, 1976, University of Maryland; epidemiology.

Stamm, Walter E. * 1979, (Adjunct); MD, 1971, Harvard University; infectious disease.

Stanford, Janet L. * 1986; PhD, 1985, Johns Hopkins University; cancer epidemiology and genetic susceptibility.

Thomas, David B. * 1979; MD, 1963, University of Washington, DPH, 1972, Johns Hopkins University; cervix and breast carcinoma epidemiology.

Vaughan, Thomas L. * 1982; MD, 1978, University of Illinois, MPH, 1983, University of Washington; cancer, environmental epidemiology.

Weiss, Noel S. * 1975; MD, 1967, Stanford University, DPH, 1971, Harvard University; chronic disease epidemiology.

White, J. Emily * 1982; PhD, 1982, University of Washington; cancer epidemiology and prevention.

Williams, Michelle A. * 1991; ScD, 1991, Harvard University; reproductive and perinatal epidemiology, cancer epidemiology.

Associate Professors

Astley, Susan J. * 1980; PhD, 1990, University of Washington; chronic childhood diseases.

Chu, Joseph * 1982, (Affiliate); MD, 1975, Georgetown University; gynecologic cancer epidemiology, perinatal epidemiology, health services research.

Critchlow, Cathy W. * 1979; PhD, 1993, University of Washington; epidemiology of sexually transmitted diseases; HIV prevention, diseases of oral cavity.

Cummings, Peter * 1992; MD, 1970, Case Western Reserve University, MPH, 1993, University of Washington; injury epidemiology, emergency medicine, epidemiologic methods.

Davis, Robert L. * 1991; MD, 1983, University of California (San Diego), MPH, 1993, University of Washington; childhood immunization, including adverse events perinatal and pediatric epidemiology.

Elmore, Joann G. 1996, (Adjunct); MD, 1987, Stanford University, MPH, 1992, Yale University; clinical epidemiology, breast cancer screening, diagnostic accuracy.

Farrow, Diana C. * 1991; MA, 1985, PhD, 1989, University of Washington; cancer epidemiology.

Goldbaum, Gary M. *; MD, 1978, University of Colorado (Denver), MPH, 1989, University of Washington; preventive medicine, chronic diseases prevention, injury.

Haselkorn, Jodie K. * 1985, (Adjunct); MD, 1985, Louisiana State University; health services for the dis-

abled; diagnostic accuracy of tests, effectiveness of interventions.

Heckbert, Susan R. * 1990; MD, 1981, Case Western Reserve University, MPH, 1987, PhD, 1990, University of Washington; clinical and cardiovascular epidemiology, pharmacoepidemiology, pharmacogenetics.

Helgeson, Steven D. * 1990, (Clinical); MD, 1973, University of Washington, MPH, 1975, University of Washington; public health practice and epidemiologic field investigation.

Holt, Victoria L. * 1989; MPH, 1987, PhD, 1990, University of Washington; women's reproductive health, intimate partner violence.

Hujoel, Philippe P. 1989, (Adjunct); DDS, 1984, University of Brussels (Belgium), MSD, 1986, PhD, 1993, University of Washington.

Jackson, Lisa A. * 1988; MD, 1988, University of Virginia, MPH, 1996, University of Washington; infectious disease epidemiology, assessments of vaccine safety and effectiveness.

Jarvik, Gail P. * 1991, (Adjunct); PhD, 1986, University of Michigan, MD, 1987, University of Iowa; quantitative genetics and genetic epidemiology, focusing on common diseases.

Kaufman, Joel D. * 1988, (Adjunct); MD, 1986, University of Michigan, MPH, 1990, University of Washington; occupational and environmental epidemiology; etiologic research and public health surveillance.

Kestin, Mark * 1990, (Affiliate); PhD, 1989, Flinders University (Australia), MPH, 1990, Harvard University; relationship between nutrition, cancer and cardiovascular disease.

Martin, Michael D. * 1986, (Adjunct); DMD, 1979, University of Kentucky, MA, MPH, 1989, PhD, 1993, MSD, 1994, University of Washington; dental education in oral health care of persons with disability.

McGrath, Barbara B. * 1987, (Adjunct Research); PhD, 1993, University of Washington; ethnographic studies with U.S. Pacific Islanders on health issues, specifically, HIV/AIDS prevention.

McTiernan, Anne * 1989; PhD, 1982, University of Washington; breast and colon cancer, women's health, exercise and obesity.

Moore, Donald E. 1977, (Adjunct); MD, 1967, Case Western Reserve University; reproductive endocrinology.

Patterson, Ruth E. * 1994; PhD, 1992, University of North Carolina; dietary assessment in adult populations, dietary change, vitamin supplements in cancer prevention.

Pendergrass, Thomas W. 1978, (Adjunct); MD, 1971, University of Tennessee, MPH, 1979, University of Washington; hematology, oncology.

Reiber, Gayle * 1991; MPH, 1975, Johns Hopkins University, PhD, 1989, University of Washington; epidemiology and health services research on preventing complications of diabetes.

Reiner, Alexander P. 2001, (Research); MD, 1984, Johns Hopkins University, MS, 2001, University of Washington.

Rossing, Mary Anne * 1988; DVM, 1980, University of Illinois, PhD, 1993, University of Washington; cancer epidemiology, particularly cancers of the reproductive system.

Schwartz, Stephen Marc * 1989; PhD, 1990, University of Washington; cancer, cardiovascular dis-

ease, reproductive conditions; molecular/genetic epidemiology; methods.

Stehr-Green, Paul 1995; DPH, 1982, University of Pittsburgh; chronic, infectious, vaccine-preventable diseases, environmental health, health-care delivery.

Weigler, Benjamin J. * 1997, (Adjunct); DVM, 1986, Colorado State University, MPH, 1988, University of California (Berkeley), PhD, 1991, University of California (Davis); infectious disease epidemiology in laboratory animal medicine and management.

Zhao, Lue-Ping * 1985, (Affiliate); PhD, 1989, University of Washington; methods for genetic epidemiology, family studies of breast and colorectal cancers.

Assistant Professors

Cheney, Carrie L. * 1990; PhD, 1989, University of Washington; nutrition in autism spectrum disorder; role of nutrition in cancer prognosis, secondary prevention.

Duchin, Jeffrey S. 1995, (Adjunct); MD, 1985, Rutgers University; infectious diseases and epidemiology.

Edwards, Karen L. * 1991; PhD, 1996, University of Washington; genetic epidemiology, public health genetics, diabetes, cardiovascular disease.

Hitti, Jane 1993, (Adjunct); MD, 1989, University of Vermont, MPH, 1995, University of Washington; perinatal medicine, HIV and pregnancy.

John Stewart, Grace C. 1992, (Adjunct); MD, 1987, University of Michigan, MPH, 1995, University of Washington; mother-to-child HIV-1 transmission (specifically, Africa, cofactors, breastmilk).

Lampe, Johanna W. * 1998, (Research); MS, 1982, PhD, 1990, University of Minnesota; gene-diet interactions and cancer susceptibility: phytochemicals, biotransformation enzymes, colon.

Malone, Kathleen E. * 1994, (Research); PhD, 1993, University of Washington; breast cancer: etiology, prognosis, and genetics.

Mock, Charles N. * 1992; MD, 1980, Brown University; injury: epidemiology, prevention, treatment; especially in less-developed countries.

Reed, Susan D. 1991, (Adjunct); MS, 1979, Sarah Lawrence College, MD, 1986, Stanford University; gynecology, evidence-based medicine and clinical outcomes studies, hormone replacement therapy.

Stehman-Breen, Catherine O. 1990, (Adjunct); MD, 1990, University of Chicago, MS, 1996, University of Washington; cardiovascular epidemiology among patients with end-stage renal disease.

Stevens, Nancy G. * 1982, (Adjunct); MD, 1979, MPH, 1982, University of Washington; family medicine.

Tsu, Vivien D. * 1992, (Affiliate); PhD, 1991, University of Washington; maternal and child health in developing countries.

Tsuang, Debby W. 1992, (Adjunct); MD, 1988, University of Iowa; genetics of schizophrenia and late-life dementia.

Vanderstoep, Ann 1994, (Adjunct); PhD, 1997, University of Washington.

Wald, Anna * 1989; MD, 1985, Mt Sinai School of Medicine, MPH, 1994, University of Washington; the epidemiology, natural history and therapeutics of HSV and other herpes viruses infections.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crsclat/.

Epidemiology

EPI 420 Introduction to Epidemiology (3) NW For the undergraduate student wishing to devote only one quarter to a course in epidemiologic methods. Description of ways in which variation in disease occurrence is documented and how that variation is studied to understand causes of disease. Offered: Sp.

EPI 497 Epidemiology Special Electives (*) Off-campus course for medical students. Offered: AWPpS.

EPI 499 Undergraduate Research (*) Offered: AWPpS.

Courses for Graduates Only

EPI 501 Public Health Practice at the Local Level (3) *Gale, Thompson* Basic overview of state and local public health practice with leaders in the field and case studies focusing on rural and urban public health challenges. Offers preparation for practice in public health agencies. Prerequisite: HSERV 511 or permission of instructor. Offered: jointly with HSERV 501.

EPI 505 Basic Epidemiologic and Biostatistical Methods (5) Epidemiologic concepts and methods to describe disease variation and how that variation is studied to understand causes of disease or adverse events. Includes introduction to basic biostatistical concepts. Written exercises, electronic discussion forums, and applications of epidemiologic research strategies to the critical review of scientific literature. Offered: jointly with BOST 505.

EPI 510 Epidemiologic Data Analysis (2) *Critchlow* Intended for students planning to take 514. Introduces skills and concepts to effectively analyze large data sets for case-control and cohort studies. A beyond-theory approach provides students hands-on experience in using epidemiologic data sets for stratified or multivariate analyses with SAS. Credit/no credit only. Prerequisite: EPI 511 or EPI 512. Offered: W.

EPI 511 Introduction to Epidemiology (3-4) *Kukull* Epidemiologic methods for non-epidemiology majors. Focuses on research designs and methods to describe disease occurrence and risk factor associations; uses quantitative and biomedical information to infer whether causal relationships exist between potential causes and disease in populations. Prerequisite: permission of instructor. Offered: A.

EPI 512 Epidemiologic Methods I (4) *Koepsell, Weiss* Principles and methods of epidemiology. Covers measures of disease frequency, measures of effect, causal inferences, descriptive epidemiology, study types, misclassification, and effect modification. Designed for students who want to take 513. Prerequisite: prior or concurrent enrollment in BOST 511 or equivalent. Offered: A.

EPI 513 Epidemiologic Methods II (4) *Koepsell, Weiss* Continuation of 512. Considers how designs of epidemiologic studies may be constructed to maximize etiologic inferences. Covers confounding, randomized trials, cohort studies, case-control studies, and selected topics. Prerequisite: EPI 512. Offered: W.

EPI 514 Application of Epidemiologic Methods (4) *Critchlow, Mueller* Practical experience in analysis of data. Students analyze data sets currently on file using contemporary epidemiologic methods as taught in 512 and 513. Prerequisite: EPI 510 or experience in programming; EPI 512, EPI 513 and epidemiology major. Offered: Sp.

EPI 515 Topics in Epidemiologic Methods (3) *Davis* Introduces advanced methodologic methods, including recursive partitioning, developing clinical prediction rules, analyses of community-level associations or interventions, case-crossover and case-only designs, propensity scores, two-stage sampling, and missing data imputation. Prerequisite: EPI 512; EPI 513. Offered: jointly with BOST 519. A.

EPI 516 Statistical Methods in Genetic Epidemiology (3) *Monks* Theory and application of statistical techniques used in genetic epidemiology. Includes discussion of association studies, linkages and segregation analyses. Examples stressed with reference to assumptions and limitations. Prerequisite: either BOST 513 or BOST 518; PHG 511/EPI 517; or permission of instructor. Offered: jointly with BOST 516/PHG 519.

EPI 517 Genetic Epidemiology (3) *Austin* Research methods for evaluating genetic influences on disease and risk factors and genetic-environmental interactions. Study designs and statistical methods include twin studies, family studies, population-based association studies, segregation analysis, and linkage analysis. Prerequisite: EPI 511, BOST 511, and GENET 371, or equivalent. Offered: jointly with PHG 511.

EPI 518 Computer Demonstrations in Genetic Epidemiology (2) *Edwards* Demonstrations and use of computer programs designed specifically for analysis of genetic epidemiologic data, including heritability, segregation, and sib-pair linkage analysis. Discussions focus on interpretation of results. Laboratory sections apply methods to data provided by instructor. Corequisite: EPI 517/PHG 511 or permission of instructor. Offered: jointly with PHG 518.

EPI 519 Epidemiology of Cardiovascular Disease (3) *Psaty, Siscovick* Principles, methods, and issues in the epidemiology of cardiovascular disease. Focuses on coronary heart disease and its major risk factors; also covers other topics such as stroke and sudden death. The format includes informal lectures and discussions of the current literature. Prerequisite: EPI 511 or EPI 512, EPI 513. Offered: A.

EPI 520 Epidemiology of Infectious Diseases (3) *Jackson* Infectious diseases from a public health perspective. Topics include analytic methods, study design, outbreak investigations, surveillance, vaccine evaluations, global eradication, screening, modeling, and infectious causes of chronic diseases. Homework and discussion based on current examples from the published literature. Prerequisite: EPI 511, EPI 512, or permission of instructor. Offered: odd years; W.

EPI 521 Epidemiology of Maternal and Child Health Problems (4) *Williams* Contributions to understanding and prevention of major maternal and child health problems, including pregnancy outcome, infant and child morbidity and mortality, maternal morbidity and mortality, abnormal child growth and development, and early-life factors in adult health problems. Prerequisite: graduate, medical, or dental school standing and EPI 511 or EPI 512 or permission of instructor. Offered: jointly with HSERV 542; W.

EPI 522 Reproductive Epidemiology (3) *Holt* Focus on conditions and diseases of the female reproductive system, as well as pregnancy outcomes other than birth. Presentation of current epidemiologic knowledge and discussion of issues on topics including contraception; infertility; spontaneous abortion;

induced abortion; breast, uterine, and ovarian disease; and menopause. Prerequisite: EPI 511 or EPI 512-513. Offered: odd years; A.

EPI 523 Injury Epidemiology (3) *Cummings* Discussion of research methods which are useful in studying the causes of injury and outcomes after injury. Information regarding the impact of injuries on health and known or suspected risk factors for some injuries. Assigned readings from literature in the field. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: Sp.

EPI 524 Epidemiologic Studies of Cancer Etiology and Prevention (3) *Thomas, Ulrich* Current knowledge of the role of environmental factors (e.g., smoking, hormonal, nutrition, viral, radiation) and genetic susceptibility in the etiology of several major cancers. Illustrates principles and conduct of research in cancer etiology and cancer prevention. Prerequisite: EPI 511 or EPI 513. Offered: A.

EPI 525 Topics in Preventive Medicine (2) *Goldbaum* Examines current scientific knowledge and state of the art of preventive medical interventions. Discusses and considers options for current practice. Recommended for MDs, RNs, and others with a clinical background. Credit/no credit only. Offered: jointly with HSERV 505.

EPI 526 Epidemiology of Diseases Communicable from Nature (3) *DiGiacomo, Rausch, Weigler* Explores the public health aspects of zoonotic diseases, their epidemiology and approaches to control. Focuses on the major viral, rickettsial, bacterial, protozoal, helminthic, and fungal diseases transmitted from wild and domesticated animals to humans. Prerequisite: EPI 511, EPI 512, or EPI 520 or permission of instructor. Offered: jointly with C MED 526; Sp.

EPI 528 Exposure Measurement in Epidemiology (3) *White* Principles and methods of measuring exposures and covariates in epidemiological studies. Validity and reliability of measures, questionnaire design, effects of measurement error, maximizing response rates, quality-control procedures, measurement of specific exposures. Credit/no credit only. Prerequisite: EPI 513. Offered: Sp.

EPI 529 Emerging Infections of International Public Health Importance (3) *Kimball* Overview of current emerging infections worldwide and contributing factors. Design of a surveillance and prevention strategy required. Offered: jointly with HSERV 536; in residence, even years; online, odd years; W.

EPI 530 AIDS: A Multidisciplinary Approach (2) *Koutsky* Comprehensive overview of the public health, clinical, and laboratory aspects of human immunodeficiency virus (HIV) infection and disease. Topics include the pathogenesis, natural history, and management of HIV infections. The impact of HIV/AIDS on community and global health care and prospects for prevention and control. Credit/no credit only. Offered: jointly with MED 530; A.

EPI 531 Problems in International Health (4) *Gloyd* Explores social, political, economic, environmental determinants of developing countries' health; traces development of societal responses to problems. Includes: origins of primary health care; child survival; traditional systems; population; water; sanitation; international agencies; impact of economic policies. Case study formulating pharmaceutical policy in a developing country. Offered: jointly with HSERV 531; A.

EPI 532 Epidemiology of Infectious Diseases of Third-World Importance (3) *John, Kreiss* A review of major infectious disease problems of the developing world, including AIDS, malaria, tuberculosis, measles, and diarrhea, with an emphasis on public health control strategies. Offered: odd years; Sp.

EPI 533 Pharmacoepidemiology (3) *Heckbert, Johnson* Overview of pharmacoepidemiology including drug development and approval; application of epidemiologic methods to study drug safety and effectiveness; exploration of the interplay between research and public policy; introduction to resources for information about drugs; introduction to pharmacology principles pertinent to pharmacoepidemiology. Prerequisite: graduate student or with permission. Offered: jointly with PHARM 533.

EPI 536 Categorical Data Analysis in Epidemiology (4) Summary of univariate categorical data analysis; introduction to multivariate analysis of categorical epidemiologic data using multiplicative models. Experience at interpretation; familiarity with available programs gained by analysis of bona fide data, critiques of analyses appearing in literature. Prerequisite: BOST 515, or EPI 514 and either BOST 513 or BOST 518, or permission of instructor. Offered: jointly with BOST 536/A.

EPI 537 Survival Data Analysis in Epidemiology (4) Introduction to the multivariate analysis of survival data using multiplicative models. Application to epidemiologic studies. Familiarity with interpretation and available computer programs gained by analysis of bona fide sets of data and critiques of analyses appearing in the literature. Prerequisite: EPI 536 or permission of instructor. Offered: jointly with BOST 537/W.

EPI 538 Nutritional Epidemiology (3) *Beresford, Drenowski* Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: jointly with NUTR 538; A.

EPI 539 Research Methods in Developing Countries (3/4) *Gloyd, Mock* Simple, practical methodologies to obtain and validate information regarding health status and health services in developing countries. Usefulness, validity, limitation of vital records, health reports, household (and cluster) surveys, nutritional anthropometry, and qualitative methods discussed. Lectures, computer lab, and student participation in community-based survey. Offered: jointly with HSERV 539; W.

EPI 542 Clinical Epidemiology (2) *Weiss* Principles and methods involved in studying outcome of illness. Prerequisite: EPI 511, or EPI 512 and EPI 513. Offered: S.

EPI 544 Maternal and Child Health in Developing Countries (3) *Mercer* Emphasizes critical health problems of women and children in developing countries in social, economic, and cultural contexts. Practical approaches to developing MCH programs shared via lecture/discussions, exercises, and small group work. Students acquire skills in baseline assessment, setting objectives, planning and evaluating interventions, and involving communities. Offered: jointly with HSERV 544; Sp.

EPI 546 Psychosocial Epidemiology (3) *Vande Stoep* Application of epidemiological methods to the study of mental illnesses. Topics include occurrence and distribution of mental illness, classification of psychiatric disorders; treatment-based vs. community-based studies; epidemiology of depression and schizophrenia; familial transmission; developmental epidemiology; mental illness and violence. Prerequisite: one course in epidemiology or permission of instructor. Offered: jointly with PBSCI 546; Sp.

EPI 568 Molecular Epidemiology of Infectious Diseases (2) *DiGiacomo, Samadpour, Roberts* Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of

molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: jointly with ENV H 568/PABIO 568. Offered: W.

EPI 570 Occupational and Environmental Epidemiology (3) *Checkoway* Research methods for studying occupational and environmental determinants of disease. Defining exposed populations, characterizing exposure levels, estimating disease risks relative to exposure. Cohort, case-control, cross-sectional designs for various health outcomes. Applications to exposure standard setting and risk assessment. Prerequisite: EPI 511 or EPI 512, EPI 513 or permission of instructor. Offered: jointly with ENV H 570; Sp.

EPI 571 Neuroepidemiology and Environmental Risk Factors (3) *Kukull* Focus on neurologic diseases and etiology. Presentation of descriptive epidemiology, clinical features, and risk factors, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis, and other disorders. Discussion of NIH grantsmanship. Guest experts present some topics. Recommended: 511 or equivalent. Offered: jointly with ENV H 571; odd years; W.

EPI 573 Methods and Issues in Using Biological Measurements in Epidemiologic Research (3) *Schwartz* Introduction to use of measurements from biological specimens in epidemiologic studies. Prepares epidemiology and laboratory science students for conduct of interdisciplinary human studies. Evaluation of biomarkers, preliminary studies, methodologic issues, quality control. Brief review of molecular biology. Applications and current literature discussed. Prerequisite: EPI 511 or EPI 512. Offered: jointly with ENV H 573; W.

EPI 580 Geographic Information Systems (2) *Hoskins, Shields* Public-health practice and epidemiologic problem solving using data from geographic information systems. Calculating rates of disease using smoothing methods for adjustment, geocoding addresses of health-outcome data including death and cancer incidence for outbreak investigations and spatial analysis, principles of cartography, basic spatial statistics (spatial modeling, autocorrelation, confounding). Offered: A.

EPI 583 Epidemiology Seminar (1, max. 3) Presentation of current epidemiologic research and application of epidemiologic research in the practice of public health. Offered: AWSp.

EPI 588 Preparing and Writing Research Proposals (2) *Kristal, Reiber* Experience in preparing, organizing, and writing research proposals, following NIH and AHRQ guidelines. Includes weekly assignments and didactic exercises, leading to final research proposal. All students participate in mock study section to review and critique proposals. Credit/no credit only. Prerequisite: second-year graduate student (PhD recommended), or PhD or MD in health-related field. Offered: even years; A.

EPI 590 Selected Topics in Epidemiology or International Health (1-6, max. 6) 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: EPI 511. Also a special summer format presenting introductory material. May be taken with ENV H 590 and/or HSERV 590. For more information and permission, consult the department program adviser. Offered: AWSpS.

EPI 591 Current Literature in Epidemiology (1) Articles pertaining to epidemiology and related subjects selected from the current literature to be distributed and read by all participants. Faculty members and enrolled students alternate being responsible for conducting sessions and choosing articles to read.

Credit/no credit only. Prerequisite: EPI 513. Offered: AWSp.

EPI 592 Program Seminars (1-6, max. 6) Graduate seminars organized to address specific educational needs of students in various specialized programs within the Department of Epidemiology (i.e., Maternal and Child Health). Prerequisite: permission of instructor. Offered: AWSpS.

EPI 593 Cancer Prevention Research Laboratory (3) *White* Research experience for pre- and postdoctoral students working on cancer prevention projects at the Fred Hutchinson Cancer Research Center. Credit/no credit only. Offered: jointly with BOST 593; AWSpS.

EPI 595 Epidemiology Master's Practicum (1-6, max. 6) Supervised practice experience providing students an opportunity to learn how epidemiology is applied in a public health setting and in the formulation and application of public health policy. Credit/no credit only. Prerequisite: EPI 512 and BOST 511 or equivalent and permission of instructor; recommended: EPI 501. Offered: AWSpS.

EPI 600 Independent Study or Research (*) Credit/no credit only. Prerequisite: permission of departmental adviser and independent study supervisor. Offered: AWSpS.

EPI 700 Master's Thesis (*) Credit/no credit only. Prerequisite: permission of departmental adviser. Offered: AWSpS.

EPI 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Public Health Genetics

Courses for Graduates Only

PHG 509 Multidisciplinary Communication in Public Health Genetics (2) *Watts* Focuses on effective communication in a multi-disciplinary context. Students will read and critique published public health genetics literature, and learn and apply principles of effective written and oral communication to public health genetics topics of their choice. Credit/no credit only. Offered: jointly with HSERV 509.

PHG 510 Genetic Principles for Public Health (3) *Austin, Doyle, Leboeuf* Basic principles of human genetics in a public health context; the molecular components of life, organization of the genome, gene expression, recombinant DNA technology, gene regulation, Mendelian inheritance, quantitative genetics, nutrition and gene expression, mitochondrial inheritance, gene mapping, gene-environment interactions, Human Genome Project, and genetic service in public health.

PHG 511 Genetic Epidemiology (3) *Austin, Edwards* Research methods for evaluating genetic influences on disease and risk factors and genetic-environmental interactions. Study designs and statistical methods include twin studies, family studies, population-based association studies, segregation analysis, and linkage analysis. Prerequisite: EPI 511, BOST 511, and GENET 371, or equivalent. Offered: jointly with EPI 517.

PHG 512 Legal, Ethical, and Social Issues in Public Health Genetics (3) *Kusler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with LAW E 562/MHE 514.

PHG 513 Basic Concepts in Pharmacogenetics and Toxicogenomics (3) *Eaton, Thummel* Addresses current DNA sequencing and genotyping approaches, and basic concepts of pharmacogenetics and

toxicogenomics. Emphasis placed on applications of genomic technologies to the understanding of "gene-environment interactions" that cause diseases of public health importance, including cancer, chronic neurological diseases, and adverse drug reactions. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H 513/PCEUT 513.

PHG 514 Animal Models and Public Health Genetics (2) *LeBoeuf* Contributions of animal models to studies of human diseases. Concepts of multi-genetic diseases, chromosomal mapping, quantitative traits with emphasis on diseases of major public health impact. Interaction between inheritance and nutrition. Focus on mouse genetics. Prerequisite: GENET 371, PHG 513, or permission of instructor. Offered: jointly with NUTR/PABIO 514.

PHG 518 Computer Demonstrations in Genetic Epidemiology (2) *Edwards* Demonstrations and use of computer programs designed specifically for analysis of genetic epidemiologic data, including heritability, segregation, and sib-pair linkage analysis. Discussions focus on interpretation of results. Laboratory sections apply methods to data provided by instructor. Corequisite: EPI 517/PHG 511 or permission of instructor. Offered: jointly with EPI 518.

PHG 519 Statistical Methods in Genetic Epidemiology (3) Theory and application of statistical techniques used in genetic epidemiology. Includes discussion of association studies, linkages and segregation analyses. Examples stressed with reference to assumptions and limitations. Prerequisite: either BIOST 513 or BIOST 518; PHG 511/EPI 517; or permission of instructor. Offered: jointly with BIOST/EPI 516.

PHG 521 Socio-Cultural Perspectives of Public Health Genetics (3) *McGrath* Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with NURS 582/ANTH 574.

PHG 522 Ethical Frameworks for Public Health Genetics (2) *Mastroianni* Case-based application of ethical principles in genetic medicine to range of problems arising in genetics practice, policy, research. Examination of traditional problems including eugenics and testing/screening for genetic disease, as well as emerging problems in population and environmental genetics. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with MHE 516.

PHG 523 Genetics and the Law (2) *Kuszler* Considers the legal issues arising from new genetic technologies and information. Statutes, regulations, and cases used to demonstrate the constitutional, contract, and tort law complications resulting from dissemination of these technological advances. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with LAW E 564.

PHG 532 Statistical Methods in Medical Genetics (2) *Wijmsman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications with stressed with reference to assumptions and limitations. Data sets analyzed with current computer programs. Offered: jointly with BIOST/MED 532.

PHG 537 Pharmacoeconomics, Genetics, and Health Care (2) *Ramsey, Veenstra* Introduction to outcomes research and economic evaluation related to pharmaceuticals and genetic technologies. Covers cost-effective analysis and quality of life evaluation. Discusses the use of economic evaluation in health-care to affect policy decisions.

PHG 580 Interactive Seminar (1, max. 6) *Veenstra* Seminar series on topics related to public health genetics, including current bioethical, legal, medical, biotechnology, and public policy issues.

PHG 590 Selected Topics in Public Health Genetics (1-6, max. 6) Tutorials are arranged for a small number of students for in-depth examination of an area of public health genetics, usually of a current nature.

PHG 595 Master's Practicum (1-12, max. 12) Supervised practice experience providing students an opportunity to learn how genetics is applied in a public health setting and in the formulation and application of public health policy. Prerequisite: EPI 517/PHG 511, LAW E 562/MHE 514/PHG 512, ENV H/PABIO/PCEUT/PHG 513, or permission of instructor.

PHG 600 Independent Study or Research (*) Credit/no credit only.

PHG 700 Master's Thesis (*) Credit/no credit only.

Health Services

 *General Catalog Web page:*
www.washington.edu/students/gencat/academic/Health_Svcs.html

 *Department Web page:*
depts.washington.edu/hserv/

Graduate Program

Graduate Program Coordinator
H660 Health Sciences, Box 357660
206-616-2926
hsinfo@u.washington.edu

The Department of Health Services offers a two-year graduate program in health services leading to the Master of Public Health or Master of Science degree. The M.P.H. degree prepares future health practitioners, managers, and researchers to conduct the unfinished work of improving the well-being of communities in the United States and throughout the world. Graduates take jobs in health system management, health program design and evaluation, health promotion, public health practice, and policy analysis. Beginning autumn 2002, the department will offer an M.P.H. in community-oriented public health practice. This new degree program will use problem-based learning methods, and will integrate classroom instruction and experiential fieldwork to prepare students to work in community and public health practice settings. Students may also pursue any of the M.P.H. specialty options. The department also offers a three-year extended degree program in community-health management, leading to the M.P.H. degree for employed professionals working full-time.

The department also maintains primary responsibility for the graduate program in Health Services Administration (an interdisciplinary degree-granting program of the Graduate School described in the Interdisciplinary Graduate Degree Programs section of this catalog). An executive evening/weekend M.H.A. degree for clinical health-care professionals was established winter quarter of 1998. The M.H.A. degree provides full academic preparation for careers in management and policy positions in health systems, hospitals, medical groups, health plans and other types of health care organizations. The department offers a Ph.D. in health services and participates in the training of doctoral students from other departments on campus by offering a specialization in health services under the Doctoral Studies Program.

Master of Public Health and Master of Science

The M.P.H. and M.S. programs in health services give priority to individuals who have completed their professional training in fields such as medicine, dentistry, or nursing, or who have had substantial experience in the health field. The M.P.H. program provides broad-based public health skills, while the M.S. provides more focused health services research skills. These programs offer a general curriculum that includes introduction to health systems, epidemiology, current issues regarding the provision of medical care, methodological training for research and program evaluation, and preparation of a thesis. In addition, the M.P.H. program requires a practicum experience, an introductory course in environmental health, and a social and behavioral science course. Examples of areas of concentration include studies of patient and provider behavior; evaluation of local, state, and federal health programs; and the impact of technology on medical-care costs and benefits. The programs are organized into four tracks: community medicine, international health, maternal and child health, and social and behavioral sciences. International health, and maternal and child health are offered jointly with the Department of Epidemiology.

The M.P.H. in *Community-Oriented Public Health Practice* (CO/PHP) offers an innovative method of public health training that prepares students to be effective problem-solvers, innovators, advocates, and leaders in addressing community health problems. Graduates are prepared to work in such varied settings as community and public health agencies, managed care organizations, federal programs, and advocacy and philanthropic associations. The CO/PHP program combines problem-based learning and experiential learning, approaches that are especially effective for adult learners who are seeking to integrate rigorous academic training and practice. During the first year, students select from a range of community-based field placements that help them acquire practical skills. In the second year, students select a community-based setting for a final degree (capstone) project.

The *Community Medicine* M.P.H. option provides a generalist approach to public health. Students take the core courses for the M.P.H., then tailor their programs to their own career goals. Because there are fewer specific course requirements for this track, applicants must have well-defined goals that are compatible with the areas of expertise represented on the faculty. This track is best suited for fellows and scholars pursuing studies after receiving an M.D., R.N., or other health degree.

The *Maternal and Child Health* M.P.H. option provides an interdisciplinary approach to the wide variety of factors that influence the health and health care of women and children. It is an interdepartmental program offered jointly by the Departments of Health Services and Epidemiology. Students must choose to major in one of these departments; however, all students are exposed to a core content that includes basic epidemiological, behavioral, sociological, political, and economic aspects of maternal and child health. The MCH program combines practical and classroom experience to give students an in-depth understanding of the behavioral, biological, social, and environmental factors that influence health and illness in maternal and child populations; competency in public health research, analytic methods, and core functions; skills in program management; and supervised experience in applying science and management tools to the planning, development and evaluation of health programs and policy. The MCH program is designed primarily for individuals with clinical or public health experience who seek advanced training to assume increased responsibility.

ty for program management, policy formation, assessment, evaluation and research.

The *International Health* M.P.H. option is offered jointly in the Departments of Health Services and Epidemiology. The International Health Program (IHP) promotes understanding of the determinants of population health, and teaches skills necessary for planning, implementation, and evaluation of health programs for developing countries and other marginalized populations. The program's goal is to balance teaching, research, and service to contribute to improvements in health at home and worldwide. The program focuses on community health and primary health-care systems, employing epidemiological and qualitative research skills to bear. The curriculum addresses the social, political, economic, environmental, geographical, and health-systems factors that have an impact on health. Requirements include completion of core M.P.H. courses, IHP elective coursework, a public health practicum, and a thesis project on a topic related to health in developing countries. Students are encouraged to carry out their thesis projects in an international setting. Substantial health-related experience in a developing country setting is generally required for admission.

The *Social and Behavioral Sciences* M.P.H. option focuses the study, thought, and practice of public health on the cultural, social, political, economic, and behavioral determinants of population health and the promotion of health through community action, health communications, group-level interventions, and individual behavior change. Students may plan a course of study concentrating on health behavior and health promotion or social determinants of health and community intervention. Both research and practice emphases can be applied to many different areas of public health. Students may pursue concurrent degrees with other schools and departments of the University.

Students in the academic options in Health Services may take courses in other departments of the University. Community agencies and resources are used extensively. Students with a background in medicine may qualify to receive concurrent credit for residency training in preventive medicine.

Admission Requirements for M.P.H. and M.S.

In addition to completing Graduate School admission requirements, applicants to the M.P.H. and M.S. programs must submit at least three letters of recommendation, Graduate Record Examination scores, and a goal statement. At least three years of medical or health care experience are usually required. Applicants are accepted only for summer and autumn quarters of each year. The application deadline is January 15.

Doctor of Philosophy

The overall goal of the doctoral program in Health Services is to train health services researchers and health policy analysts for careers in academic institutions, health delivery systems, public health departments, government agencies, and the private sector. This in-residence program prepares students to conduct high quality independent, collaborative research and policy analysis by offering applied research opportunities on a wide variety of topics under the mentorship of faculty. In addition, students obtain advanced knowledge of population health and health care, theoretical frameworks, and extensive research skills to identify and critically analyze social, behavioral, and health care system effects on health; and the organization, delivery, financing, and management of health services.

Doctoral Studies Program

Doctoral study in health services is available to qualified students on campus who are enrolled in the doctoral programs of other departments (e.g., anthropology, biostatistics, economics, epidemiology, geography, medicine, nursing, operations research, organizational theory, political science, psychology, social work, or sociology). Students in the Doctoral Studies program take four courses in health services and focus their dissertation on original research that relates the basic discipline to a specific health services issue (e.g., health behavior, health care organizations, costs, or quality and utilization of health care services).

Financial Aid

Every attempt is made to ensure that students admitted are not prevented from pursuing graduate studies due to inadequate finances. Some fellowships, assistantships, scholarships, and loans are available each year. However, students should be prepared to use their own resources to finance their graduate education.

Research Facilities

In addition to using University facilities, the program has extensive links with community health-care delivery systems and agencies for research and training.

Extended M.P.H.

Graduate Program Coordinator
H685 Health Sciences, Box 357660
206-685-7580

The Extended M.P.H. Degree Program is a part-time, partial distance learning program delivered through a combination of intensive four-week summer sessions on the University campus, directed independent study, and four intensive weekend seminars during the academic year. The program is designed for mid-career public and community health professionals with three or more years of experience related to public health. The program provides knowledge and skills required at mid- and upper-level practice and management positions for health professionals. In addition to the core courses in health services, epidemiology, biostatistics, and environmental health, the prescribed course work includes a broad exposure to the health-care system plus specific management training in budgets, finance, personnel management, economics, organization theory, and program planning and evaluation. Pathways are available in health education, maternal and child health, public health practice, and oral health.

The Extended M.P.H. Degree Program provides training in developing skills in the scientific base of public health, analytic methods, management and communication, and policy and advocacy, as well as training in cross-cutting issues. Graduates apply their skills directly to their careers.

Admission Requirements

In addition to Graduate School admission requirements, applicants must submit a program application, at least three letters of recommendation, a goal statement, Graduate Record Examination scores (applicants with doctoral degrees may waive this requirement), transcripts from all college-level courses completed, a statistics self-test, and a computer literacy self-test. A minimum of three years work experience in public health or a related field is required. Applicants are accepted to begin the program summer quarter. The deadline for priority consideration is December 1. Applications are accepted through February 15 and considered on a space-available basis.

Faculty

Chair

William L. Dowling

Professors

Berkowitz, Bobbie * 1988, (Adjunct); PhD, 1990, Case Western Reserve University; administration, leadership and policy development within public health and nursing.

Bowen, Deborah J. * 1986; PhD, 1986, Uniformed Service University of the Health Sciences; health psychology.

Boyko, Edward J. *, (Adjunct); MD, 1979, University of Pittsburgh; epidemiology of inflammatory bowel disease and non-insulin-dependent diabetes mellitus.

Chapko, Michael K. * 1978, (Research); MA, 1970, Hunter College, PhD, 1972, City University of New York; ambulatory care, long-term care, cost-effectiveness in health care, international health.

Cheadle, Allen D. * 1987, (Research); PhD, 1987, University of California (Berkeley); community-based research and program evaluation.

Connell, Frederick A. * 1978; MD, 1972, New York University; child health, child health services research, Medicaid, community health assessment.

Conrad, Douglas A. * 1977; MHA, 1973, University of Washington, MBA, 1977, PhD, 1978, University of Chicago; alternative vertical and horizontal market structures in health care.

Coombs, John B. 1983, (Adjunct); MD, 1972, Cornell University; health care outcomes, rural health policy, healthcare workforce issues and applied nutrition.

Day, Robert W. * 1968; MD, 1956, University of Chicago, MPH, 1958, PhD, 1962, University of California (Berkeley); translational research.

Deyo, Richard A. * 1986; MD, 1975, Pennsylvania State University; health status measurement and evaluation of common medical practices.

Diehr, Paula K. * 1970; MS, 1967, PhD, 1970, University of California (Los Angeles); health services, small-area analysis, health status.

Dowling, William L. * 1982; MBA, 1961, University of Chicago, MA, 1970, PhD, 1971, University of Michigan; strategic management of health-care organizations, managed care.

Fihn, Stephan * 1982; MD, 1977, St Louis University, MPH, 1981, University of Washington; internal medicine.

Fuller, Sherrilynne S. * 1988, (Adjunct); PhD, 1984, University of Southern California; analysis, representation and mapping of research findings (data mining).

Gale, James L. * 1969, (Adjunct); MD, 1961, Columbia University, MS, 1969, University of Washington; epidemiology and control of infectious disease, international health.

Gloyd, Stephen S. * 1985; MD, 1973, University of Chicago, MPH, 1983, Harvard University; political economy, epidemiology, and primary health care in developing countries.

Grembowski, David * 1981; MA, 1975, Washington State University, PhD, 1982, University of Washington; health services research, survey research, program evaluation, performance of health care systems.

- Grossman, David C. 1988, (Adjunct); MD, 1982, University of California (Los Angeles), MPH, 1990, University of Washington; injury control, Native American health, and pediatric health services research.
- Hart, Lawrence G. 1982, (Adjunct); MS, 1975, University of Utah, PhD, 1985, University of Washington; rural health policy, medical geography.
- Hedrick, Susan * 1983; MA, 1975, PhD, 1982, Michigan State University; long-term care.
- Hegyvary, Sue T. 1986, (Adjunct); MN, 1966, University of Washington, PhD, 1974, Vanderbilt University; administration and productivity of health care and nursing services.
- Hunt, D. Daniel 1977, (Adjunct); MD, 1973, Cornell University, MBA, 1977, University of Pennsylvania; medical education, career choice.
- Katon, Wayne J. * 1976, (Adjunct); MD, 1976, University of Oregon; depression, panic disorder, somatization, adherence.
- Kimball, Ann M. * 1992; MD, 1976, MPH, 1981, University of Washington; emerging infections, public health response to epidemic disease.
- Klasterin, Theodore * 1974, (Adjunct); PhD, 1973, University of Texas (Austin); operations management, facility location, project management, waiting lines, logistics, inventory.
- Kukull, Walter A. * 1981, (Adjunct); PhD, 1984, University of Washington; neurological disease etiology, aging and methodology; focus on Alzheimer's disease.
- Kuszler, Patricia Carol * 1994, (Adjunct); MD, 1978, Mayo Medical School/graduate School, JD, 1991, Yale University; law and medicine: health-care finance and regulation, medical malpractice, biotechnology and law.
- Larson, Eric B. * 1977, (Adjunct); MD, 1973, Harvard University; internal medicine.
- Logerfo Sr., James P. * 1974; MD, 1968, University of Rochester, MPH, 1974, University of Washington; quality-of-care assessment.
- Martin, Diane P. * 1978; MA, 1972, Temple University, PhD, 1979, University of Washington; research methods, health services quality, use, and outcomes.
- Mayer, Jonathan D. * 1977, (Adjunct); PhD, 1977, University of Michigan; medical geography, health policy, env. health, epidemiology, intl. health, infectious diseases.
- McCann, Barbara S. * 1986, (Adjunct); MS, 1982, PhD, 1984, Rutgers University; behavior change, health, nutrition, psychological stress, cardiovascular disease, diabetes, obesity.
- Milgrom, Peter M. * 1974, (Adjunct); DDS, 1972, University of California (San Francisco); management of fearful and phobic dental patients, quality of dental care.
- Mitchell, Pamela H. * 1971, (Adjunct); MS, 1965, University of California (San Francisco), PhD, 1991, University of Washington; neuroscience nursing, diagnostic strategies.
- Monsen, Elaine R. * 1969; MS, 1959, PhD, 1961, University of California (Berkeley); nutrition, dietetics.
- Muecke, Marjorie A. * 1979, (Adjunct); PhD, 1976, University of Washington; community health, medical anthropology, reproductive health, Southeast Asia (Thailand).
- Norris, Thomas E. 1988, (Adjunct); MD, 1973, University of Texas (Galveston); clinical applications, health policy and health workforce needs.
- Oberle, Mark W. 1988; MD, 1974, Johns Hopkins University; public health; Native American health.
- Patrick, Donald L. * 1987; MS, 1968, PhD, 1972, Columbia University; health status and quality of life, end of life, adolescents.
- Pearlman, Robert A. * 1981, (Adjunct); MD, 1975, Boston University; gerontology.
- Perrin, Edward * 1962, (Emeritus); MA, 1956, Columbia University, PhD, 1961, Stanford University; biostatistics, health information, health services research methodology.
- Psaty, Bruce M. * 1984, (Adjunct); PhD, 1979, MD, 1981, Indiana University; cardiovascular disease, coronary heart disease, hypertension, pharmacoepidemiology.
- Rosenblatt, Roger A. * 1977, (Adjunct); MPH, 1971, MD, 1971, Harvard University; research into the organization and delivery of health services, rural health policy.
- Ross, Austin, Jr. 1982, (Emeritus); MPH, 1955, University of California (Berkeley); ambulatory care, health care delivery systems.
- Sullivan, Sean * 1992; PhD, 1992, University of California (Berkeley); health economics, pharmaceutical outcomes research and health policy.
- Thompson, Engelberta 1989; MA, 1978, PhD, 1981, Western Michigan University; community studies, cancer prevention, smoking cessation, children's pesticide exposure.
- Urban, Nicole D. * 1988, (Research); MS, 1973, DSc, 1978, Harvard University; analysis of the cost-effectiveness of disease prevention trials and interventions.
- Wagner, Edward H. * 1984; MD, 1965, State University of New York (Buffalo), MPH, 1972, University of North Carolina; clinical epidemiology and health services research, health promotion and disease prevention.
- Watts, Carolyn A. * 1975; MA, 1974, Johns Hopkins University, PhD, 1976, Johns Hopkins University; health economics and policy.
- Wickizer, Thomas M. * 1988; MSW, 1974, University of Washington, MPH, 1979, MA, 1987, PhD, 1989, University of Michigan; health economics, health policy, program evaluation, quality improvement, occupational health.
- Wolf, Fredric M. * 1997, (Adjunct); MEd, 1977, PhD, 1980, Kent State University; clinical decision making, evaluation of new technology, evidence-based health care.
- Chasteen, Joseph E. 1989, (Adjunct); DDS, 1967, MA, 1976, University of Michigan; dental informatics and multi-media instructional programs.
- Crittenden, Robert A. 1981, (Adjunct); MD, 1976, MPH, 1987, University of Washington; health plans/policies.
- Curtis, Jared R. 1988, (Adjunct); MD, 1988, Johns Hopkins University, MPH, 1994, University of Washington; pulmonary diseases and critical care medicine.
- Ensign, B. Josephine * 1994, (Adjunct); MS, 1986, Virginia College of Medicine, MPH, 1992, DPH, 1994, Johns Hopkins University; health care program planning and evaluation for marginalized populations and high-risk youth.
- Goldbaum, Gary M. * 1989, (Adjunct); MD, 1978, University of Colorado (Denver), MPH, 1989, University of Washington; preventive medicine, chronic diseases prevention, injury prevention.
- Goldberg, Harold I. 1986, (Adjunct); MD, 1977, Stanford University; applying clinical informatics to health services delivery and quality improvement.
- Holt, Victoria L. * 1989, (Adjunct); MPH, 1987, PhD, 1990, University of Washington; women's reproductive health, intimate partner violence.
- Jarvik, Jeffrey G. 1993, (Adjunct); MD, 1987, University of California (San Diego); neuroradiology, outcomes research.
- Kienast, Philip K. * 1970, (Adjunct); PhD, 1972, Michigan State University; human resources management.
- Kopjar, Branko 1997; PhD, 1996, University of Oslo (Norway); prevention effectiveness, outcomes research, health care reform, quality of care.
- Lafferty, William E. 1988; MD, 1978, University of Kansas; STDs, HIV/AIDS, surveillance and epidemiology of STD, managed care.
- Lalonde, Bernadette 1980, (Research); PhD, 1979, University of Toronto (Canada); public health program development, process and outcome program evaluation, evaluation research.
- Lessler, Daniel * 1990, (Adjunct); MD, 1986, Stanford University, MHA, 1992, University of Washington; health services research pertaining to cost-effectiveness, quality of care, medical management.
- Maynard, Charles C. * 1991, (Research); PhD, 1986, University of Washington; cardiovascular health services research.
- Meischke, Hendrika W. * 1991; MPH, 1987, PhD, 1992, University of Michigan; health communication, with an emphasis on mass media and health.
- Melzer, Sanford M. 1990, (Adjunct); MD, 1982, Mt. Sinai School of Medicine; general pediatrics.
- Plough, Alonzo L. * 1995; MA, 1975, Cornell University, MPH, 1977, Yale University, PhD, 1978, Cornell University; anthropology, sociology or social welfare and public affairs/policy, epidemiology.
- Reiber, Gayle * 1991; MPH, 1975, Johns Hopkins University, PhD, 1989, University of Washington; epidemiology and health services research on preventing complications of diabetes.
- Rhodes, Lorna A. * 1983, (Adjunct); PhD, 1973, Cornell University; medical anthropology, symbolic anthropology, South Asia, religion, psychiatry.
- Richardson, Mary L. * 1977; MHA, 1978, PhD, 1984, University of Washington; organization, management, and analysis of policy relevant to health services.

Associate Professors

- Baldwin, Laura M. 1984, (Adjunct); MD, 1980, University of Southern California, MPH, 1986, University of Washington; family medicine.
- Bell, Michelle * 1984; MSW, 1967, University of Washington, PhD, 1984, University of Washington; maternal/child health, adolescent health, access to health services for disadvantaged populations.
- Braddock, Clarence H. * 1993, (Adjunct); MD, 1981, University of Chicago; doctor-patient communication, informed consent, bioethics education.
- Bradley, Katharine A. 1990, (Adjunct); MD, 1987, Stanford University, MPH, 1993, University of Washington; general internal medicine.

Shell-Duncan, Bettina * 1995, (Adjunct); MS, 1988, University of Wisconsin, PhD, 1994, Pennsylvania State University; health assessment in traditional societies, including immunity, nutrition.

Spigner, Clarence * 1994; MPH, 1982, DPH, 1987, University of California (Berkeley); health of the disadvantaged, race/ethnic relations, societal behavior, popular culture.

Stout, James W. * 1986, (Adjunct); MAT, 1981, Duke University, MD, 1986, Wake Forest University; childhood asthma, health services and epidemiology.

Taylor, Victoria M. * 1989, (Research); MD, 1978, University of Nottingham (UK), MPH, 1989, University of Washington; cancer control in minority populations.

Wood, Robert W. 1977, (Adjunct); MD, 1970, University of Rochester; internal medicine.

Assistant Professors

Christakis, Dimitri A. 1993, (Adjunct); MD, 1993, University of Pennsylvania, MPH, 1998, University of Washington; general pediatrics.

Gray, Darryl 1997, (Research); MPH, 1981, University of Washington, MD, 1984, Case Western Reserve University, ScD, 1992, Harvard University; clinical epidemiology/cost-effectiveness of radiological, pediatric cardiac and surgical procedures.

Doctor, Jason N. * 1995, (Adjunct); PhD, 1995, University of California (San Diego); medical decision making, health economics, decision theory.

Huebner, Colleen Ellen * 1982; PhD, 1991, MPH, 1994, University of Washington; the social bases of developmental problems in early childhood.

Johnson, Donna 1990; MS, 1979, Syracuse University, PhD, 1995, University of Washington; public health nutrition practice: obesity, maternal and child nutrition.

Karras, Bryant Thomas 2000; MD, 1995, University of Wisconsin; public health informatics, guidelines, bioterrorism surveillance.

Kitahata, Mari M. 1991, (Adjunct); MD, 1987, University of Pennsylvania, MPH, 1995, University of Washington; allergy and infectious diseases.

Liu, Chuan-Fen 1998, (Research); MPH, 1982, National Taiwan University, PhD, 1994, University of Minnesota; health economics, health services research, mental health.

Lydon-Rochelle, Mona 2001, (Adjunct); PhD, 1999, University of Washington; applied epidemiology in maternal health.

Maciejewski, Matthew L. * 1999; PhD, 1998, University of Minnesota; managed care, outcomes research, research methods, health economics, diabetes.

Mastroianni, Anna C. * 1996, (Adjunct); JD, 1986, University of Pennsylvania, MPH, 1997, University of Washington; law, ethics and policy genetics, reproduction, human subjects research.

Mock, Charles N. * 1992, (Adjunct); MD, 1980, Brown University; injury: epidemiology, prevention, treatment; especially in less-developed countries.

Penson, David F. 1999, (Adjunct); MD, 1991, Boston University, MPH, 1999, Yale University; clinical epidemiology and health services research in the areas of urologic disease.

Sales, Anne * 1997; MSN, 1989, University of North Carolina, PhD, 1998, University of Minnesota; patient and organizational outcomes, health care work force, health economics.

Seifer, Sarena 1995, (Research); MS, 1985, MD, 1989, Georgetown University; best practices for health professionals, ambulatory medical education.

Weaver, Marcia R. * 1994, (Research); MA, 1981, PhD, 1986, University of Chicago; HIV/AIDS, cost-effectiveness of community-based care, contingent valuation, health care reform.

Yueh, Bevan 1997, (Adjunct); MD, 1989, Stanford University; clinical epidemiology of hearing loss and head and neck cancer.

Zierler, Brenda * 1988, (Adjunct); PhD, 1996, University of Washington; research in patient with venous thromboembolism; clinical outcomes, process outcomes.

Zimmerman, Frederick J. 2002; PhD, 1994, University of Wisconsin; disparities economics, quantitative methods, children's health services, international health.

Senior Lecturers

Downer, Ann E. * 1989; MS, 1984, University of Washington, EdD, 1996, Seattle University; implementation and evaluation of HIV/AIDS/STI prevention/treatment programs.

Gish, Oscar * 1989; MSS, 1967, MPH, 1969, University of Sussex (UK); socio-economic dimensions of health and health services: third world development focus.

Hanken, Mary A. 1991; MEd, 1974, Seattle University, PhD, 1989, University of Washington; health information systems.

Harris, Jeffrey R. 2001; MD, 1978, University of Texas, MPH, 1993, Johns Hopkins University; preventive health care benefits, quality of health care.

Katz, Aaron 1988; CPH, 1975, University of Toronto (Canada); health policy, public health, determinants of health.

Murphy, Gretchen C. 1992; MEd, 1973, University of Washington; health information systems, health informatics, electronic health records.

Royer, Charles T. 1994; LLD, 1983, Antioch College; urban policies, health policy.

Thompson, John (Jack) R. 1989; MSW, 1976, University of Washington; public health practice, health policy analysis, work force development.

Welton, William E. 2001; MHA, 1972, DPH, 1999, University of Michigan; strategic and organizational effectiveness of health systems.

Lecturers

Gonzales, Virginia 1993; MSW, 1971, MPH, 1974, University of California (Berkeley), EdD, 1988, Harvard University; women's health, STI/HIV/AIDS prevention in United States and developing countries.

Masuda, David 1997, (Adjunct); MD, 1980, University of North Dakota, MS, 1996, University of Wisconsin; biomedical and health informatics.

Rees, Jane * 1973, (Adjunct); MS, 1972, University of Washington; nutritional support of adolescent health, especially during pregnancy; eating disorders.

Sappington, Jeremy L. 1992; MPH, 1964, University of North Carolina; systems theory, human resources management, undergraduate studies in public health.

Shiu-Thornton, Sharyne 1988; MA, 1980, University of Washington.

Stillman, Dennis 1987; MHA, 1979, University of Washington; health care financial management, management development.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Health Services

HSERV 475 Perspectives in Medical Anthropology (5) *Rhodes* Introduction to medical anthropology. Explores the relationship among culture, society, and medicine. Examples from Western medicine as well as from other medical systems, incorporating both interpretive and critical approaches. Offered: jointly with ANTH 475.

HSERV 480 Issues in Public Health (1-3, max. 6) *Bezručka, Sappington, Wing* Problems and issues in epidemiology, health services delivery and administration, environmental health, pathobiology, biostatistics, and related fields.

HSERV 499 Independent Study in Health Services (1-12, max. 12) Individual library or field study project selected in consultation with a faculty adviser.

Courses for Graduates Only

HSERV 501 Public Health Practice at the Local Level (3) *Thompson* Basic overview of state and local public health practice with leaders in the field and case studies focusing on rural and urban public health challenges. Offers preparation for practice in public health agencies. Prerequisite: HSERV 511 or permission of instructor. Offered: jointly with EPI 501; Sp.

HSERV 503 Public Health Informatics and Surveillance (3) Covers collection and use of public health surveillance data in formulating policy and managing programs through lectures and real-world interactive exercises. Discusses surveillance for birth defects, environmental exposures, and hospital-acquired infections, and use of tools such as small area analysis and geographic information systems. Offered: jointly with EPI 503.

HSERV 504 Health Communication (3) *Downer* Overview of the theory and practice of designing, producing, and evaluating public health communication campaigns, including the use of mass media. Develops greater capacity for critical judgment about the use of communication strategies for achieving public health goals.

HSERV 505 Topics in Preventive Medicine (2) *Goldbaum* Examines current scientific knowledge and state of the art of preventive medical interventions. Discusses and considers options for current practice. Recommended for MDs, RNs, and others with a clinical background. Credit/no credit only. Offered: jointly with EPI 525.

HSERV 507 Mass Media, Health, and Society (3) *Meischke* Provides students with a broader understanding of how the mass media affects the health of individuals and communities; introduces students to theoretical perspectives on mass communication and persuasion; teaches students how to plan, design, implement, and evaluate media interventions.

HSERV 508 Dynamics of Community Health Practice (3-5, max. 5) *Chrisman* Examination of and experience with basic principles of clinical practice in community settings. Includes family as community

constituent, populations at risk, community assessment, and community development. Prerequisite: Graduate standing or permission of course faculty. Offered: jointly with NURS 560.

HSERV 509 Multidisciplinary Communication in Public Health Genetics (2) *Madden* Focuses on effective communication in a multi-disciplinary context. Students will read and critique published public health genetics literature, and learn and apply principles of effective written and oral communication to public health genetics topics of their choice. Credit/no credit only. Offered: jointly with PHG 509.

HSERV 510 Society and Health (3) *Spigner* Analysis of social inequalities in health and service use by class, gender, and the social construction of race. Examines biological, cultural, social, political, and economic determinants which consistently put certain minority groups within Eurocentric societies at higher risk for inequitable health status and provision. Prerequisite: HSERV 511 or equivalent or permission of instructor.

HSERV 511 Introduction to Health Services and Public Health (3-4) *Thompson* History, organization, and effectiveness of United States health care and public health systems. Determinants of health, need, and utilization. Public and private financing. Supply and provision of personal and public health services. Managed care. Government and private sector roles. Prerequisite: graduate standing or permission of instructor.

HSERV 515 Health Care and Society (3) *Lafferty* Interdisciplinary introduction to health services designed for future health care practitioners. Examines the history, organization, and effectiveness of the U.S. health care system. Stresses the student's ability to adopt a broad perspective across health care disciplines and traditional boundaries. Offered: jointly with PHARM 541.

HSERV 516 Introduction to Health Services—Extended Degree(4) *Wickizer* Provides overview of health care system, exposes students to current issues and developments affecting organization and delivery of health services, helps students develop ability to frame and analyze questions and issues related to health services. Prerequisite: registration in Extended Degree program. Offered: A.

HSERV 517 Provision of Health Services—Extended Degree (2) *Baesler* Builds on material covered in 516 and provides students with tools used to evaluate alternative health delivery systems; exposes students to various international health delivery systems; encourages students to decide how to organize such a system. Prerequisite: HSERV 516, registration in Extended M.P.H. Degree program. Offered: W.

HSERV 518 Social and Ethical Issues (2-4, max. 4) *Mastroianni* Presents introduction to ethical issues in public health policy and practice. Additional one credit option focuses on health administration/managed care. Coursework designed to train students in basic skills of ethical analysis and increase competency in recognizing, researching, and analyzing issues arising in public health and health services delivery.

HSERV 520- Methods in Applied Community Research (2-) *Astley* Skills/knowledge necessary to conduct orderly investigation of specific problems in preparation for M.P.H. thesis or project. Includes problem identification, posing research questions, literature review, consideration of theoretical/practical context, choosing study design, data collection, protection of human subjects, and recognizing potential errors. Credit/no credit only. Prerequisite: registration in Extended M.P.H. Degree program.

HSERV 522 Health Program Evaluation (3-4) *Grembowski* Politics, theory, methods of evaluation, from simple health programs to evaluation of large-scale interventions. Emphasizes experimental and quasi-experimental designs to estimate program impacts, as well as evaluation of program implementation. Case studies drawn from health field illustrate various types of evaluations. Prerequisite: background in introductory statistics.

HSERV 523 Community Health Assessment (3) *Connell* Survey of approaches and tools to measure health status and health-care problems in defined communities. Topics include: uses and limitations of available data; community surveys; public health surveillance; problem identification and needs assessment; measurement of community health indices; analytic methods; and presentation techniques for program and policy planning.

HSERV 526 Qualitative Research Methods for Public Health (4) *Bezruchka* Covers a range of qualitative, ethnographic tools for practical applications in public health. Methods covered include direct observation, informant interviews, focus groups, and formal methods. Covers Rapid Assessment Procedures and Participatory Action Research. Student teams investigate research questions using these techniques. Offered: Sp.

HSERV 528 Critically Appraising and Applying Evidence in Health Care (3) *Pinsky, Wolf* Literature appraisal skills for various articles (therapy effectiveness, diagnostic tests, literature reviews, clinical measurement, prognosis, quality of care, decision analysis, causation/etiology, guidelines, and economic evaluation). Appraisal of clinical information from literature, strengths/weaknesses of data, analyses, study design/applicability to a current patient's problem. Prerequisite: permission of instructor. Offered: jointly with MEDED 540; W.

HSERV 529 Introduction to Systematic Reviews and Meta-analysis of Evidence (2) *Wolf* Conceptual understanding of the quantitative methods used to synthesize evidence. Methods for pooling evidence across independent studies, pooling binary/continuous outcomes, differences between fixed and random effects models, and guidelines for appraising published systematic reviews/meta-analyses. Prerequisite: introductory-level courses in statistics, epidemiology, or biostatistics. Offered: jointly with MEDED 541; Sp.

HSERV 531 Problems in International Health (4) *Gloyd* Explores social, political, economic, environmental determinants of developing countries' health; traces development of societal responses to problems. Includes: origins of primary health care; child survival; traditional systems; population; water; sanitation; international agencies; impact of economic policies. Case study formulating pharmaceutical policy in a developing country. Offered: jointly with EPI 531; A.

HSERV 533 Population, Health, and Development (2) *Povey* Provides students with an introduction to demographic conditions in Third World countries and an understanding of the consequences of rapid population growth on health and the environment. The context and effectiveness of family planning programs is a major focus.

HSERV 534 Comparative International Health Systems (3) *Bezruchka* Assesses the effects of local culture, politics, resource constraints on health policy and organization, health status utilization, and financing. Interprets information and feasibility of alternatives. Required paper. Prerequisite: graduate standing or permission of instructor.

HSERV 536 Emerging Infections of International Public Health Importance (3) *Kimball* Overview of current emerging infections worldwide and contribut-

ing factors. Design of a surveillance and prevention strategy required. Offered: jointly with EPI 529; in residence, odd years; online, even years; W.

HSERV 537 Economic Development and Health (1, max. 3) *Gish* Discusses issues of broad interest in the areas of economics, development, and health. Credit/no credit only. Offered: A/W/Sp.

HSERV 539 Research Methods in Developing Countries (3/4) *Gloyd, Mock* Simple, practical methodologies to obtain and validate information regarding health status and health services in developing countries. Usefulness, validity, limitation of vital records, health reports, household (and cluster) surveys, nutritional anthropometry, and qualitative methods discussed. Lectures, computer lab, and student participation in community-based survey. Offered: jointly with EPI 539; W.

HSERV 541- Topics in Maternal and Child Health I (3-) *Bell* Historic, legislative, organizational, and financial basis of health and social services for families and children in United States. Effects of changing family structure and norms; factors affecting health care needs of specific populations, including racially and ethnically diverse groups; impact of policies/programs on health and well-being of families and children.

HSERV 542 Epidemiology of Maternal and Child Health Problems (4) *Emanuel, Williams* Contributions to understanding and prevention of major maternal and child health problems, including pregnancy outcome, infant and child morbidity and mortality, maternal morbidity and mortality, abnormal child growth and development, and early-life factors in adult health problems. Prerequisite: graduate, medical, or dental school standing and 511 or 512 or permission of instructor. Offered: jointly with EPI 521.

HSERV 543 Topics in Maternal and Child Health III (3) *Huebner* Provides an overview of contextually based frameworks for understanding growth and development. Identifies and describes the conceptual basis and theory of change that underlie successful preventive intervention efforts to promote the well being of children and reduce common MCH problems.

HSERV 544 Maternal and Child Health in Developing Countries (3) *Mercer* Emphasizes critical health problems of women and children in developing countries in social, economic, and cultural contexts. Practical approaches to developing MCH programs shared via lecture/discussions, exercises, and small group work. Students acquire skills in baseline assessment, setting objectives, planning and evaluating interventions, and involving communities. Offered: jointly with EPI 544; Sp.

HSERV 550 Policy and Economics: Fundamentals and Applications (3) *Katz, Madden* Explores how values drive the structure of societies, economic systems, public policies, and ultimately, allocation and distribution of resources. Explores how science and community values intertwine in the development of health policy, and how ideology, culture, and history influence structure and change a nation's health system. Offered: W.

HSERV 551 Health Law (3) Analysis of law, the legal system and current legal problems as they relate to the financing and delivery of health care services. Offered: Sp.

HSERV 552 Health Policy Development (3) *Katz, Madden* Focuses on development of public policy concerning medical care and public health and the relationship between public decisions and the market place. Using contemporary policy issues as case studies, examines the role science, ideology, culture, and history play in influencing the structure of and changes to a nation's health system.

HSERV 553 Politics of Health Care (3) *Hagens* Understanding of health policy making within the context of American politics. Health policy making is examined in light of political leadership, the legislature, the initiative process, rule making, interest groups, and lobbying. Prerequisite: HSERV 551, a basic understanding of the American health care system, or permission of instructor.

HSERV 554 Health Legislation Seminar (1) *Lichiello* Discussion of current state health policy topics with legislative staff and others involved with state health policy. In addition to two sessions on campus, course meets once during the quarter in Olympia. Credit/no credit only.

HSERV 560- Introduction to Health Promotion and Planning (3) *Downer* Overview of behavior change theory and comprehensive approach to planning, implementing, and evaluating health promotion interventions. Links theory to practice. Uses PRECEDE/PROCEED planning model by Green and Kreuter as framework.

HSERV 561- Application of Learning Theory to Health Education (3) *Downer* Designed to help students apply Popular Education theory and practice to preparation, presentation, and evaluation of health education. Students design, teach, and evaluate four separate teaching sessions (one between each seminar) using theory and principles of Popular Education learned to date. Prerequisite: graduate standing or permission of instructor.

HSERV 570 Seminar on Issues in Social Medicine (3) *Rhodes* Qualitative research organized around selected works in sociology, anthropology, and public health. Readings and discussion of literature, individual class presentations. Addresses fellowship programs and student research projects.

HSERV 572 Community Development for Health (4) *Hagopian, House* Structured overview of community development in the health field. Discusses power and leadership; ethical, legal, administrative, and financial issues; organizing special groups; evaluation; community assessments; and approaches and tools for community development. Offered: W.

HSERV 573 Community Development for Health Seminar (1) Provides an opportunity for students to hear from skilled and talented leaders who are working to improve population health status through community development strategies. Topics include sustainability, competency, civil society, cultural issues, community organizing, specific community development techniques, ethical and legal issues, financial and economic problems, power/leadership, and evaluation.

HSERV 575 Seminar in Biobehavioral Interventions, Communications, and Cancer Outcomes II (1-3, max 3) An intensive, case-focused review of methods for conducting research in cancer prevention and control, covering areas related to epidemiology, genetic epidemiology, clinical trials, and translational research as it applies to cancer. Includes faculty lectures, discussions of new proposals, and trainee presentations of research ideas.

HSERV 580 Society, Chronic Illness, and Disability (3) *Hedrick* Definition and assessment of chronic illness, disability, and health status. Analysis of chronic illness and disability using frameworks from social sciences and public health. Dimensions of disablement as they affect provision of health services. Research on effectiveness of services and approaches to improvement. Prerequisite: HSERV 511 or permission of instructor.

HSERV 581 Health Promotion and Disease Prevention (4) *Bowen* Health promotion planning, implementation, and evaluation models studies regarding strengths, weaknesses, and effectiveness.

Students critique strategies to modify behavioral factors that influence lifestyle of individuals, including decisions influencing their reciprocal relationship with environmental factors that affect the health of individuals, organizations, and communities. Prerequisite: HSERV 511.

HSERV 582- Health Behavior and Preventive Medicine ([3-4]-) *Meischke* Overview of theoretical perspectives in health behavior at the individual, interpersonal, and community level. Focuses on increasing skills in describing, applying, and integrating these frameworks in the design and evaluation of health promotion interventions. Prerequisite: HSERV 511 or permission of instructor.

HSERV 583 Economic Evaluation in Health and Medicine (3) *Sullivan, Veenstra* Methods and techniques for evaluating costs and cost-effectiveness of health, medical, and pharmaceutical interventions. Emphasis on economic evaluation, decision analysis, and modeling techniques for resource allocation and decision making. Applications to technology assessment, health policy, clinical practice, and resource allocation. Prerequisite: permission of instructor. Offered: jointly with PHARM 534; A.

HSERV 584 Evaluating Cost and Outcomes in Health and Medicine 2 (3) *Patrick, Sullivan, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis., pharmacoeconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with PHARM 535.

HSERV 586 Medical Geography (3) *Mayer* Geography of disease, consideration to health systems planning. Distributions, diffusion models, migration studies. Application of distance, optimal location models to health systems planning; emergency medical services, distribution of health professionals; cultural variations in health behavior. Prerequisite: familiarity with social science research, health-related issues. Offered: jointly with GEOG 580.

HSERV 587 Health Policy Economics (3) *Madden* Applies economic theory to selected topics in health care, including information, risk and insurance, industry organization, government regulation, and public health issues. Emphasizes policy implications of these applications.

HSERV 588 Community Approaches to Health Promotion (3) *Thompson* Provides opportunities to critically examine community-based health promotion interventions and the design, evaluation, and implementation issues they raise. A wide range of disciplinary perspectives is presented. Case studies and class projects are designed to give students the skills needed to critically assess community projects around health promotion.

HSERV 590- Selected Topics in Health Services (*-) By individual arrangement, the student and faculty member(s) develop a program of reading and conference appropriate to the topic selected by the student. The topic chosen will be within the special competence of the faculty participating in the course, in the areas of health-care delivery and health-care administration. Also special summer format presenting introductory material may be taken with ENV H 590 and/or EPI 590. For more information and permission, consult department program adviser.

HSERV 592 Program Seminars (1-6, max. 6) Graduate seminars organized to address specific educational needs of students in various fellowships, residencies, and other specialized programs within the Department of Health Sciences (i.e., maternal and child health, international health, preventive medicine, social and behavioral sciences). Prerequisite: permission of instructor.

HSERV 595 Practicum/Field Work in Community Medicine (1-12, max. 12) Experience in variable time blocks in community health activities in agencies delivering and planning health services. Sites include neighborhood clinics, health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environmental programs and services. Prerequisite: master's student in health services and permission of instructor.

HSERV 598 Extended Degree Program Project Option (*, max. 9) Supervised project work on a selected topic related to student's concentration in graduate study. Includes survey of literature, development of approach, and written paper on conclusions. Prerequisite: registration in extended MPH degree program and satisfactory completion of the first summer's course work.

HSERV 600 Independent Study or Research (*) Prerequisite: permission of instructor.

HSERV 700 Master's Thesis (*) Prerequisite: permission of instructor.

Health Services Management

Courses for Graduates Only

HSMGMT 500 Seminar in Managed Care (2) *Dowling* Examination of the organization and management of managed-care health plans and delivery systems. Focuses on features that influence the effectiveness of such organizations. Goals, functions, organization structure, and technology of the internal systems common to managed care are discussed with executives from health plans and delivery systems. Credit/no credit only. Offered: Sp.

HSMGMT 501 Epidemiology/Critical Evidence Appraisal (3-4) *Kopjar* Basic knowledge about methods used in epidemiology and their application to critical appraisal of clinical, epidemiological, and health administration literature for evidence-based management of healthcare organizations, improvement of delivery of health services, and for creating health policies. Offered: W.

HSMGMT 502 Evidence-Based Health Care Planning (3-4) *Kopjar, Richardson* Applies the techniques of statistics, epidemiology, and critical evidence appraisal to the design and evaluation of population-based health care programs. It is the third course in a three-course sequence. Offered: Sp.

HSMGMT 512 Introduction to Management in Health Services (3) *Dowling* Overview of managerial roles, such as supervising and motivating, approaches to organizational and environmental assessment and change, and development of systems analysis skills. For students pursuing careers in research and teaching who are likely to have management responsibilities.

HSMGMT 513 Allocating Health Care Resources: A Population Based Perspective (4) *Conrad* Analysis of health services financing in the United States, with comparison to systems of other developed countries. Develops analytic and normative frameworks for examining public and private health insurance. Study of pricing, underwriting, benefit design, and delivery system; financing integration issues. Prerequisite: HSERV 511 or equivalent or permission of instructor. Offered: Sp.

HSMGMT 514 Health Economics (3) *Wickizer* Uses economic concepts and tools to examine range of issues pertaining to health care, delivery of health care services. Includes demand analysis, production of health services, expenditure growth, markets for hospital and physician services, externalities. Emphasis on using economics to examine issues and solve problems. Prior economics courses not required. Offered: W.

HSMGMT 522 Applied Data Analysis (3) *Cheadle, Connell* Practical experience in quantitative research, using a data set of their choosing to formulate a research question, clean and edit the data, and do the analysis. For second-year students in the School of Public Health who plan to do quantitative analysis for their thesis or project. Credit/no credit only. Offered: W.

HSMGMT 523 Informatics in Health Care Management (3) *Masuda* Medical informatics concerns the representation, organization, and manipulation of biomedical information and knowledge. Exposes students to a high-level understanding of informatics and its health care applications. Discussion of successes and failures in implementing information technology focuses on gaining leadership and management knowledge that embraces informatics. Offered: W.

HSMGMT 526 Selected Topics in Health Informatics (1-3, max. 12) *Masuda* Computers and information technology are improving and changing healthcare education, research, and clinical practice. Informatics faculty and researchers from the UW and affiliated institutions present their research findings as well as discuss their views of national developments in their respective disciplines. Credit/no credit only. Offered: jointly with MEDED 590; A/WSp.

HSMGMT 543 Social and Behavioral Strategies for Improving Health (3) *Sлома* Explores social dimensions of health and medical care. Learn to identify key social and cultural principles that guide appropriateness in health care. Introduced to tools used to influence social expectations and personal behavior in relation to illness, health, and demand for medical treatments. Offered: S.

HSMGMT 545 Capstone Integrative Seminar (4) *Scott* Designed to assist students in the transition from theory to practice. Emphasis on sharpening analytical and intuitive leadership practices through the use of interactive case studies and team building exercises and field projects. Prerequisite: second-year MHA students. Offered: Sp.

HSMGMT 546 Long-Term Care (3) *Hawley* Learning experience for graduate students in health services administration, planning, other graduate students to increase their ability to identify and solve problems related to long-term care they confront in their employment. Students are exposed to available knowledge in the field; effective problem-solving attitudes and techniques for organizing information and/or developing strategies, and agencies in the field. Prerequisite: HSERV 511 or permission of instructor.

HSMGMT 560 Management Practice in Health Care and Public Health Organization (3) *Richardson, Sappington* Introduction to leadership and management, focusing on effective strategies for creating a productive work environment. Organizational structure and strategy introduced. Case studies and other problem-solving methods, using health services applications are utilized in order to apply theoretical material. Prerequisite: graduate student. Offered: Sp.

HSMGMT 561 Health Planning: The Management of Change (3-4) *Erbstoesser* Designing realistic implementation strategies at beginning of planning process to optimize impact of planning on real problems. Discussion of ways in which change is brought about and decisions are made and implemented. Includes managing planning process, work plans, stakeholders, negotiation, and working with groups. Prerequisite: HSERV 511 or permission of instructor. Offered: A.

HSMGMT 562 Strategic Management of Health Care Organizations (3-4, max. 4) *Dowling* Management of goals, strategy, and structure in health care organizations. Design of external relation-

ships and internal structures., strategy-formulation, decision-making, and change. Integration of professional, social, and organizational values. Theory, student and practitioner experience, and case studies used to enhance repertoire of management approaches and skills. Prerequisite: HSERV 511 and HSMGMT 560 or equivalent.

HSMGMT 563 Personnel Management for Health Professionals (3) *Kienast* Designed for midcareer health services professionals developing strategies and skills in human resource management. Focuses on policy and practice issues important to handling day-to-day personnel problems-selection, promotion, performance appraisal, discipline, grievances. Prerequisite: registration in Extended M.P.H. Degree program or permission of instructor; non-business majors.

HSMGMT 565 Quantitative Decision Making for Health Services Management (3) *Pilcher* Applications of various quantitative techniques for problem solving, monitoring, controlling, decision making in health services. Identifying problem area, communications with consultant, evaluation to the quality and applicability of analyst's work. Statistical, mathematical, operations research, industrial engineering techniques. Prerequisite: QMETH 500 or BOST 509 or permission of instructor.

HSMGMT 566 Decision Support Models for Health Services (3) *Pilcher* Management science and approaches developed as applied to problems in public health. Emphasizes conceptual understanding of processes/application of systematic, and rational approach to managerial problem solving, including cost-benefit, cost effectiveness analysis. Prerequisite: BOST 502 and 503, or BOST 511; registration in Extended M.P.H. Degree program; non-business majors.

HSMGMT 571 Health Care Financial Management (4) *Conrad, Stillman* Third course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered are: health services law, hospital and program policy decisions, financial planning, and hospital design and architecture; and the presentation of hospital survey and health services research project reports. Prerequisite: HSERV 511 and ACCTG 500 or ACCTG 501 or permission of instructor.

HSMGMT 572 Financial Management for Health Professionals (3) Intensive review of basic accounting principles/terminology and an introduction to financial management/managerial accounting, including budgeting for managerial control, planning, cost accounting, financing health programs. Managerial accounting, program costing, rate setting, budget preparation. Prerequisite: BOST 502 and BOST 503, or BOST 511; registration in Extended M.P.H. Degree program or permission of instructor; non-business majors.

HSMGMT 573 Seminar in Health-Care Finance (3) *Pinsky, Wolf* Practical applications of corporate finance principles. Applies theoretical framework to health-care financial problems, including capital investment analysis, leasing vs. borrow-to-buy, debt capacity analysis, bond refunding, control of capital, joint venture. Prerequisite: either HSMGMT 514, HSMGMT 587; ECON 400, or ECON 500; ACCTG 503 (or equivalent); HSMGMT 571; or permission of instructor.

HSMGMT 574 Financial Management I (3-4) *Stillman* Prepares clinical professionals for participating intelligently in, and contributing to, financial decisions of health care organizations. Learn the language and fundamental concepts of accounting and finance, and become comfortable with what is required in formal financial analysis. Offered: A.

HSMGMT 575 Financial Management II (4) *Conrad, Stillman* Second in a two part series, the emphasis of this financial management course is on preparing medical executives for managerial and leadership roles in health care organizations. Focus is on tools and analytic frameworks that health care managers use to make forward-looking decisions, including capital budgeting and risk analysis. Offered: W.

HSMGMT 590 Select Topics (1-6, max. 12) By arrangement, students and faculty members develop a program of reading and conference appropriate to the selected topic. The topic chosen is within the special competence of the faculty member participating in the course in the area of health services management.

HSMGMT 592 Health Management Program Seminar (1-6, max. 6)

Pathobiology

 *General Catalog Web page:*
www.washington.edu/students/genca/academic/Pathobiology.html

 *Department Web page:*
depts.washington.edu/pathobio/

Graduate Program

Graduate Program Coordinator
F161F Health Sciences, Box 357238
206-543-4338
pathobio@u.washington.edu

The Department of Pathobiology offers a research training program leading to the Master of Science and Doctor of Philosophy degrees. Pathobiology is the study of pathogenic biological agents and their interaction with their hosts, primarily humans. As a discipline, pathobiology ties together the fundamental concepts of biology and clinical medicine. The Department of Pathobiology applies a multidisciplinary approach as well as the latest research technologies to the study of public-health problems such as cancer, HIV, and other infectious agents. Members of the department have diverse research interests including the molecular biology of cancer, molecular investigation of pathogenesis, drug resistance and host responses, diagnosis of diseases, development of vaccines and therapeutics, and fundamental biology of infectious agents. Course work provides the foundation for interfacing molecular and cellular biology with public-health issues.

Admission Requirements

Students from a variety of academic backgrounds are accepted for graduate study in pathobiology. It is highly desirable that applicants have completed course work in biology, microbiology, organic chemistry, and biochemistry or molecular and cellular biology. Persons holding professional doctorates (medicine, dentistry, veterinary medicine) are also encouraged to enter the graduate program.

Financial Aid

Some financial aid may be available in the form of research assistantships funded primarily through federal research grants held by faculty members.

Research Facilities

In addition to the research facilities at the University of Washington, opportunities for training also exist at the Fred Hutchinson Cancer Research Center, the Pacific Northwest Research Institute, the Seattle Biomedical Research Institute, and other biotech facilities.

Faculty

Chair

Kenneth Daniel Stuart

Professors

Campbell, Lee Ann * 1985; PhD, 1982, Pennsylvania State University; molecular biology and pathogenic mechanisms of chlamydiae.

Carter, William G. * 1981; PhD, 1974, University of California (Davis); elucidation of components in cell attachment and cell spreading in normal cells.

Grabstein, Kenneth 1998, (Affiliate); PhD, 1982, University of California (Berkeley).

Grayston, J. Thomas * 1960, (Adjunct); MD, 1948, MS, 1952, University of Chicago; infectious causes (*Chlamydia pneumoniae*) of atherosclerotic cardiovascular disease.

Hakomori, Sen-Itiroh * 1967; MD, 1951, DrMedS, 1956, Tohoku Imperial University (Japan); membrane biochemistry and glycoproteins.

Kenny, George E. * 1961; PhD, 1961, University of Minnesota; antigenic structure.

Kuo, Cho-Chou * 1969; MD, 1960, National Taiwan University, PhD, 1970, University of Washington; chlamydiae.

Leboeuf, Renee C. * 1987; PhD, 1985, Harvard University, MD, 1987, University of Massachusetts; genetic and nutritional regulation of proteins involved in lipid transport.

Lukehart, Sheila A. * 1980, (Adjunct Research); PhD, 1978, University of California (Los Angeles); immunology of infectious diseases, microbiology, sexually transmitted diseases.

McElrath, Margaret Juliana * 1990, (Adjunct); PhD, 1978, MD, 1980, Medical University of South Carolina; infectious diseases.

Parkinson, Alan J. 1996, (Affiliate); PhD, 1976, Otago University (New Zealand); prevention and control of infectious diseases in Arctic populations.

Parsons, Marilyn * 1981; PhD, 1979, Stanford University; parasite cell biology.

Perine, Peter L. * 1981, (Adjunct); MD, 1966, University of Kansas, MPH, 1973, University of Washington; international health, sexually transmitted diseases.

Rausch, Robert L. * 1978, (Emeritus); DVM, 1945, Ohio State University, PhD, 1949, University of Wisconsin; parasitology, helminthic zoonoses.

Reed, Stephen G. * 1993; PhD, 1979, University of Montana; immune response to human pathogens.

Roberts, Marilyn C. * 1981; PhD, 1978, University of Washington; antibiotic resistance genes, plasmids, sexually transmitted diseases, oral microbiology.

Rosenfeld, Michael E. * 1992; PhD, 1981, University of Wisconsin; mechanisms of atherogenesis and macrophage gene expression.

Stuart, Kenneth Daniel * 1985; PhD, 1969, University of Iowa; molecular biology of parasites.

Todaro, George J. * 1983; MD, 1963, New York University; growth regulation in normal/tumor cells, growth factors and their receptors, novel cell therapies.

Van Voorhis, Wesley C. * 1986, (Adjunct); PhD, 1983, Rockefeller University, MD, 1984, Cornell University; infectious diseases.

Associate Professors

Belury, Martha 2002, (Affiliate); PhD, 1992, University of Texas (Austin).

Bosch, Marnix L. * 1994, (Affiliate); PhD, 1987, University of Leiden (Netherlands); molecular virology of lentiviruses and herpes viruses, as well as animal models for viral diseases.

Duffy, Patrick E. 2002, (Affiliate); MD, 1986, Duke University.

Feagin, Jean E. * 1993; PhD, 1982, Stanford University; molecular parasitology, emphasizing gene organization and expression in protozoans.

Haigwood, Nancy L. * 1994; PhD, 1980, University of North Carolina; host immunity in the control and prevention of AIDS.

Hill, Walter E. * 1992, (Affiliate); PhD, 1972, University of Washington; genetic methods for detecting and characterizing food-borne microbial pathogens.

Kahn, Michael * 1992; PhD, 1983, Yale University; molecular recognition, protein structure-function relationships, peptidomimetics.

Kurath, Gael * 1994, (Affiliate); PhD, 1984, Oregon State University; molecular biology and evolution of RNA viruses that infect fish.

Lampe, Paul D. * 1996; PhD, 1984, University of Minnesota; regulation of intercellular communication via gap junctions.

Myler, Peter J. * 1993; PhD, 1982, University of Queensland (Australia); regulation of gene expression in protozoan parasites.

Rose, Timothy M. * 1991; PhD, 1981, University of Geneva (Switzerland); molecular biology of tumor viruses, cell growth, differentiation, and transformation.

Stamatatos, Leonidas 2001; PhD, 1988, McGill University (Canada).

Thouless, Margaret E. * 1980; PhD, 1974, University of Birmingham (UK); retroviruses, herpes viruses, enteric viruses, immunodiagnosis, virus variability.

White, Theodore C. * 1996; PhD, 1984, University of Michigan; molecular mechanisms of virulence and drug resistance in pathogenic yeasts.

Assistant Professors

Cangelosi, Gerard A. * 1985, (Research); PhD, 1984, University of California (Davis); molecular biology of tuberculosis.

Freitag, Nancy E. 2000; PhD, 1989, University of California (Los Angeles); bacterial pathogenesis and regulation of gene expression.

Koelle, David 1988, (Adjunct); MD, 1985, University of Washington; allergy and infectious diseases.

Lingappa, Jaisri * 1999; PhD, 1985, Harvard University, MD, 1987, University of Massachusetts; cell biology of virus assembly; host proteins involved in assembly of HIV and other viruses.

Sherman, David R. * 1998; PhD, 1987, Vanderbilt University; molecular genetics, microbiology and biochemistry of pathogenic mycobacteria.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

UCONJ 420 Biological Safety Practices (1) *Kenny*
See University Conjoint courses.

PABIO 445 Medical Virology (2) *NW Thouless, Wong*
An introductory course emphasizing basic understanding of medical virology and viral pathogenesis. The biochemical, replication, host-parasite relationships and pathogenesis of animal viruses are examined. Prerequisite: either BIOL 180, BIOL 200, or BIOL 201. Offered: jointly with MICROM 445; Sp.

PABIO 498 Undergraduate Thesis (*)

PABIO 499 Undergraduate Research (*)

Courses for Graduates Only

PABIO 500 Introduction to Pathobiology Research (3-9, max. 9) Rotation through research laboratory. Credit/no credit only.

PABIO 511 Pathobiological Frontiers (2) *Kenny*
Molecular and immunological concepts of infectious and noninfectious diseases presented in format suitable for graduate students knowledgeable in health-related areas who are not in biology-oriented programs. Allergy, immune responses, nature of infectious agents, prevention of disease with emphasis on newly defined diseases and disease agents. Prerequisite: permission of instructor.

PABIO 514 Animal Models and Public Health Genetics (2) *LeBoeuf*
Contributions of animal models to studies of human diseases. Concepts of multi-genic diseases, chromosomal mapping, quantitative traits with emphasis on diseases of major public health impact. Interaction between inheritance and nutrition. Focus on mouse genetics. Prerequisite: GENET 371, PHG 513, or permission of instructor. Offered: jointly with NUTR 514/PHG 514.

PABIO 525 Cell Surface Membrane in Cell Sociology and Immunology (2) *Carter, Hakomori*
Structure and function of cell surface membranes in relation to development of various diseases, particularly infection, cancer, and inflammation. Examines how specific cell surface molecules are targets of recognition by microbes, tumor cells, and recruited inflammatory cells. Prerequisite: BIOC 440, BIOC 441, BIOC 442, and permission of instructor. Offered: jointly with MICROM 525.

PABIO 536 Bioinformatics and Gene Sequence Analysis (3) *Rose*
Nature and relevance of molecular sequence information, computer-based protein, and DNA sequence analysis, molecular sequence and genomic databases, and methods for database accession and interrogation. Prerequisite: background in molecular biology and permission of instructor. Offered: jointly with MEDED 536; ASp.

PABIO 540 Antibiotic Resistance Mechanisms and Their Impact on Public Health (3) *Roberts*
Lectures covering resistance mechanisms against bacterial antibiotics, antiviral, antiparasitic, and cancer drugs. Topics also include the effects that resistant microorganisms have on therapy and cancer treatment and their impact on public health. Prerequisite: permission of instructor.

PABIO 548 Molecular and Cellular Parasitology (3) *Feagin*
Molecular and cellular biology of parasites of health-related significance, emphasizing current research topics unique to parasites, particularly well-

sued for study in parasites, and especially important to study in host-parasite systems. Prerequisite: familiarity with molecular and cellular biology and permission of instructor. Offered: even years; Sp.

PABIO 550 Diseases of Public Health Importance and Strategies for their Control (3) Public Health perspective of major disease of national and global importance. Discussion of origins, establishment, progression, and pathogenesis of diseases. Importance of immunological, intercellular and external factors, and strategies of disease prevention. Requires a grounding in cellular and molecular biology, microbiology, and immunology. Prerequisite: permission of instructor.

PABIO 551 Biochemistry and Genetics of Pathogens and Their Hosts (4) . Provides a strong foundation in biochemistry, molecular biology, and genetics for students interested in disease. Principles will be illustrated through examples focusing on pathogens, and infectious and non-infectious disease. Prerequisite: undergraduate-level course work in molecular biology or biochemistry or permission of instructor.

PABIO 552 Cell Biology of Human Pathogens and Disease (4) Cell biology and immunology explored through diseases of public health importance with examples of pathogen interaction with host cell biology and immune systems, unique aspects of the cell biology of pathogens, perturbations of these systems in non-infectious diseases and design of therapeutic

tics and vaccines to combat diseases of public health importance. Prerequisite: undergraduate level coursework in biology or molecular biology or permission of instructor.

PABIO 553 Survival Skills for Scientific Research (2) *Lukehart, Parsons* Focuses on skills needed for scientific career: writing abstracts, curriculum vitae, research proposals; preparing for oral presentations; lab management skills; discussion of mentorship/trainee relationships; case-based discussions of various topics in ethics and scientific misconduct. Offered: Sp.

PABIO 568 Molecular Epidemiology of Infectious Diseases (2) Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: PABIO 511 or PABIO 512 or permission of instructor. Offered: jointly with ENV H 568/EPI 568; W.

PABIO 580 Pathobiology Seminar (1, max. 15) Research from students, faculty members, and invited speakers is presented and discussed. Topics include immunochemistry, viruses, membranes, infectious diseases, immune response and other related topics.

PABIO 581 Current Literature in Pathobiology (1, max. 15) Develops skills in analyzing data and

assessing conclusions through an analysis of current literature in Pathobiology. Focuses on breadth and analytical skills. Prerequisite: enrollment in the pathobiology graduate program.

PABIO 582 Critical Thinking and Research Design in Pathobiology (1.5) *Lingappa* Analysis of issues, hypothesis and experimental design and testing. Credit/no credit only. Prerequisite: graduate standing in pathobiology. Offered: W.

PABIO 590 Selected Topics (1-20, max. 20) Individual offerings focusing on topics such as pathogenesis, immunology, virology, disease agents, bioinformatics and grant writing. Small lecture format. Credit/no credit only. Prerequisite: permission of instructor.

PABIO 598 Didactic Pathobiology (*, max. 12) Supervised teaching experience in pathobiology courses for Ph.D. candidates. Prerequisite: permission of instructor.

PABIO 600 Independent Study or Research (*) Credit/no credit only. Prerequisite: permission of graduate program adviser.

PABIO 700 Master's Thesis (*) Credit/no credit only. Prerequisite: permission of graduate program adviser.

PABIO 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of graduate program adviser.



School of Social Work

210 Social Work/Speech and Hearing Sciences



General Catalog Web page:
www.washington.edu/students/genecat/academic/School_Soc_Work.html



School Web page:
depts.washington.edu/sswwweb/

Dean

Dorothy Van Soest

The School of Social Work offers two professional programs, one at the undergraduate level and one at the graduate level, as well as a Ph.D. program. The undergraduate program prepares students for entry-level generalist practice; students earn the Bachelor of Arts in Social Welfare degree. The graduate professional program prepares students for advanced practice within a field of concentration; students earn a Master of Social Work degree. Both professional programs are accredited by the Council on Social Work Education. The School also offers a Doctor of Philosophy degree in social welfare that prepares students for careers in research and education. For the three programs, no credit is granted on the basis of life experience or previous employment. All three programs are housed in the Social Work/Speech and Hearing Sciences Building, 4101 Fifteenth Avenue Northeast, Seattle, WA 98105-6299.

In addition, the School offers a concurrent degree program with the School of Public Health and Community Medicine leading to the M.S.W. and M.P.H. degrees.

Graduate Program

Graduate Program Coordinator
Box 354900
206-543-8617
sswstsr@u.washington.edu

Master of Social Work

The School of Social Work offers a Master of Social Work degree with four options for completion: a two-year full-time program; a one-year Advanced Standing program for qualified students with a degree in social work/social welfare from an accredited undergraduate program; a three-year Evening Degree program; and a three-year MSW Outreach program.

All program options prepare students for advanced professional practice with a culturally diverse range of at-risk populations in publicly funded social services. The curriculum encompasses two distinct but interconnected areas: the beginning content or professional foundation, and opportunities for advanced content in areas of policy, services, and methods.

The professional foundation provides instruction in the basic knowledge and skills required for effective, generalist social work practice, as well as socialization to the profession, its value orientation, ethics, and history.

The advanced curriculum provides in-depth knowledge and skills needed for advanced practice in the social work profession. At the time of publication, the advanced curriculum is being

revised. Please check the School's Web page (depts.washington.edu/sswwweb/) for the most current information.

Students in the Evening Degree and Outreach options may also select from courses in advanced policy services and methods. Elective offerings are determined by a vote of students in the cohort.

Admission Qualifications

Admission to the M.S.W. program requires formal admission to the Graduate School as well as to the School of Social Work. Applicants are required to have a bachelor's degree, a strong academic background, and social-service experience. Applicants must submit transcripts, references, application forms, Graduate Record Examination scores, résumé, and an admission essay to be considered for autumn-quarter entry. January 15 is the closing date for receipt of applications and materials. Admission is competitive and selection is based on a review of the applicant's submitted materials. Current application materials can be obtained from the School's Admissions Office, 23 Social Work/Speech and Hearing Sciences Building, or by calling 206-543-5676 in Seattle or 1-800-558-8703.

Financial Aid

A limited number of financial-aid opportunities are available to students. Applicants to the M.S.W. program are urged to apply for assistance through the Office of Student Financial Aid by February 15. Completion of the Free Application for Federal Student Aid (FAFSA) is required for consideration for any departmental funding. Departmental funding is limited to a few resident tuition scholarships which cover only one or two quarters of tuition. Inquiries may be directed to the Chair of the Scholarship Committee, School of Social Work.

Master of Social Work-Master of Public Health Concurrent Degree Program

The School of Social Work participates with the School of Public Health and Community Medicine in a concurrent degree program leading to the M.P.H. and M.S.W. degrees. The program offers interdisciplinary preparation in the fields of public health and social work. Historically, public health and social work have shared an interest in a preventive approach to health and social problems, a community perspective, and a focus on vulnerable populations. Both fields recognize the interrelationship of the health, social, and behavioral components of contemporary problems and the need for interventions and research that address all three components. The concurrent degree program prepares professionals to function at the interface of both fields, in practice, research, planning, administration, and policy development.

Additional information concerning the concurrent degree program may be obtained from the School of Social Work's Admissions Office.

Doctor of Philosophy in Social Welfare

The Ph.D. program in social welfare prepares students to contribute to the advancement of knowledge and practice in the field of social welfare and the profession of social work. The program builds on the premise that social welfare scholarship must be scientifically based, responsive to service and practice needs, and informed of developments in related fields and disciplines.

After the first year of required courses, each student's program of study is individually designed and focuses on well-defined substantive and interventive areas of research relevant to the field of social welfare. In

the basic core of required courses, which include teaching and research practice, students have an opportunity to pursue their particular interests with faculty members in the School of Social Work and in other schools and departments.

During the first two years, students are expected to define and develop the specialized areas that will be the focus of their General Examination and, typically, their subsequent dissertation research. The selected areas must have clear significance for the development of practice, programs, or policies in social work and social welfare.

The General Examination for advancement to candidacy generally occurs at the end of the second year or early in the third year. After advancement to candidacy, students devote themselves full time to completion of their dissertation research. The last step before award of the degree is the Final Examination, which consists mainly of the defense of the dissertation. Students are strongly encouraged to remain in residence at the University until the dissertation is accepted. The Ph.D. program is designed to take approximately four years, although academic excellence in learning and performance is always the first criterion for degree progress.

Admission

Admission is highly selective and students are admitted for autumn-quarter entry only. Applicants should have a master's degree in social work or comparable preparation in a closely related field.

The Council on Social Work Education requires that faculty who teach practice courses in accredited programs have two years of supervised practice experience. Thus, obtaining such experience is highly important for those who seek academic positions following graduation.

Applicants selected for admission are those whose scholastic achievements, previous experience, and aptitude for social welfare research, scholarship, and teaching indicate the greatest promise for achieving the objectives of the program. In addition, an effort is made to maintain a balanced student group reflecting the range of concerns in social welfare and of faculty resources. The deadline for receipt of admission material is January 2. For more information, call 206-685-1680, or email pdmhpr@u.washington.edu.

Financial Aid

Stipends, scholarships, teaching and research assistantships, and tuition waivers are available. Every effort is made to provide aid to each student who requires it, and research and teaching assistant positions are provided to all Ph.D. students for at least the first three years. The financial assistance provided is not usually adequate to cover all educational and living expenses. Financial-aid forms required for financial assistance must be submitted by February 15 by completing the Free Application for Federal Student Aid (FAFSA).

Faculty

Professors

Catalano, Richard F. * 1979; PhD, 1982, University of Washington; crime, violence and drug abuse prevention, promotion of positive youth development.

Conte, Jon * 1990; PhD, 1979, University of Washington; effects of sexual abuse on children and adult survivors, prevention of sexual abuse.

Gilchrist, Lewayne D. * 1981; PhD, 1981, University of Washington; health promotion and disease pre-

vention in community settings, women's health, research methods.

Gillmore, Mary Louise 1977; MS, 1970, University of Michigan, MA, 1977, PhD, 1983, University of Washington; adolescent sexuality and substance abuse.

Hawkins, John D. * 1976; PhD, 1975, Northwestern University; crime and delinquency, substance abuse, social development, research, prevention.

Hooyman, Nancy * 1979; PhD, 1974, University of Michigan; aging, caregivers of dependents, feminist practice, community organization development.

Jaffee, Ben-Joshua * 1967, (Emeritus); DSW, 1972, Columbia University; research methodology, program evaluation, needs assessment, evaluation of direct practice.

Lazzari, Marceline * 1998, (Adjunct); PhD, 1990, University of Denver; women, human diversities, and teaching/learning collaboration.

Levy, Rona L. * 1975; PhD, 1974, University of Michigan; research methodology, single-case evaluation, health care, behavioral medicine, biofeedback.

Longres, John F. * 1993, (Emeritus); PhD, 1970, University of Michigan; race and ethnicity; children, youth, and families.

Maier, Henry W. * 1985, (Emeritus); PhD, 1959, University of Minnesota; child development, group child care, direct practice with individuals, families, and groups.

Morrison, Diane M. * 1980; PhD, 1982, University of Washington; sexual decision-making, attitudes and behavior, teen pregnancy.

Nurius, Paula S. * 1984; PhD, 1984, University of Michigan; social cognition, violence against women, stress and coping, critical thinking.

Parsons, Jack R. 1978, (Emeritus); MA, 1940, University of the Pacific, MS, 1943, Columbia University, PhD, 1958, University of Chicago; social work.

Pecora, Peter * 1990; PhD, 1982, University of Washington; child welfare practice, foster care, family preservation services, personnel management.

Resnick, Herman * 1967, (Emeritus); PhD, 1970, Bryn Mawr College; organizational development, group dynamics, planned change, environmental psychology, social welfare.

Richey, Cheryl A. * 1973; DSW, 1974, University of California (Berkeley); cultural and gender issues, intervention design and research.

Roffman, Roger Alan * 1972; DSW, 1983, University of California (Berkeley); alcoholism and drug abuse, research methodology, program evaluation.

Stier, Florence E. * 1964, (Emeritus); MS, 1941, University of Pittsburgh; social welfare planning and program development.

Sutton, Sharon E. * 1998, (Adjunct); MArch, 1973, Columbia University, PhD, 1982, City University of New York; the effect of the environment on learning and community well-being.

Takagi, Calvin Y. 1961, (Emeritus); MSW, 1952, PhD, 1958, University of Minnesota; mental health services, child development, services to minority populations.

Weatherley, Richard A. * 1975, (Emeritus); PhD, 1977, Massachusetts Institute of Technology; social welfare policy and administration, poverty and inequality.

Whittaker, James * 1970; PhD, 1970, University of Minnesota; interpersonal practice with individuals, families, and small groups; child and family policy.

Associate Professors

Anderson, James R. * 1968, (Emeritus); MA, 1954, Indiana University; social work and health care, interdisciplinary teams in health care, growth and development.

Arthur, Michael * 1991, (Research); PhD, 1990, University of Virginia; Project Director—Community Youth Activity, Six State Prevention Needs and Assessment.

Balassone, Mary Lou * 1986; DSW, 1987, University of California (Berkeley); health care policy and delivery systems, maternal and child health.

Berleman, William C. * 1965, (Emeritus); MSW, 1960, University of Washington; undergraduate social welfare, social welfare policy.

Dear, Ronald Bruce * 1970; DSW, 1972, Columbia University; welfare and income maintenance policy and programs, fiscal impact of social programs.

Duplica, Moya M. * 1963; MSW, 1956, St Louis University; social welfare policy and history, women and social policy, values and ethics.

Ellis, Jack A. N. * 1966, (Emeritus); MSW, 1955, University of British Columbia (Canada); social welfare administration and planning, social work and the justice system.

Erera, Pauline * 1993; PhD, 1983, Cornell University; non-traditional families including: step-families, foster families, single-parent families.

Fredriksen, Karen Ilene * 1993; PhD, 1993, University of California (Berkeley); gerontology, work and family dependent care, non-traditional families, social policy.

Hanneman, Carl F. 1967, (Emeritus); MA, 1951, Indiana University; aging, alcoholism, human services practice.

Harachi, Tracy * 1987, (Research); PhD, 1991, University of Washington; child development, interventions for children and families, cultural adaptation and ethnic identity.

Herrick, James E. * 1966, (Emeritus); DSW, 1966, University of Southern California; social policy, social work and the justice system, research methodology, social and cultural change.

Ishisaka, Anthony H. * 1971; DSW, 1978, University of California (Berkeley); social work practice, mental health services, services to minority communities, human development.

Kelley, Jerry Lee * 1961, (Emeritus); MA, 1949, University of Chicago; social workers in schools, interviewing and counseling in human services.

Kemp, Susan 1994; MA, 1981, University of Auckland (New Zealand), PhD, 1994, Columbia University; supports to low-income families; public child welfare; social welfare history; social work theory.

Kruzich, Jean * 1991; PhD, 1982, University of Washington; child maltreatment and substance abuse, influence of organizational characteristics on human service.

Leigh, James William * 1967, (Emeritus); MSW, 1954, Wayne State University; social work practice with families, multiethnic and multicultural concerns, family life education.

Lindenberg, Catherine S. 1998, (Adjunct); DPH, 1985, Johns Hopkins University; public health management and policy.

Marcenko, Maureen * 1997; PhD, 1988, McGill University (Canada); research on the efficacy of interventions for families.

Meyers, Marcia 2001; PhD, 1992, University of California (Berkeley); gender, poverty, inequality, welfare, child care, social policy, policy implementation.

Miller, Sidney * 1962, (Emeritus); MS, 1953, Columbia University; children, adolescents, and their families, interviewing, crisis intervention, marital counseling.

Mundt, Lenora B. 1985, (Emeritus); MSW, 1950, University of Washington; family treatment.

Ryan, Rosemary * 1991, (Research); PhD, 1987, University of Washington; behavioral HIV prevention research; AIDS services policy, planning and evaluation.

Semke, Jeanette * 1988, (Research); PhD, 1991, University of Washington; mental health services research, older adults with neuropsychiatric disorders.

Sohng, Sue * 1990; PhD, 1989, University of Pittsburgh; action research and chronic mental illness, cross-cultural social work practice.

Teather, Edward Charles * 1966, (Emeritus); MSW, 1962, University of British Columbia (Canada); residential treatment of children, group work, program development.

Uehara, Edwina * 1990; PhD, 1987, University of Chicago; qualitative/quantitative research methods, cross-cultural mental health, human services organization.

Walters, Karina 2000; PhD, 1995, University of California (Los Angeles); American Indian health and mental health research and multicultural counseling.

Assistant Professors

Ai, Amy 1999; PhD, 1996, University of Michigan; health, mental health, aging, spirituality, coping, depression, psychosocial adjustment, PTSD.

Allen, Allethia Lee * 1966, (Emeritus); MSW, 1950, Boston University, PhD, 1986, Walden University; social work practice, social policy, interviewing, minority women, minority families, adolescents.

Almgren, Gunnar R. 1986; MSW, 1979, Portland State University, PhD, 1990, University of Washington; the relationship between race, ethnicity, socioeconomic status, and health outcomes.

Cherin, David * 1999; PhD, 1996, University of Southern California; community-based health research focused on service delivery systems for chronically/terminally ill.

Cook, Douglas * 1990, (Clinical); PhD, 1990, University of Washington; neurodevelopmental disabilities: parents with; health promotion for; clinic work, collaboration.

Emler, Charles 2000, (Adjunct); MSW, 1979, California State University, Fresno, PhD, 1998, Case Western Reserve University; gerontology, community-based long term care, older adults with HIV/AIDS.

Evans-Campbell, Teresa A. 2000; PhD, 2000, University of California (Los Angeles); Indian child welfare; practice; effects of historical trauma on native families and communities.

Farwell, Nancy 1998; PhD, 1998, University of California (Berkeley); mental health policy.

Herrenkohl, Todd 1995; PhD, 1998, University of Washington; the etiology and prevention of antisocial behavior among children and adolescents.

Huang, Bu 1997, (Research); PhD, 1997, Bowling Green University; juvenile delinquency, risky sexual behavior, criminological theories, problem behavior, violence.

Laakso, Janice 1999, (Adjunct); PhD, 1999, University of Texas (Austin).

Lincoln, Karen D. 2001, (Acting); PhD, 2002, University of Michigan; informal social networks; role of social and personal resources on stress process; black families.

Lindhorst, Taryn 2001; PhD, 2001, Louisiana State University; violence against women, poverty, gay/lesbian issues, multicultural practice.

Nagda, Biren A. * 1996; PhD, 1996, University of Michigan; multicultural and empowerment approaches in social work, organizations and education.

Ogilvie, Myrth 2001, (Adjunct); MSW, 1982, PhD, 1999, Portland State University.

Oxford, Monica L. 2001, (Research); PhD, 2000, University of Washington; child and adolescent development, parenting, longitudinal data analysis, research methods.

Tajima, Emiko A. 1999; PhD, 1999, Bryn Mawr College; domestic violence; child abuse; parenting practices; law and social policy.

Senior Lecturers

Amidei, Nancy 1992; MSW, 1968, University of Michigan; poverty, public policy, advocacy.

Pearce, Diana * 1998; PhD, 1976, University of Michigan; the feminization of poverty.

Roberts, Elizabeth A. 1982; MSW, 1975, University of Washington; aging, social policy and aging, social work administration and field education.

Lecturers

Cahn, Katharine C. 1985; MSW, 1989, University of Washington; Director—Northwest Resource Center for Children, Youth, and Families.

Carrigan, Lynn 1981; MSW, 1981, University of Washington; spirituality, creativity, leadership, communications and ethics.

De Mello, Stan 1996; MSW, 1982, MPA, 1983, Dalhousie University (Canada); cross-cultural social work practice.

Delong, James B. 1985; MSW, 1979, University of Washington; aging, men's and gender issues, group work, human diversity and social justice, distance learning.

Haggerty, Kevin P. 1985; MSW, 1989, University of Washington; Project Director—Focus on Families, Raising Healthy Children; prevention.

Horn, Michael 2001; PhD, 2001, University of Washington; organizational development in child welfare; participatory action research; measurement theory.

Keenan, Lynn 1990; PhD, 1996, University of Washington; project development and initiation; school support; cross-cultural supervision; distance learning.

Macy, Jane 2000; PhD, 1999, University of Minnesota; continuing education, adult education, technology and social work practice.

Rivara, J'may B. 1985; MSS, 1975, Bryn Mawr College.

Course Descriptions

See page 39 for an explanation of course numbers, symbols, and abbreviations.

For complete undergraduate course descriptions, see the undergraduate volume of the *General Catalog* or visit the online course catalog at www.washington.edu/students/crscat/.

Social Welfare (BASW)

SOC WF 402 Human Behavior and Social Environment I (3) I&S Focuses on person-in-the-environment for individuals and family development across the life span. Utilizes developmental and social systems perspectives in seeking to understand and influence human behavior across diverse backgrounds. Addresses dynamics and processes of families, small groups, organizations, and community systems.

SOC WF 403 Human Behavior and Social Environment II (3) I&S Focuses on person-in-the-environment for small groups, organizations, community, and society as systems. Utilizes developmental and social systems perspectives in seeking to understand and influence human behavior across diverse backgrounds. Prerequisite: SOC WF 402.

SOC WF 404 Cultural Diversity and Justice (5) I&S *Duplica, Sohng* History and culture of disadvantaged and oppressed groups served by Social Welfare generalist practitioners. Offered: Sp

SOC WF 405 Fieldwork Seminar (2-4, max. 9) *Balassone* Integrates social work practicum experiences with prior and concurrent course work in social sciences, social work, and research. Includes discussion of class presentations and simulations or practice situations that combine knowledge and skill utilization. Student logs provide a basis for individual goal identification and achievement. Required of social welfare seniors. Prerequisite: SOC WF 312. Offered: A/WSp.

SOC WF 409 Readings in Social Welfare (1-5, max. 15)

SOC WF 415 Beginning Field Instruction (4-6, max. 12) Students are placed in selected social service agencies and accept beginning social service assignments under the supervision of competent agency personnel. Credit/no credit only. Prerequisite: SOC WF 312. Offered: A/WSp.

SOC WF 430 Child Care Work Practice (3) *Whittaker* Specialized practice with emotionally disturbed and delinquent children in group-care settings with focus on providing child-care staff with specific tools for teaching alternative behavior. Major topics include: etiology and diagnosis, observing and recording children's behavior, special problems of group living, life-space interviewing, token economies, activity programming, group interventions, parental involvement, organizational requisites and community linkages. Offered: alternate years; A.

SOC WF 442 Building Competencies for Intergroup Dialogue Facilitation (3) Focuses on both knowledge and skills development for peer facilitators. Topics include philosophy and principles of dialogic education and dialogic communication; intergroup communication; social identity development; principles of working with conflict; group dynamics, observation, and facilitation; team building among co-facilitators; and creating a support system among instructors and facilitators. Credit/no credit only.

SOC WF 443 Facilitating Intergroup Dialogue (3) Practicum seminar providing instruction, consultation, and supervision of peer group facilitators. Focuses on comparison of facilitation experiences and consultations, trouble-shooting with other facilitators, co-facilitator team building, and planning for dialogues. Exploration of specific, current intergroup issues, such as affirmative action and immigration. Continuation of team-building work begun in 452. Credit/no credit only.

SOC WF 490 Research in Social Welfare (1-3, max. 10) Individual work with faculty member to assist with current research project (s). Students trained and supervised in some or all of the following research tasks: literature review, data analysis, record-keeping, interviewing, report writing, data entry and coding, data collection, and other tasks commonly found in research problems in social welfare. Credit/no credit only.

SOC WF 495 Special Topics in Generalist Social Welfare (5) Readings, lectures, and discussions pertaining to significant topics of special and current interest to social workers.

Social Welfare

Courses for Graduates Only

SOC WL 552 Analytical Perspectives on Social Welfare Policy (3) Broad overview of the social welfare policy process, including epistemological issues, content on social problem construction and definition, policy agendas and case study methodology. Introduction to analytical tools and concepts needed to take a proactive role in policy development, advocacy, implementation, and policy research. Offered: Sp.

SOC WL 553 Seminar in Contemporary Social Welfare Policy (3) Critical review of contemporary American income maintenance and related social welfare policies, and the economic, political, and social factors that affect their development, implementation, and effectiveness. Evaluation of their effects on poverty, income inequality, and related social outcomes, including international comparisons. Assessment of proposals for reform. Closely linked to 552. Offered: Sp.

SOC WL 558 Integrative Seminar (1-2, max. 2) Topic-driven seminar that targets professional development of the first and second years (scholarship, research, teaching). Active participation expected in discussions and reflective papers. May require preparation for presentation or demonstration. Offered: A.

SOC WL 559 Doctoral Seminar in Teaching Preparation (3) Focus on teaching content and issues integral to being a skillful instructor. Issues and related skills generalized to range of post-graduate positions. Promote understanding of pedagogical issues and development of specific teaching skills. Credit/no credit only. Prerequisite: doctoral student. Offered: A.

SOC WL 578 Seminar in Special Topics for NIMH Prevention Research Trainees (1, max. 9) Interdisciplinary overview of major concepts in promotion of mental health and prevention of mental distress with prevention science as framework. Provides conceptual foundations for advanced study in specialized aspects of mental health prevention research. Prerequisite: enrollment in Social Welfare Predoctoral Training Program in Prevention of Mental Health Problems and Disorders. Credit/no credit only. Offered: A/WSp.

SOC WL 579 Interdisciplinary Approaches to Prevention Science: Children and Adolescents (3) Overview of theory, research, and practice in prevention science. Developmental perspective examining

factors that promote or inhibit health development at different stages and during transitions (focus on birth through age 21). Designed for interdisciplinary dialogue, and includes guest faculty from around the University who are specialists in course topics. Credit/no credit only. Offered: A.

SOC WL 580 Introduction to Advanced Research Method and Design (3) Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Offered: A.

SOC WL 581 Introduction to Advanced Research Method and Design (3) Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Offered: W.

SOC WL 582- Research Practicum (3-) Development of specific methodological skills in social welfare research through participation in an ongoing research project. Learning contract used to target specific research competencies. Credit/no credit only. Offered: ASpS.

SOC WL -583 Research Practicum (-3) Development of specific methodological skills in social welfare research through participation in an ongoing research project. Learning contract used to target specific research competencies. Credit/no credit only. Offered: ASpS.

SOC WL 584 Teaching Practicum (3) Supervised teaching of a required course or teaching as a co-instructor with a faculty member. Learning contract used to target specific teaching competencies, e.g., assessing and evaluating student outcomes, identifying class session goals and objectives, tailoring instruction methods to diverse learning styles. Offered: ASpS.

SOC WL 587 Fundamentals of Social Work Statistics I (4) Descriptive and inferential statistics. Underlying logic of statistical inference. Statistical issues of special relevance in social work, including measurement, research design, and ethics in research. Prerequisite: concurrent registration in SOC WL 580. Offered: A.

SOC WL 588 Fundamentals of Social Work Statistics II (4) Issues in the use of descriptive and inferential statistics, especially the statistical control of extraneous variables. Applications of statistical inference in factorial design, and correlation and regression. Statistical issues of special relevance in social work. Ethics in the use of statistics. Prerequisite: concurrent registration in SOC WL 581. Offered: W.

SOC WL 598- Research Problems and Priorities in Social Work and Social Welfare (3-) Provides students with foundations in the definitions of theory; the socially constructed nature of theory and definition of social "problems"; conceptual and theoretical perspectives on human society, interaction, and change; and analysis of current conceptual models in social welfare literature. Prerequisite: admission to social welfare Ph.D. program or permission of instructor. Offered: A.

SOC WL -599 Research Problems and Priorities in Social Work and Social Welfare (-3) Assists students in applying theory in building an original conceptual model. Emphasizes critical thinking, including ideological, political, methodological, and ethical contexts/implications of ideas, theories, and models that shape social welfare scholarship and its application to social practice. Prerequisite: admission to social welfare Ph.D. program or permission of instructor. Offered: W.

SOC WL 600 Independent Study or Research (*) Prerequisite: approval of a well-specified plan by the instructor and program director. Includes a written product. Offered: ASpS.

SOC WL 800 Doctoral Dissertation (*) Offered: ASpS.

Social Work (MSW)

Courses for Graduates Only

SOC W 501 Social Policy and Economic Security (3) *Duplica, Weatherley* Study of United States welfare system with emphasis on income maintenance programs. Analytical and descriptive focus on major income maintenance and social insurance programs, their strengths and weaknesses, and their historical, philosophical, and cultural foundations. Examines poverty, inequality, unemployment, and homelessness in context of emergent welfare state and related policies. Offered: A.

SOC W 502 Human Behavior and Social Environment I (3) *Erera, Longres, Resnick* Human functioning in a social context across the life span. Includes human biological, psychological, social, and cultural functioning across the range of social systems in which individuals live, i.e., cultures, institutions, communities, organizations, groups, and families. Offered: A.

SOC W 503 Human Behavior and Social Environment II (3) *Erera, Longres, Resnick* Human functioning in a social context across the life span. Includes human biological, psychological, social, and cultural functioning across the range of social systems in which individuals live, i.e., cultures, institutions, communities, organizations, groups, and families. Offered: W.

SOC W 504 Cultural Diversity and Social Justice (3) *Nagda, Sohng* History, culture, and status of disadvantaged and oppressed groups served in public sector social work practice. Offered: AW.

SOC W 505 Foundations of Social Welfare Research (3) *Almgren, Balassone, Erera, Roffman* Overview of research process/methods in social work, with focus on consuming and performing practice-related research and evaluating one's own practice. Emphasis on critical understanding of empirical literature, development of useful and appropriate questions about social work practice, and strategies and techniques for doing research and applying findings to practice. Offered: Sp.

SOC W 510 Practice I: Introduction to Social Work Practice (3) *Kemp, Marcenko, Richey, Roffman* Foundation knowledge and skills for direct practice with individuals, families, and groups. Assists students toward mastery of interviewing and relationship building skills and knowledge of cross-cultural communication and practice issues and of social work values and ethics. Provides opportunity to develop beginning level skills in assessment. Offered: ASp.

SOC W 511 Practice II: Intermediate Direct Service Practice (3) *Kemp, Marcenko, Richey, Roffman* Foundation knowledge and skills for direct practice with individuals, families, and groups. Course assists students toward mastery in assessment, development of treatment plans based on theory and assessment information, goalsetting skills, and selection of appropriate interventions. Offered: AW.

SOC W 512 Practice III: Organizational Practice (3) *Fredriksen, Kruzich, Uehara* Focuses on ways in which management activities contribute to service effectiveness for clients and quality of conditions for staff. Various managerial roles, functions, and skills examined. Impact of agency structure, culture, and mission on staff, clients, and organizational out-

comes discussed with emphasis on ways social work managers influence change. Offered: W.

SOC W 513 Practice IV: Community Change Practice (3) *Weatherley* Provides frame of reference and skills for community-based social work practice. Theories of social change are examined with examples drawn from community organizing and policy advocacy. Offered: Sp.

SOC W 514 Foundation Practice Skills (3) Focus on the teaching of practice skills (micro, mezzo, and/or macro) associated with key contemporary themes in social work. Possible topics include social work with American Indian communities, adult interpersonal violence, and assessment and brief intervention in substance abuse and dependence. Offered: SpS.

SOC W 523 Introduction to Practicum (1) *DeLong, Rivara, Roberts, Wollin* Workshops for preparation for agency-based placement interviewing and orientations occur at agencies. Credit/no credit only.

SOC W 524 Foundation Practicum (1-8, max. 12) *DeLong, Rivara, Roberts* Agency-based practicum with emphasis on development of knowledge, perspectives, and skills needed for practice with individuals, families, groups, organizations, and communities. Credit/no credit only. Prerequisite: social work major. Offered: ASpS.

SOC W 525 Advanced Practicum (2-10, max. 24) *DeLong, Rivara, Roberts* Agency-based advanced practicum. Credit/no credit only. Prerequisite: SOC W 515 and foundation courses. Offered: ASpS.

SOC W 531 Child and Family Policy and Services (3) *Pecora, Whittaker* Examines selected areas of child and family services policy in terms of historical antecedents, expressed values, practice implications, and potential for policy reform. Representative topical areas include: foster care; family preservation and support; residential services; services to prevent and ameliorate child maltreatment. Offered: A.

SOC W 532 Children, Youth, and Family Practice I (3) *Kemp, Marcenko, Teather* Builds on foundation practice methods sequence to deepen individual, family, and community level assessment and intervention skills relevant for work with children, youth, and families. Offered: ASp.

SOC W 533 Children, Youth, and Family Practice II (3) *Kemp, Marcenko, Teather* Builds on 532 and focuses on the values, knowledge, and skills used in intensive case management and intensive family preservation services. Offered: A.

SOC W 535 Advanced Social Work Research: Children, Youth, and Families Practice (3) *Richey* Principles and procedures for evaluation of direct practice interventions, research methods involved in community-needs assessment, program evaluation, and management-information systems. For Children, Youth, and Families (CYF) concentration. Offered: W.

SOC W 536 Children, Youth, and Family Methods (3, max. 9) *Cook, Dear, Kemp, Marcenko, Pecora, Roffman, Teather, Whittaker* Focuses on child welfare and family services intervention methods, including social work in schools, services for early intervention, prevention and family support, child and adolescent mental health services, work with families of developmentally disabled, permanency planning, group work, family violence and child maltreatment, and intensive family preservation services. Offered: ASpS.

SOC W 543 Praxis of Intergroup Dialogue (3) Students design, plan, implement, and evaluate intergroup dialogue sessions as peer facilitators.

Students facilitate intergroup dialogue in conjunction with SOC W 504. Focuses on intensive in-vivo instruction, consultation and supervision of facilitators. Credit/no credit only.

SOC W 545 Advanced Social Work Research: Participatory Action Research for Multi-Ethnic Practice (1-3, max. 3) *Sohng* Principles and procedures for the evaluation of direct practice interventions, research methods involved in community-needs assessment, program evaluation, and management-information systems. For Multi-Ethnic Practice (MEP) concentration. Offered: W.

SOC W 546 Multi-Ethnic Practice Methods (1-3, max. 12) Focus on specialized knowledge and skills necessary for effective social work with American-Indian, African-American, Asian-American, and Latino or Hispanic individuals, groups, and communities and for work in a variety of settings and fields of practice. Offered: AWSp.

SOC W 552 Planning and Program Development (3) *Fredriksen, Kruzich* Introduces the practice skills and knowledge required for specialized practice in agency management. Offered: W.

SOC W 553 Supervisory Leadership (3) *Kruzich, Pecora* Presents critical skills for major phases of the personnel process including recruiting, supervising, and supporting employees. Offered: A.

SOC W 554 Financial Management in Human Services (3) Focus on key budgeting concepts and techniques common to human service agencies including budget development, resource allocation, problems of fiscal control, fiscal record keeping, and cost analysis. Offered: W.

SOC W 555 Advanced Social Work Research: Using information to Improve Agency Performance for Administration (3) *Uehara* Principles and procedures for the evaluation of direct practice interventions, research methods involved in community-needs assessment, program evaluation, and management-information systems. For Administration (ADM) concentration. Offered: W.

SOC W 556 Social Work Administration Methods (3, max. 9) *Fredriksen, Kruzich, Pecora, Uehara* Focus on relevant skills for social work administra-

tors, including such topics as fundraising, grantwriting, and advocacy. Offered: WSp.

SOC W 560 Adult Psychopathology (1) *Roffman* Introduction to major categories of adult psychopathology, differential diagnosis, applying diagnostic criteria to case examples, and use of DSM-IV in social work practice settings, including strengths and weaknesses of DSM-IV. Offered: A.

SOC W 561 Health and Mental Health Policy (3) *Almgren* Review of trends in the development of health and mental health policies and services in the United States, the linkage between key policies and care, initiatives for reform in policy and health/mental health care models, and social work roles. Offered: A.

SOC W 562 Chemical Dependency (2) *Roffman* Introduction to acute and chronic as well as physical and psychological effects of alcohol and other drugs. Current trends in alcohol and drug abuse. Addiction treatment options, outcome studies, and assessment issues in social work practice. Offered: Sp.

SOC W 563- Advanced Health and Mental Health Practice I (3-) *Almgren, Conte, Levy, Rivara* Emphasizes advanced social work practice skills in health and/or mental health settings. Attention is given to key theoretical bases for assessment and intervention with clients and client systems. Offered: A.

SOC W 564 Advanced Health and Mental Health Practice II (3) *Almgren, Conte, Levy, Rivara* Emphasizes advanced social work practice skills in health and/or mental health settings. Attention is given to key theoretical bases for assessment and intervention with clients and client systems. Offered: W.

SOC W 565 Advanced Social Work Research: Health and Mental Health (3) *Levy* Covers methods of measurement, direct practice evaluation, ethical issues, and research methodology of special interest in health and mental health settings. Additional topics may include grant writing, community needs assessment, and management information systems. Offered: W.

SOC W 566 Health and Mental Health Methods (3, max. 9) *Roffman* Focus on a variety of specialized social work practice roles in such health and mental health fields as addiction and grief and loss. Emphasis is given to advanced skills and knowledge for specialized expertise. Offered: WSp.

SOC W 592 Social Problems and Social Welfare (3, max. 9) 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 are studied and related to the student's field.

SOC W 594 Advanced Human Services Practice (3, max. 9) Integration of practice and research with an understanding of and an ability to perform practice skills such as specification of problems and goals, intervention planning, evaluation. Scientific reasoning applied to practice tasks with problems including value conflicts and ethical dilemmas.

SOC W 595 Problem-Focused Human Development (3, max. 9) Focus on the social and developmental determinants of specific human problems and their impact on individual development, families, and social institutions. Some time given to examining the nature of organized social responses that are designed to deal with the specified human problem.

SOC W 597 Seminar (3, max. 6) Seminar for special topics in social work.

SOC W 598 Integrative Seminar (1-5, max. 12) Integrates specialized knowledge in social work settings. Credit/no credit only. Offered: AWSp.

SOC W 599 Readings in Social Work (*) Independent Studies. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

SOC W 600 Independent Study or Research (*)

SOC W 700 Master's Thesis (*)

Faculty Index

A

- Aagaard, Knut 405
 Abbott, Robert D. 225
 Abkowitz, Janis L. 346
 Abrams, Robert 105
 Abrass, Christine K. 346
 Abrass, Itamar B. 346
 Adams, Hazard S. 90
 Adams, Helen D. 195
 Adams, Jacob E. 419
 Adams, John B. 96
 Adams, Loyce M. 62
 Adee, Bruce H. 268
 Adelberger, Eric G. 73, 150
 Aderem, Alan A. 295, 339, 346
 Adler, Stuart B. 243
 Aebersold, Rudolf Hans 335, 354
 Affleck, James Q. 225
 Afromowitz, Martin 256, 310
 Agee, James K. 278
 Ahmad, Suhail 348
 Ai, Amy 444
 Aitken, Moira L. 348
 Alarcon, Nancy B. 179
 Alberg, Mary Ann 150
 Albers, John J. 346, 364
 Albert, Marilynn L. 392
 Alberti, Marina 49, 51, 309
 Alberts, Marco 221
 Alberts, William 196
 Albrecht, Robert G. 43
 Aldea, Gabriel S. 386
 Alden, Dauril 114
 Alexander, Daniel 267
 Alexander, E. Russell 430
 Alexander, Edward 105
 Alexander, M. Joan 75
 Alexandro, Frank J. 256
 Alford, Matthew H. 407
 Alilovic-Curgus, Jadranka 258
 Allan, Christopher H. 362, 387
 Allan, G. Graham 243, 265, 278
 Allen, Allethia Lee 444
 Allen, Carolyn 105, 185
 Allen, Craig H. 317, 403
 Allen, David G. 185, 389
 Allstot, David James 256
 Almgren, Gunnar R. 444
 Alpers, Charles E. 346, 364
 Altieri, Joanne S. 105
 Altman, Gaylene M. 391
 Altman, Leonard 346
 Altschul, Roberto 182
 Alverson, Dayton L. 403
 Alvord, Ellsworth C. 356, 364
 Ambrozy, Donna M. 343
 Ames, Eric C. 112
 Amidei, Nancy 445
 Ammerlahn, Hellmut H. 90, 112
 Ammirati, Joseph F. 78, 278, 292
 Ammons, William F. 219
 Amory, John K. 350
 Amoss, Harold L. 51
 Anagnost, Ann S. 55, 186
 Anasetti, Claudio 346
 Anawalt, Bradley D. 348
 Anchordoguy, Marie C. 121
 Andersen, Niels H. 80
 Andersen, William 317
 Anderson, Alex Thomas 43
 Anderson, Benjamin O. 386
 Anderson, C. Leigh 419
 Anderson, Corrie 325
 Anderson, David 330
 Anderson, Denise G. 355
 Anderson, Donald 265
 Anderson, Farris Furman 168
 Anderson, Gail 356, 411, 412
 Anderson, Garnet L. 423
 Anderson, George C. 405
 Anderson, Helen A. 318
 Anderson, James J. 306, 400
 Anderson, James R. 444
 Anderson, Marjorie E. 302, 373, 382
 Anderson, Patricia M. 96, 307
 Anderson, Richard J. 252
 Anderson, Richard V. 387
 Anderson, Robert A. 225
 Anderson, Robert T. 318
 Anderson, Scott F. 73
 Anderson, Thomas E. 252
 Anderson, Todd A. 240
 Andress, Dennis 346
 Andrews, Robert G. 367
 Andrews, Thomas R. 317
 Andrews, Walter G. 143, 301
 Angell, Patricia L. 195
 Ankudinov, Alexei 152
 Ansell, Julian S. 388
 Antony, James Soto 226
 Anzai, Yoshimi 379
 Ao, Ping 152
 Appelbaum, Frederick R. 346
 Archbold, Thomas F. 265
 Arduino, Pedro 247
 Argenyi, Zsolt B. 346, 364
 Armbrust, E. Virginia 407
 Arms, Judith M. 133
 Armstrong, David A. 292, 400
 Armstrong, Hubert E. 375
 Arnstein, Lawrence 253
 Aronson, Robert H. 317
 Arsove, Maynard G. 132
 Arthur, Michael 444
 Artru, Alan A. 325
 Ashbaugh, David G. 386
 Ashley, Rhoda L. 340
 Astion, Michael L. 341, 342
 Astley, Susan J. 368, 431
 Atkins, William M. 411
 Atkinson, M. Wendy 359
 Atlas, Les Eugene 252, 256
 Atman, Cynthia J. 263, 268
 Atwater, Brian F. 96, 307
 Augerot, James E. 128, 172
 Austin, Melissa A. 346, 430
 Austin-Seymour, Mary M. 378
 Auth, David C. 310
 Averbeck, Patrick J. 133
 Avery, David H. 375
 Aw, Tar C. 221
 Aylward, Elizabeth H. 375, 378
 Ayub, Kamran 350

B

- Baas, Arnold S. 350
 Babb, Albert L. 243
 Babbitt, William R. 257
 Babcock, Donner 373
 Babson, Eric K. 133
 Bacharach, Jere L. 114, 121, 143, 301
 Bachman, David M. 121, 155
 Back, Anthony L. 344, 348
 Badanes, Steven P. 42
 Badgley, Franklin 74
 Bae, Christine 51, 309
 Baer, Jean-Loup 252, 256
 Baer, John S. 161
 Baillie, Thomas A. 410
 Bajjalieh, Sandra M. 298, 303, 371
 Baker, Ann Michelle 148
 Baker, David 152, 297, 311, 326
 Baker, Edward T. 406
 Baker, Marcia 61, 74, 96, 150
 Baker, Marshall 150
 Bakken, Aimee 189, 297
 Balassone, Mary Lou 444
 Baldasty, Gerald J. 86, 185
 Baldwin, Laura M. 333, 436
 Bales, David J. 221
 Balick, Bruce 73
 Balise, Peter 268
 Balistrieri, Laurie S. 406
 Ballweg, Ruth A. 343
 Baneyx, Francois 243, 310
 Banks, James A. 225
 Banse, Karl 406
 Bansleben, Manfred 112
 Barash, David P. 160
 Baratuci, William B. 243
 Bardeen, James M. 73, 150
 Bare, B. Bruce 278, 306, 400
 Barei, David P. 362
 Barker, Scott F. 288
 Barlow, Tani E. 114, 185
 Barlow, William E. 423
 Barnard, Kathryn E. 160, 389
 Barnes, Glover W. 355, 388
 Barnes, Robert 375
 Barnhart, Scott 348, 427
 Baross, John A. 406
 Barr, Karen P. 383
 Barrack, Charles M. 112, 128
 Barrett, Kimberly 162
 Barrett, P. Hugh R. 311
 Barth, Ernest A. T. 175
 Barzel, Yoram 101

- Basdeo, Ganeshdath D. 168
 Bashein, Gerard 310, 325
 Bashey, Husain Ismail 227
 Baskin, Denis G. 302, 328, 346
 Bassingthwaighe, James 295, 306, 310, 378
 Bassok, Miriam 161
 Bates, Timothy S. 75
 Batey, Marjorie V. 389
 Battisti, David S. 74
 Bauer, Larry 340, 412
 Bawarshi, Anis 106
 Baydar, Nazli 390
 Beach, Kirk Watson 256, 310, 386
 Beadie, Nancy Elizabeth 226
 Beale, James M. 137
 Beame, Paul W. 252
 Beamon, Benita M. 263
 Bean, Jennifer M. 91
 Beaton, Randal D. 211, 389
 Beauchaine, Theodore P. 161
 Beauchamp, David A. 400
 Beavo, Joseph A. 295, 302, 370
 Becker, Joseph 160, 375
 Becker, Kyra J. 357, 358
 Becker, Thomas 430
 Beckett, Katherine A. 175
 Beecher, Michael D. 160, 189, 302
 Beeson, Craig C. 81, 327, 339
 Beeson, Paul B. 346
 Behler, Diana I. 90, 112
 Behlmer, George K. 114
 Behrens, Joyce A. 341
 Beirne, Owen Ross 214
 Beitz, Laurie O. 368
 Belcher, Donald W. 348
 Belcher, Edward O. 258
 Bell, Earl J. 51
 Bell, Kathleen 382
 Bell, Michelle 436
 Bell, Philip L. 227
 Bellabarba, Carlo 362
 Belury, Martha 441
 Belza, Basia 362, 390
 Bender, Michael A. 368
 Bendich, Arnold J. 78, 295, 335
 Benditt, Joshua O. 348, 382
 Benedetti, Jacqueline K. 348, 423
 Benedetti, Thomas J. 359
 Benirschke, Stephen K. 361
 Benjamin, Mark M. 246
 Benne, Mae M. 287
 Bennett, Forrest C. 367
 Bennett, W. Lance 86, 155
 Benoliel, Jeanne 389
 Bensadon, Leon M. 168
 Benshoof, Kenneth 137
 Bensinger, William I. 346
 Benson, Keith R. 114, 148, 344
 Bereano, Philip L. 185, 272
 Beresford, Shirley A. 304, 430
 Berg, Alfred O. 332
 Berg, Celeste A. 297, 335
 Berg, Daniel 348
 Berg, John C. 243
 Berg, Kenneth B. 195
 Berg, Martin C. 257, 268
 Bergantz, George W. 96
 Berger, Albert J. 295, 302, 373
 Berger, Paul E. 64
 Berger, Richard E. 388
 Berger, Robert H. 197
 Bergman, Abraham 367
 Bergquist, Charles W. 114
 Bergstrom, Carl T. 189
 Berkowitz, Bobbie 389, 435
 Berleman, William C. 444
 Bernard, Gary D. 256
 Bernard, Jonathan W. 137
 Bernards, Christopher M. 325
 Berni, Rosemarian 382
 Berninger, Virginia Wise 225
 Bernstein, Ilene L. 160, 302
 Bernstein, Irwin D. 367
 Berry, Donna L. 388, 390
 Berry, Melissa M. 318
 Berryman, Jack W. 344, 361
 Bershad, Brian 252
 Bertsch, George F. 151
 Besag, Julian E. 181
 Betrus, Patricia 390
 Bevan, Michael J. 295, 339
 Bevens, Stella Hay 390
 Beyer, Richard P. 311
 Beyers, William B. 49, 51, 108, 308
 Bhandari, Anuja 361
 Bi, Nyan-Ping 69
 Bichsel, Hans 151
 Bierds, Linda L. 105
 Biggins, Susan 298
 Bigley, Gregory 197
 Bilaniuk, Laada M. 56, 129
 Billingsley, Felix F. 225
 Billingsley, Kevin G. 387
 Bilmes, Jeffrey A. 129, 258
 Binder, Marc D. 302, 373
 Bird, Thomas D. 346, 358, 375
 Bishop, Michael J. 325, 346
 Bix, Mark 339
 Black, Albert W. 176
 Black, Douglas J. 412
 Blackburn, Susan T. 389
 Blackmore, Christopher C. 379
 Blagg, Christopher R. 346
 Blainey, Carol 390
 Blake, Kathleen 105, 185
 Blanco, Hilda J. 51, 309
 Blau, Carl A. 348
 Blau, Herbert 93, 105
 Blinks, John R. 373
 Bliquez, Lawrence J. 64, 66, 84
 Bliss, Lawrence C. 78
 Bloch, Robert D. 379
 Blondell, Ruby 84
 Bloomquist, Dale S. 214
 Blough, David K. 412
 Blumenthal, Robert M. 132
 Bobola, Michael S. 357
 Bodansky, David . 151
 Boddur, Krishna 325
 Bodoia, John R. 268
 Boeckh, Michael J. J. 350
 Boehrer, John 419
 Boeker, Warren 196
 Boers, Geoffrey Paul 137
 Boersma, P. Dee 185, 189, 292
 Bogan, Richard H. 246
 Bogel, Cynthia J. 65, 67
 Bohm, Karl-Heinz 73
 Bohm-Vitense, Erika H. 73
 Böhlinger, Karl F. 252, 253, 258, 268
 Boiko, Robert B. 288
 Bolender, Charles L. 221
 Boler, John F. 148
 Bollen, Anne-Marie 217
 Bolton, Dale Leroy 225
 Bolton, Susan M. 279, 400
 Boltz, Judith M. 69
 Boltz, William 69
 Bombardier, Charles H. 382
 Bomszyk, Karol 295, 346, 370
 Bonadio, Jeffrey 311
 Bond, Eleanor 389
 Bond, Gail E. 391
 Bond, Nicholas A. 75
 Bonjour, Laurence A. 148
 Bonsteel, David 42
 Bonus, Enrique C. 86
 Booker, John R. 96
 Booth, Cathryn L. 160, 389
 Booth, Derek B. 49, 51, 96, 246, 279
 Borch-Jacobsen, Mikkel 90, 166
 Borden, Weston T. 80
 Bordia, Rajendra Kumar 265
 Bordin, Sandra 215, 220
 Borgatta, Edgar F. 175
 Borgs, Christian 132
 Born, Donald E. 365
 Bornfeldt, Karin E. 297, 365
 Borning, Alan H. 252, 287, 308
 Bornstein, Paul 295, 326, 346
 Boroughs, Homer, Jr. 225
 Borreguero, Paloma A. 168
 Borriello, Gaetano 252, 256
 Borsa, John J. 379
 Borson, Soo 375
 Bosch, Marnix L. 441
 Bosma, Martha 189, 303
 Bosmajian, Haig A. 86
 Bostrom, Robert C. 96
 Bosworth, David L. 105
 Bosworth, Thomas L. 42
 Bothwell, Mark A. 295, 302, 373
 Boulware, David G. 151
 Bourgeois, Joanne (Jody) 96, 307
 Bourque, Philip J. 196
 Bowden, Douglas M. 375
 Bowdle, T. Andrew 325
 Bowen, Deborah J. 160, 435
 Bowen, J. Ray 243
 Bowen, James D. 358, 383
 Bowen, Lawrence 86
 Bowen, Robert M. 195
 Bowen-Pope, Daniel 295, 364
 Bowles, Thomas J. 151
 Boxx, Karen E. 318

450 FACULTY INDEX

- Boyko, Edward J. 346, 430, 435
Boyle, Eloise M. 172
Boynton, Paul E. 73, 151
Bozarth, George S, Jr. 137
Braddock, Clarence H. 344, 348, 436
Bradford, William D. 196
Bradley, Gordon A. 49, 51, 278, 308
Bradley, Katharine A. 349, 436
Bradshaw, Harvey D. 78, 279
Braester, Yomi 69, 91
Brainard, Suzanne Gage 186, 272
Brame, Michael K. 128, 301
Bramhall, John S. 325
Brammer, Lawrence M. 225
Brandauer, Frederick P. 69
Brandl, Klaus K. 171
Brandt, Edna M. 390
Brandt, Patricia 389
Brannen, George 388
Brass, Paul R. 121, 155
Braun, Robert Elmer 297, 335
Bravmann, Rene A. 64, 66, 301
Breedon, Linda 297
Breidenthal, Robert E. 74, 239
Breitner, John 375
Bremner, William J. 346, 359
Bregelmann, George L. 373
Brenner, Gerald J. 105
Brenowitz, Eliot A. 160, 189, 302
Brentnall, Teresa A. 350, 365
Breslow, Norman E. 423
Bretherton, Christopher S. 61, 74
Brett, Michael T. 246
Breuner, Cora C. 368
Brewer, David K. 368, 379
Brewer, Kristen K. 383
Brewster, Riley P. 65
Bridge, Janis D. 350
Bridges, George S. 175
Bridgman, Jon M. 114
Briggs, David G. 278, 306
Brines, Julie E. 175, 186
Brinkley, James F., III 252, 328, 342
Britzmann, Jeannie R. 195
Brock, Douglas M. 343
Brock, Jonathan 419
Brock, Philip L. 101
Broderson, Stevan H. 329
Brodie, Scott J. 341
Brodkin, Carl 349
Brodkin, Kayla I. 350
Brody, David 64
Bronner, Mary P. 349, 365
Brooks, Terrence A. 287
Broudy, Virginia C. 346
Brown, Angus M. 358
Brown, B. Greg 346
Brown, Colin B. 246
Brown, Frances A. 225
Brown, Frederick C. 151
Brown, Gardner 101, 306
Brown, George W. 400
Brown, J. Michael 96
Brown, Jane K. 90, 112
Brown, Jonathon D. 161
Brown, Lowell S. 151
Brown, Marie Annette 389
Brown, Marshall J. 90, 105, 112
Brown, Michael P. 109
Brown, Robert A. 74
Brown, Robert Lewis 226
Brown, Sharan E. 226
Brown, Tom 307
Brown, Zane A. 359
Brownell, Francis H, II 132
Brownlee, Donald E. 73
Brownstein, Dena R. 368
Brubaker, Linda B. 278, 307
Bruce, Harry 288
Bruce, Neil 101
Bruce, Robert A. 346
Bruckner, Adam 239
Bruckner, James 362
Brudvik, James S. 221
Brumback, Babette 424
Brunzell, John D. 346
Bruschi, Sam 411
Brush, Lucien N. 265
Bryant, Benjamin S. 278
Bryant-Bertail, Sarah 93, 170
Bube, Kenneth P. 61, 132
Buchter, Carol M. 349
Buchwald, Dedra S. 346, 375
Buck, Steven L. 160, 302
Buck, Warren W. 151
Buckley, F. Peter 325
Bucknam, Ronald E. 247
Buckner, Frederick S. 350
Budzynski, Helen Kogan 389
Buick, Roger 96
Bulgac, Aurel 152
Bulger, Eileen 387
Bullister, John L. 407
Bungart, Lutz 133
Burbacher, Thomas M. 427
Burdzy, Krzysztof 132, 181
Burgess, Stephen J. 246
Burgess, Charles O. 225
Burgner, Robert L. 400
Burgstahler, David C. 195
Burke, James V. 61, 132, 181, 310
Burke, Wylie 344, 346, 430
Burnett, Thompson H. 151
Burns, David H. 311
Burns, Edward M. 161, 179
Burns, Jane L. 368
Burns, Stephen P. 383
Burns, Wayne 105
Burr, Robert L. 390
Burrows, William E. 197
Burstein, Jessica L. 106
Burstein, Paul 155, 175
Bush, James P. 390
Bush, William H. 378
Bushnell, Linda 258
Businger, Joost A. 74, 96
Butler, Johnella E. 105, 185
Butow, Robert J. C. 114, 121
Butterfield, David A. 407
Butwin, Joseph M. 105
Byers, Breck E. 295, 335
Byers, Margaret R. 213, 214, 302, 325, 328
Byers, Peter H. 214, 295, 346, 364
Byrd, David R. 386
- ### C
- Cabeen, Louise 64, 186
Cahn, John Werner 151
Cahn, Katharine C. 445
Cai, Tianxi 424
Calandrillo, Steve P. 318
Calderon, Rosemary 363, 375
Caldwell, James H. 310, 346, 378
Callahan, Mary P. 121
Callis, James B. 80, 310
Callus, Helen Sarah 137
Calsyn, Donald 375
Cameron, Cheryl A. 211
Camp, Janice E. 427
Camp, Stephanie M. H. 114, 186
Campbell, Charles T. 80, 151
Campbell, Christopher D. 51
Campbell, Frederick L. 175
Campbell, Lee Ann 295, 441
Campbell, Mark E. 240
Campbell, Nancy M. 419
Campbell, Patricia A. 411
Campbell, Patricia S. 137
Canfield, James G. 162
Canfield, Robert C. 221
Cangelosi, Gerard A. 215, 441
Canning, Douglas J. 403
Cannon, Glenn A. 406
Cao, Guozhong 265
Capoccia, Kam Lee 412
Caporaso, James A. 155
Cardenas, Diana D. 382
Carithers, Robert L. 346
Carlin, Albert S. 375
Carline, Jan D. 332, 342
Carlsen, James C. 137
Carlson, Dale A. 246
Carlson, Daniel L. 419
Carlson, Stephanie M. 162
Carlson, Steven S. 295, 302, 373
Carlyle, Allyson 288
Carmichael Olson, Heather 376
Carnevali, Doris 390
Carpenter, Paul A. 368
Carpenter, Robert L. 179
Carpenter, Roy 406
Carr, Catherine A. 391
Carr, John E. 160, 375
Carraher, Ronald G. 64
Carrere, Sybil 391
Carrigan, Lynn 445
Carter, Richard Fremont 86
Carter, William G. 295, 441
Carvalho, Paula G. 349
Carwein, Vicky 389
Casseday, John H. 160, 302
Cassinelli, Charles W. 155
Casteras, Susan P. 64, 66
Castle, John R. 197
Castner, David G. 243, 311

- Catalano, Richard F. 443
 Catling, David C. 75
 Catterall, William A. 295, 302, 371
 Cattolico, Rose A. 78, 295, 406
 Cauce, Ana Mari 160, 185
 Ceccarelli, Leah M. 86, 273
 Celentano, Francis 64
 Celum, Connie L. 349
 Chabal, Charles 325
 Chadwick, Heathcliff S. 325
 Chait, Alan 304, 346
 Chalk, William 268
 Chalker-Scott, Linda 279
 Chaloupka, Vladimir 137, 151
 Chalupnik, James 268
 Chamberlain, Jeffrey S. 358
 Chambers, Craig D. 252
 Champoux, James J. 295, 354
 Chan, Anthony B. 86
 Chan, Kam Wing 108
 Chan, Leighton 383
 Chance, Phillip F. 358, 367
 Chandler, Mark S. 355
 Chandler, Wayne L. 340
 Chaney, Edmund 375
 Chang, Kuei-Sheng 109, 309
 Chang, Michael Wei 382
 Chang, Stephanie E. 109
 Chansky, Howard Alan 362
 Chapko, Michael K. 211, 435
 Chapman, Jens R. 357, 362
 Chapman, Warren H. 388
 Charan, Nirmal B. 346
 Charlson, Robert J. 80, 96
 Chasteen, Joseph E. 216, 221, 436
 Chatrion, Gian E. 340, 356
 Chauncey, Thomas R. 349
 Chavkin, Charles 295, 302, 371
 Chayes, Jennifer T. 132, 151
 Cheadle, Allen D. 435
 Checkoway, Harvey 426, 430
 Chen, Philip P. 360
 Chen, Shuyi S. 75
 Chen, Tai-Chang 258
 Chen, Xiao-Ping 197
 Chen, Zhen-Qing 133
 Cheney, Carrie L. 304, 431
 Cheney, Douglas A. 226
 Cheney, Eric S. 96
 Cheney, Frederick W. 325
 Cheng, Edith Y. 349, 359
 Cheng, Karen 65
 Chenoweth, Harry H. 247
 Cherin, David 444
 Chernicoff, Stanley E. 97
 Chesnut, Charles 346, 361, 378
 Chew, Kenneth K. 400
 Chi, Emil Y. 364
 Childs, Marian T. 349
 Chin, Mae 212
 Ching, Francis D.K. 42
 Ching, Randal Preston 268, 311, 362
 Chinowsky, Timothy M. 258
 Chirot, Daniel 121, 175
 Chiu, Daniel T. 81
 Chiu, John S. Y. 197
 Chizeck, Howard Jay 256
 Cho, Paul S. 257, 378
 Choi, Jai Joon 258
 Chopelas, Anastasia 151
 Chou, David 341, 342
 Chou, Philip A. 257
 Chrisman, Nicholas R. 108, 308
 Chrisman, Noel J. 332, 389
 Christakis, Dimitri A. 368, 437
 Christian, Gary D. 80
 Christiansen, Walter H. 240
 Christianson, Phyllis L. 392
 Christie, Dennis L. 367
 Christie, Patrick 403
 Christie, Richard Dunstan, Jr. 257
 Christofides, Constantine 64, 90, 166
 Chu, Joseph 431
 Chuang, Elaine L. 360
 Chudler, Eric H. 325
 Church, Lili Lucille 333
 Cichowski, Rachel A. 156
 Ciol, Marcia A. 383
 Cirtautas, Ilse D. 143, 301
 Clark, Edward A. 339, 354
 Clark, Joan G. 346
 Clark, John I. 296, 328, 360
 Clark, John M, Jr. 362
 Clark, Kenneth C. 96, 151
 Clark, Robert N. 240
 Clarke, Donald C. 317
 Clarren, Sterling K. 367
 Clatterbaugh, Kenneth C. 148, 186
 Clausen, Meredith L. 42, 64, 66, 166
 Clauss, James J. 84
 Clay, Jack D. 93
 Clayson, Kathleen J. 341
 Cleland, Robert E. 78, 292
 Cleveland, Bruce 151
 Clifton, Donald K. 359
 Cloney, Richard A. 189
 Close, Angela E. 55, 301, 307
 Clowes, Alexander W. 364, 386
 Clowes, James D. 122
 Clurman, Bruce E. 298, 350, 365
 Coats, Herbert S. 172
 Cobb, Leonard A. 346
 Cobden, David H. 152
 Coburn, Robert C. 148
 Cochrane, Barbara B. 391
 Coggins, Truman E. 179
 Cohen, Pamela 92
 Cohen, S. Marc 148
 Cohen, Wendy A. 356, 378
 Cohn, Henry L. 133
 Colcord, J. E. 246
 Coldewey, John C. 105
 Coldwell, Susan E. 212, 218
 Cole, Dale W. 278
 Colley, Peter S. 325
 Collier, Ann C. 346
 Collier, Thomas W. 137
 Collingwood, David 132
 Collins, Douglas P. 90, 166
 Collins, Helene V. 166
 Collins, Jeffrey L. 64, 66, 166
 Collins, Steven J. 296, 346, 364
 Collum, Jerry L. 93
 Colman, Brdley R. 75
 Coltrera, Marc Dante 363
 Colven, Roy M. 350
 Comai, Luca 78, 296
 Comtois, Katherine Ann 162, 376
 Comtois, Mary Elizabeth 93
 Concannon, Patrick J. 297, 339
 Coney, Mary B. 86, 272
 Conley, Kevin E. 310, 373, 378
 Conlon, Frank F. 114
 Connell, Frederick A. 367, 430, 435
 Connors, Catherine M. 84
 Conquest, Loveday L. 278, 306, 400, 423
 Conrad, Douglas A. 196, 211, 294, 435
 Conrad, Ernest U. 361
 Conroy, Patricia L. 171
 Conte, Jon 443
 Contreras, Heles 128
 Conway, Howard B. 96
 Cook, David G. 350, 371
 Cook, Douglas 444
 Cook, Victor 151
 Cooke, Joseph R. 69
 Cooker, Harry S. 179
 Cookson, Brad T. 298, 341, 355
 Coombs, John B. 333, 367, 435
 Coombs, Robert W. 341, 349
 Cooper, Elizabeth A. 92
 Cooper, Jonathan A. 296, 326
 Cooper, Joyce S. 269
 Cooper, Mark S. 189, 297, 303
 Copass, Michael K. 346, 358, 386
 Copland, Michael A. 227
 Copping, Andrea 403
 Cordes, Dietmar 379
 Corey, Lawrence 296, 341, 346, 354, 367
 Corina, David P. 129, 161, 303
 Corlett, Richard 268
 Cormick, Gerald W. 294, 419
 Cornejo, Carol J. 387
 Cornman, Barbara J. 392
 Corson, Marshall A. 349
 Costa, Lucio Guido 296, 426
 Costner, Herbert L. 175
 Counts, Richard B. 346
 Courbois, Jean-Yves Pip 182
 Couser, William G. 346
 Coutu, Lisa 87
 Covert, David S. 74, 246, 426
 Covey, Ellen 161, 303
 Cowan, Darrel S. 96
 Cowan, Marie J. 389
 Cowley, Deborah S. 375
 Cox, Collett D. 69
 Coyle, Marie B. 341, 354
 Craft, Suzanne 161, 375
 Cramer, John G. 151
 Cramer, Steven C. 303, 358
 Cranston, Patricia 86
 Craven, Ruth F. 389
 Creager, Joe S. 96, 406
 Creager, Kenneth C. 96

452 FACULTY INDEX

- Creore, A. Emerson 166
Cridler, James R. 93
Crill, Wayne E. 358, 373
Criminale, William O. 61, 96, 406
Crisman, Phoebe A. 43
Critchlow, Cathy W. 212, 431
Crittenden, Alden L. 81
Crittenden, Robert A. 333, 436
Crnkovic, Gordana 90, 172
Cronin, Meghan 407
Crosson, Robert S. 96
Crowley, John, Jr. 423
Crum, Lawrence A. 256, 310
Crutchfield, James A. 101, 403
Crutchfield, Robert D. 175
Culbert, Sidney S. 161
Cullen, Alison 306, 419
Cullen, Bruce F. 325
Culver, Bruce H. 349
Cummings, David E. 350
Cummings, Katherine 105, 186
Cummings, Peter 431
Cummins, Rebecca 65
Cummins, Richard 346
Cunningham, Michael L. 215, 297, 329, 368
Cunningham, Susanna L. 373, 389
Cupp, Randal C. 343
Curjel, Caspar R. 132
Curless, Brian L. 253
Curtis, Edward B. 132
Curtis, J. William 43
Curtis, Jared R. 349, 436
Curtis, William E. 387
Curtis-Newton, Valerie 93
Curtis-Verna, Mary 137
Curzan, Anne L. 106, 129
Cusack, Barry J. 349
Czerniecki, Joseph M. 382
- D**
- D'ambrosio, Charles A. 196
D'Ambrosio, Raimondo 357
D'Asaro, Eric A. 406
Dabiri, Dana 240
Dacey, Dennis M. 302, 328
Dagadakis, Christos S. 376
Dager, Stephen R. 310, 375, 378
Daggett, Valerie D. 326, 411
Dahl, Peter H. 268
Dahlstrom, Robert A. 93, 137
Dahn, Richard F. 64
Dailey, Daniel J. 247, 257
Dailey, Michael D. 64
Dalcanton, Julianne 73
Dale, David C. 346
Dale, Linda 343
Dale, Philip S. 160
Dale, Robert C. 166
Dale-Crunk, Beverly A. 215, 219, 296, 326, 346
Daling, Janet R. 430
Dalley, Robert W. 357, 379
Dalton, Larry R. 80
Daly, Colin H. 268
Damborg, Mark J. 256
Daniali, Saeed 47
Daniel, Thomas L. 189, 302
Daniell, William E. 427
Darling, Robert B. 256
Darveau, Richard P. 215, 220
Dash, J. Gregory 151
Daum, Guenter 386
David, Morton 243
Davidson, Robert C. 349
Davie, Earl Warren 296, 326
Davis, Connie 349
Davis, E. James 243
Davis, Kathryn A. B. 423
Davis, Robert L. 368, 431
Davis, Scott 430
Davis, Shoni Kay 391
Davis, Trisha Nell 296, 326
Dawson, Geraldine 160
Dawson, Karan N. 412
Day, Emmett E. 268
Day, Robert W. 435
De Master, Douglas Paul 403
De Mello, Stan 445
De Rose, Anthony David 252
De Rouen, Timothy 211, 423
De Tornay, Rheba 389
Dean, Larry S. 346, 386
Dear, Ronald Bruce 444
Decher, Reiner 240
Dee, Jennifer 43
Dee, Katherine E. 379
Deeb, Samir S. 335, 346
Deeg, H. Joachim 346
Deem, Steven A. 325, 349
Dehmelt, Hans G. 151
Deines, Katrina 43
Deisher, Robert W. 367
Deitz, Jean L. 382
Dekker, David B. 133, 252
Del Beccaro, Mark A. 368
Del Moral, Roger 78
Delaney, Collene J. 341
Delaney, John R. 96, 403, 406
Delcourt, Denyse 166
Dellinger, E. Patchen 386
DeLong, James B. 445
Deming, Jody W. 406
Demorest, Steven M. 137
Dempster, Stuart R. 137
Den Nijs, Marcel P. 151
Dennis, Melvin B. 330, 346
Denton, Denice Dee 256
Deolalikar, Anil B. 101
Depew, Creighton A. 268
Detter, James C. 341
Detwiler, Peter B. 296, 302, 373
Devasia, Santosh 268
Devinatz, Ethan S. 133
Devine, Emily E. 412
Devol, Allan H. 406
Dewenter, Kathryn L. 196
Dewitt, Dawn E. 342, 349
Dey, Debabrata 197
Deyo, Richard A. 346, 435
Deyoung, Terri L. 144, 168, 301
Deyrup-Olsen, Ingrith J. 189, 292
Di Giacomo, Ronald F. 330
Di Stefano, Christine 155, 186
Diab, Mohammad 362
Diaz, Aidnag Z. 357, 378
Diaz, Jaime 160, 302
Dichek, David A. 346
Dichek, Helen 368
Dickey, Martin 253
Dickhoff, Walton W. 400
Diehr, Paula K. 423, 435
Diekema, Douglas S. 344, 368
Dietrichson, Paul 148
Dietz, Robert H. 42
Dikmen, Sureyya S. 356, 375, 382
Dillon, George L. 105
Diment, Galya 172
Dimmitt, Norma M. 226
Dimond, Margaret 390
Diorio, Christopher J. 252, 258, 303
Disis, Mary L. 349
Disteche, Christine M. 296, 346, 364
Dively, Dwight D. 419
Do, Yi-Luen Ellen 43, 49, 309
Dobel, J. Patrick 155, 418
Dobie, Dorcas J. 376
Dobie, Sharon A. 333
Doctor, Jason N. 343, 437
Dodrill, Carl B. 358
Doe, Peter J. 151
Doerr, Hans O. 160, 375
Doescher, Mark 333
Dogan, Fatih 265
Dohner, Charles W. 342
Doi, James I. 225
Domingos, Pedro Morais Del 253
Dominitz, Jason A. 350
Domino, Karen B. 325, 356
Domke, David S. 86, 155
Domoto, Peter K. 211, 218
Donaldson, James A. 363
Donaldson, Samuel A. 318
Donaldson, Susan K. 419
Doney, Kristine 349
Dong, Chen 298, 339
Dong, Yue 114, 121, 186
Donnette, James J. 43
Donovan, Dennis 160, 375
Dornbush, Jean M. 91
Douglas, James G. 357, 378
Dovich, Norman J. 80
Dow, Daniel G. 256
Dowdle, Barney 278
Dowling, William L. 294, 435
Downer, Ann E. 437
Downing, Donald F. 412
Drachman, Jonathan G. 350
Drane, Daniel L. 358
Draye, Mary A. 391
Drewnowski, Adam 304, 346, 430
Dreyfuss, Jeffrey 69
Driscoll, John P. 225
Driver, Charles H. 278
Drobny, Gary P. 80, 151
Drui, Albert B. 263
Du Charme, Larry L. 195

Du Pen, Everett 64
 Duarte, Jefferson 196
 Dubach, Mark F. 375
 Dubinsky, Theodore J. 359, 379
 Dubisch, Roy 132
 Dubois, Ia G. 171
 Dubrow, Gail Lee 43, 49, 51, 186, 309
 Duchamp, Thomas E. 132, 252
 Duchin, Jeffrey S. 350, 431
 Duckert, Larry Gene 363
 Dudgeon, Brian J. 383
 Dudley, Shannon K. 137
 Dudzinski, Denise M. 344
 Duffy, Patrick E. 441
 Dugdale, David C. 349
 Dugowson, Carin E. 349
 Dukes, Roland E. 195
 Dunbar, Peter J. 325, 343
 Dunham, Scott T. 256, 265
 Dunlop, William M. 106
 Dunn, Richard J. 105
 Dunne, Thomas 96
 Dunnell, Robert C. 55
 Dunner, David L. 375
 Duplica, Moya M. 444
 Durand, Joel-Francois 137
 Durran, Dale R. 61, 74
 Dushaw, Brian D. 407
 Dutro, Elizabeth M. 227
 Duxbury, Alyn C. 403, 406
 Dworkin, Samuel F. 216
 Dyamenahalli, Umesh 368
 Dziwirek, Katarzyna A. 129, 172

E

Eary, Janet F. 364, 378
 Easterling, Thomas R. 359
 Eastin, Ivan 279
 Eastman, Fred 240
 Eaton, David L. 426
 Ebeling, William H.C. 252
 Eberhard, Marc O. 247
 Eberhardt, David Scott 240
 Ebrey, Patricia B. 114, 121
 Ebrey, Thomas 78, 296
 Eck, Gerald G. 56, 307
 Eckert, Linda O. 359
 Eddy, Allison A. 367
 Edgar, Bruce A. 298
 Edgar, Eugene Bayard 225
 Edmonds, Robert L. 278
 Edwards, John S. 189, 292
 Edwards, Karen L. 431
 Edwards, Richard T. 279
 Edwards, Scott V. 189, 297
 Edwards, William T. 325
 Eeffmann, Eric L. 378
 Efimov, Vitaly 151
 Efthimiadis, Efthimis 288
 Egan, Kelly J. 382
 Egbert, Mark A. 214, 386
 Eggers, Susan Jane 252
 Eggert, Leona 390
 Ehde, Dawn 383
 Ehrenberg, John E. 256

Eicher, Theo S. 101
 Eisen, Harvey 335, 364
 Eisenberg, Michael B. 287
 Eisenberg, Mickey 346, 430
 Eisenman, Robert M. 296, 326
 El-Sharkawi, Mohamed A. 256
 Elias, Ziad 246
 Eliel, Leonard P. 346
 Elkon, Keith B. 296, 339, 346
 Ellenbogen, Richard G. 357
 Ellingson, Terry J. 56, 137
 Elliott, Andrew J. 376
 Elliott, Steven R. 152
 Ellis, Georgiana K. 349
 Ellis, Jack A. N. 444
 Ellis, John Mark 108, 308
 Ellis, Stephen D. 151
 Ellis, William J. 388
 Ellison, Herbert J. 114, 121
 Ellrich, Robert J. 90, 166
 Ellsbury, Kathleen E. 333
 Ellsworth, Allan J. 333, 412
 Elmer, Gary W. 410
 Elmore, Joann G. 349, 431
 Elmore, Shawn K. 390
 Emanuel, Irvin 367, 430
 Emerick, Christina M. 407
 Emerman, Michael 296
 Emerson, Scott S. 423
 Emerson, Steven R. 406
 Emery, Ashley F. 42, 268
 Emler, Charles 444
 Emmi, Adriana 357
 Emond, Mary Jane 424
 Emory, Meade 317
 Engel Knowles, Joyce M. 382
 Engel, Thomas 80, 151
 England, Kim V. L. 109, 186
 Engrav, Loren H. 386
 Ensign, B. Josephine 186, 390, 436
 Ensinn, John W. 346
 Epiotis, Nicholas 80
 Epstein, Joel B. 216, 363
 Erera, Pauline 444
 Erickson, Albert W. 400
 Erickson, Gary 197
 Erickson, Harvey D. 278
 Erickson, Kent B. 132
 Erickson, Richard C. 375
 Eriksen, Charles C. 406
 Eros, Peter S. 137
 Eschenbach, David A. 359
 Escobedo, Eva M. 362, 379
 Eskridge, Joseph M. 356, 378
 Esselman, Peter C. 382
 Estes, Nada 390
 Etzioni, Oren 129, 252
 Etzioni, Ruth B. 423
 Eubank, William B. 379
 Evans, Bernard W. 96
 Evans, Charles A. 354
 Evans, Ellis D. 225
 Evans, John R. 214
 Evans, Roger J. 246
 Evans, Timothy C. 350

Evans-Campbell, Teresa A. 444
 Everett, Lucinda 325
 Ewart, Terry E. 406
 Ewing, Kern 49, 279
 Eyre, David R. 215, 326, 361

F

Faaland, Bruce H. 197
 Fabien, Brian C. 268
 Fagan, Corey N. 162
 Failing, Patricia A. 64, 66, 299
 Fain, Samuel C. 151
 Faine, Mary P. 221
 Fales, Martha H. 211
 Falk, Robert Aaron 257
 Fan, Erkang 329
 Fang, Ferric C. 341
 Fangman, Walton L. 335
 Fann, Jesse R. 376, 383
 Fantel, Alan G. 367, 426
 Farber, Stuart J. 333
 Farkas, David K. 272
 Farr, Andrew G. 296, 328, 339
 Farrell, Donald F. 358
 Farrow, Diana C. 431
 Farwell, Donald Gregory 363
 Farwell, George W. 151
 Farwell, Nancy 444
 Fatherazi, Sahba 215
 Faustman, Elaine M. 296, 426
 Fausto, Nelson 296, 364
 Feagin, Jean E. 297, 441
 Fearn-Banks, Kathleen A. 86
 Feathers, James K. 56
 Feely, Richard A. 406
 Fefer, Alexander 347
 Feigl, Eric O. 373
 Feijen, Jan 310
 Felak, James R. 114
 Felker, Bradford 376
 Felsenstein, Joseph 181, 189, 335
 Feng, Ziding 423
 Fenn, Margaret P. 196
 Fenske, Richard A. 426
 Ferguson, John R. 383
 Ferguson, G. (Jack) 56
 Ferguson, John F. 246
 Fero, Matthew L. 350
 Ferre-D'Amare, Adrian Riu 298, 327
 Ferrill, Arther L. 114
 Fetz, Eberhard 302, 373
 Fidel, Raya 287, 299
 Fiedler, Fred E. 160
 Fields, Stanley 296, 335, 347, 354
 Figley, Melvin M. 347, 378
 Fihn, Stephan 347, 435
 Finch, Clement A. 347
 Findlay, John M. 114, 308
 Fine, James 341, 343
 Fink, Pamela J. 297, 339
 Finlayson, Bruce A. 243
 Finn, Laura S. 365
 Finrow, Jerry V. 42
 Firestone, Jordan A. 358
 Firey, Joseph C. 268

454 FACULTY INDEX

- Fischbach, David B. 265
Fischer, Edmond H. 326
Fishbein, Daniel P. 349
Fisher, Alan S. 90, 106
Fisher, Lloyd D. 423
Fitts, Douglas A. 161
Fitzgibbon, Dermot R. 325, 350
Fitzhugh, J. Ben 56, 307
Fitzpatrick, Joan M. 317
Flagler, Susan B. 390
Fleagle, Robert G. 74
Fleckman, Philip H. 347
Fleet, Wendell P. 349
Fleming, Douglas K. 108
Fleming, Thomas Richard 181, 423
Fletcher, Robert L. 317
Fligner, Corinne L. 341, 365
Flinn, Brian D. 265
Flores, Lauro H. 168
Floss, Heinz G. 80
Flowers, Mary E. 350
Fluharty, David L. 403
Flynn, Barbara G. 343
Folch, Albert 311
Folland, Gerald Budge 132
Folsom, Richard C. 178
Foot, Kirsten A. 86
Foote, Jefferson 297, 339
Ford, E. David 61, 181, 278, 306
Ford, Paul W. 268
Fordyce, Wilbert E. 382
Forehand, Mark Robeck 198
Forrester, William D. 93
Forster, Fred 268
Forster, Jerald R. 226
Fortson, E. Norval 151
Foster, Clifford D. 226
Foster, David M. 310
Fought, Sharon G. 390
Fowler, David C. 105
Fowler, Wilton B. 114
Fox, Dieter 253
Fox, Joan H. 168
Foy, Hjordis 430
Foy, Hugh M. 386
Francis, Robert C. 306, 400, 403, 406
Frank, Leonard R. 350
Frank, Natia 81
Frank, Richard P. 221
Franklin, Christopher C. 365
Franklin, Gary M. 358, 426
Franklin, Jerry F. 278
Fraser, Robert T. 356, 358, 382
Fredricks, David N. 350
Fredriksen, Karen Ilene 444
Freehill, Maurice F. 226
Freeman, Rosario 350
Freitag, Nancy E. 355, 441
French, James W. 367
French, Wendell L. 196
Frenkel, Lisa M. 341, 368
Frerichs, Alberta J. 226
Freund, Felix G. 325
Freund, Peter 325
Frey, Charles Hubbard 105
Frey, Karin S. 161, 226
Fridley, James 268, 278
Friedman, Batya 252, 288
Friedman, Carolyn 400
Friedman, Debra L. 368
Friedman, Kathie 121, 186
Friedman, Lionel J. 166
Friedman, Michael H. 132
Friedman, Seth D. 379
Friedrich, Pia 166
Fritsche, Thomas R. 341, 354, 360
Fritschen, Leo J. 278
Froehner, Stanley C. 296, 302, 373
Frost, Bruce W. 406
Frost, Peter A. 196
Fryer-Edwards, Kelly 344
Fu, Qiang 75
Fuchs, Albert F. 160, 302, 363, 373
Fuchs, Barbara 106, 168
Fujimoto, Wilfred Y. 347
Fuller, Sherrilynne S. 287, 342, 435
Fulton, Janis R. 355
Furlong, Clement E. 296, 335, 347
Furness, Thomas A. 256, 262, 272
Futran, Neal David 363
Fyfe, Ian M. 240
- G**
- Gaddum-Rosse, Penelope 329
Gale, Ann E. 65
Gale, James L. 430, 435
Gallant, Jonathan A. 335
Galle, Kurt R. 268
Galloway, Denise A. 296, 354, 364
Gallucci, Betty J. 390
Gallucci, Vincent 306, 400, 403
Gamboa, Erasmo 114
Gamelin, Daniel R. 81
Gammon, Richard H. 75, 80, 406
Gangolli, Ramesh A. 132
Ganter, Mark 268, 278
Gara, Robert I. 278
Garbini, Joseph 268
Garcia, Rochelle 365
Gardella, Carolyn M. 359
Garden, Gwenn A. 303, 358
Gardner, Gregory C. 349, 362, 382
Gardner, Jacqueline S. 412
Gardner, Jill C. 379
Garlid, Kermit L. 243
Gartler, Stanley M. 335, 347
Garvens, Ellen J. 64
Gaster, Barak 350
Gastil, John W. 86, 155
Gates, George A. 178, 363, 430
Gates, Sarah N. 93
Gavel Adams, Ann-Charlotte 171, 186
Gavrin, Jonathan R. 325, 349
Gay, Geneva 226
Geballe, Adam Philip 297, 349, 354
Gehrig, John D. 214, 328
Gehrke, Nathalie J. 226
Geiduschek, Jeremy M. 325
Geissmar, Else J. 137
Geist, Anthony L. 90, 168
Gelb, Michael H. 80, 296, 326
Gelinias, Richard 364
Gennari, John H. 343
George, E. Laurie 106
George, William H. 161
George-Falvy, Jane 197
Georges, George E. 350
Gerberding, William P. 155
Gerhart, James B. 151
Gernsheimer, Terry B. 350
Gerstenberger, Donna 105
Gessner, Frederick B. 268
Geyer, Jeffrey R. 357, 368
Geyman, John P. 333
Ghan, Steven J. 75
Ghiorso, Mark S. 96
Ghose, Subrata 96, 265
Giachelli, Cecilia 297, 311, 365
Giambattista, Michele D. 198
Gianola, Fred J. 343
Gibaldi, Milo 411, 412
Giblin, Elizabeth C. 390
Gibran, Nicole 349, 386
Gibson, Ronald L., Jr. 368
Giebel, Christoph 114, 121
Giffard, Charles A. 86
Gil, Carlos 114
Gilchrist, Lewayne D. 443
Gill, Anthony J. 155
Gill, Edward A. 349
Gillespie, Alan R. 96, 307
Gillespy, Thurman 362, 379
Gillick, James V. 195
Gilligan, Diana Mary 349
Gilliland, Bruce C. 341, 347, 354
Gillis-Bridges, Kimberlee 106
Gillman, Maria 168
Gillmore, Mary Louise 175, 444
Gilmore, Susan L. 392
Giniger, Edward Scott 297, 303, 373
Ginorio, Angela B. 161, 186
Giri, Jay 257
Gish, Oscar 437
Gist, Marilyn Elaine 196
Givens, Terri E. 156
Glass, Ernest G. 216
Glass, Ian 349, 368
Glassman, Debra A. 196
Gleason, Christine A. 367
Glenn, Allen D. 226
Glenn, Susan A. 114, 186
Glenny, Robb 349, 373
Glickerman, David J. 379
Glickman, Gerald N. 213
Glomset, John A. 326, 347
Gloyd, Stephen S. 333, 418, 430, 435
Gneiting, Tilmann J. 182
Gochmour, Michelle Kom 392
Godwin, J. David 378
Goettler, Christine E. 65, 67
Goff, Barbara A. 359
Gold, Julia Ann 318
Goldbaum, Gary M. 333, 431, 436
Goldberg, Ellis 155, 301
Goldberg, Harold I. 343, 349, 436

- Goldberg, Jack 430
 Goldberg, Karen 81
 Goldberg, Steven L. 349
 Goldblatt, Steven M. 43, 47, 247
 Golde, Hellmut 252
 Golden, Matthew R. 350
 Goldschneider, Jill 258
 Goldsmith, Layne 64, 186
 Goldstein, Allen A. 132
 Goldstein, Barry 382
 Goldstein, Erika A. 349
 Golumbek, Paul T. 358
 Gonzales, Virginia 437
 Gonzalez, Jorge 168
 Gonzalez, Richard D. 161
 Goodearl, Kenneth R. 132
 Goodkin, Robert 357
 Goodlad, John I. 226
 Goodman, Richard B. 349
 Goodner, Charles J. 347
 Goodwin, Robert F. 403
 Goodyear, Nancy 341
 Gooley, Theodore A. 424
 Gorbman, Aubrey 189
 Gorbman, Claudia L. 186
 Gordon, Albert M. 296, 373
 Gordon, Andrew 418
 Gordon, Guy G. 197
 Gordon, Margaret T. 186, 419
 Gordon, Michael J. 333, 342
 Gordon, Milton 296, 326, 354
 Gordon, Patricia E. 392
 Gordon, Sharon A. E. 298, 303, 361, 373
 Gore, William J. 155
 Gorman, Mark 373
 Gospe, Sidney M. 358
 Goss, Christopher Hooper 350
 Goss, J. Richard 350
 Gottfried, Alex 155
 Gottman, John M. 160
 Gottschling, Daniel E. 296, 335
 Govedare, Philip B. 64
 Goverman, Joan M. 297, 335, 339
 Govin, Glenn M. 216
 Gowing, Alain M. 84, 114
 Grabstein, Kenneth 441
 Grady, Richard W. 388
 Graham, C. Robin 132
 Graham, Elinor A. 368
 Graham, Joan Adelle 106
 Graham, Katherine J. 390
 Gralow, Julie R. 351
 Graney, Daniel O. 328, 362
 Grant, Therese M. 376
 Grathwohl, Harrison L. 198
 Graubard, Katherine 189, 296, 302
 Gray, Carol A. 226
 Gray, Darryl 437
 Gray, Kendall M. 355
 Gray, Richard T. 112
 Gray, Shelly L. 412
 Grayson, Donald K. 55, 307
 Grayston, J. Thomas 430, 441
 Green, James W. 56, 301
 Green, Maurice W. 288
 Green, Philip 252, 335
 Green, Stephanie J. 423
 Greenbaum, Anne 61, 132
 Greenberg, Deborah L. 351
 Greenberg, Mark T. 160
 Greenberg, Philip D. 339, 347, 354
 Greenberg, Ralph 132
 Greenlee, Theodore K. 362
 Greenwald, Anthony G. 160
 Greenwald, Mark J. 360
 Greer, Benjamin E. 359
 Greer, H. Thomas 333
 Gregg, Michael C. 406
 Gregory, James N. 114
 Gregory, Norman W. 80
 Grembowski, David 175, 211, 294, 435
 Grenfell, Thomas C. 75
 Gretch, David R. 341, 349
 Greulich, Francis E. 278, 306
 Grey, Arthur L. 51
 Gribble, Steven 253
 Griep, Robert J. 349, 379
 Griffith, John W. 106
 Griffith, Malcolm A. 106
 Griffiths, W. Mary 189
 Groeneboom, Petrus 181
 Groom, Martha 189
 Gross, Edward 175
 Gross, Mark D. 43, 49, 309
 Gross, Ted S. 311, 362
 Grossman, Arthur 137
 Grossman, David C. 367, 436
 Grossmann, Angelika 330
 Groudine, Mark 296, 364, 378
 Grudin, Jonathan T. 287
 Grue, Christian E. 279, 400
 Gruenewald, David A. 349
 Grunbaum, Branko 132
 Grunbaum, Daniel 189, 407
 Gruss, Joseph S. 356, 386
 Gu, Chuang 257
 Gu, Yansong 339, 378
 Guerra, Juan C. 106
 Guest, Avery 108, 175, 308
 Gugerty, Mary Kay 419
 Guilford, Edward C. 256
 Gunderson, Donald R. 400
 Gundlach, Jens 152
 Gunther, Daniel F. 368
 Guntheroth, Warren G. 367
 Gupta, Yash P. 197
 Guralnick, Michael J. 160, 367
 Gustafson, Richard Roy 243, 278
 Guthrie, Mark R. 382
 Guttorp, Peter 181, 306
 Guy, Arthur W. 310
 Guy, R. Kent 114, 121
- H**
- Ha, James 161
 Haag, Richard 49
 Haaga, Agnes M. 93
 Haberman, Mel R. 390
 Hackett, Murray 411
 Hackman, Robert C. 341, 365
 Hadjimichalakis, Karma G. 196
 Hadjimichalakis, Michael 101
 Haggerty, Kevin P. 445
 Hahn, Steven M. 297, 326
 Haigwood, Nancy L. 297, 354, 441
 Hakim, Gregory J. 75
 Hakomori, Sen-Itiroh 80, 354, 441
 Halar, Eugen M. 382
 Halevy, Alon Y. 252
 Haley, Charles 196
 Hall, Benjamin D. 78, 296, 335
 Hallam, Danial K. 379
 Halleran, Michael R. 84
 Hallet, Bernard 96, 307
 Hallstrom, Alfred 423
 Halmi, Nicholas 106
 Halperin, Walter 78
 Halpern, Charles 78, 279
 Halpern, Isaac 151
 Halpern, Lawrence M. 371
 Halsey, George D. 80
 Halver, John E. 400
 Halvorsen, Robert 101
 Hamblin, Mark W. 371, 375
 Hamilton, A. Ian 221
 Hamilton, Clement Wilson 278
 Hamilton, Gary G. 121, 175
 Hamilton, Roxanne 49
 Hammer, Dana 412
 Hammer, Vernon B. 246
 Hammond, Margaret C. 382
 Hancock, John L. 51
 Handcock, Mark S. 175, 181, 308
 Handel, Zev 69, 129
 Handsfield, Hunter 347, 430
 Handwerk, Gary J. 90, 105, 166
 Hanel, Douglas Paul 361, 386
 Hanken, Mary A. 437
 Hanley, Donald P. 278
 Hanley, Susan B. 121
 Hannaford, Blake 256, 310, 386
 Hanneman, Carl F. 444
 Hansen, Gary S. 197
 Hansen, John A. 347
 Hansen, Sigvard T. 361
 Hansen-Krening, Nancy M. 226
 Hanson, Kermit O. 196
 Hanson, Stephen E. 155
 Hansten, Philip D. 412
 Harachi, Tracy 444
 Haralick, Robert M. 257
 Harder, Virgil E. 197
 Hardisty, James 317
 Hargis, Ann M. 330
 Hargus, Sharon Louise 129
 Haring, Norris Grover 226
 Harlan, John M. 347, 364
 Harley, John D. 378
 Harmon, Alexandra J. 114
 Harmon, Daniel P. 84
 Harrast, Mark A. 383
 Harrell, Stevan 55
 Harrington, Gerald W. 213
 Harrington, James W. 108, 308
 Harrington, Robert D. 349

456 FACULTY INDEX

- Harris, A. Basil 356
Harris, Jana N. 106
Harris, Jeffrey R. 437
Harris, Roger M. 329
Harris, Victoria L. 376
Harrison, David S. 419
Harrison, Devin A. 361
Harrison, Don Edmunds 75, 406
Harrison, Halstead 75
Harrison, Mark Jeffrey 93
Harrison, Robert B. 278
Hart, Lawrence G. 109, 333, 436
Hartman, Richard C. 101
Hartmann, Dennis L. 75, 307
Hartsock, Nancy C.M. 155, 186
Hartwell, Leland H. 335, 347
Hartz, Billy J. 246
Haselkorn, Jodie K. 382, 431
Haselkorn, Mark P. 272
Haskins, Edward F. 78
Hatheway, William H. 278
Hatsukami, Thomas 386
Hauck, Scott 252, 257
Hauschka, Stephen D. 189, 296, 326
Hautala, Susan L. 407
Hawkins, Douglas S. 368
Hawkins, John D. 444
Hawley, Suzanne 73
Hawthorne, Donald C. 335
Haxton, Wick C. 73, 151
Hayden, Patricia 367
Hayes, Brian 243
Hayes, Cecil E. 378
Haynor, David R. 181, 310, 356, 379
Hays, Ross M. 367, 382
Hazelton, Penny A. 287, 317
Hazlet, Thomas K. 412
Hazzard, William R. 347
Heagerty, Patrick J. 423
Healey, Patrick J. 387
Healy, Michael J. 257
Heath, G. Ross 307, 403, 406
Hebert, Mary F. 412
Hechter, Michael N. 175
Heckbert, Susan R. 412, 431
Heckel, Blayne 151
Heckman, Paul E. 226
Hedges, John I. 406
Hedrick, Susan 436
Heer, Nicholas L. 143, 301
Heerwagen, Dean Reese 43
Heerwagen, Juidth 43
Hegg, Dean A. 75
Hegyvary, Sue T. 390, 436
Heideger, William J. 243
Heilman, Robert B. 105
Heiman, Julia R. 160, 375
Heimbach, David M. 386
Heinekey, Dennis M. 80
Heitkemper, Margaret M. 347, 390
Helgerson, Steven D. 431
Hellmann, Donald C. 121, 155
Hellstrom, Ingegerd 364
Helms, Ward J. 257
Henderson, Maureen M. 347, 430
Henderson, Rebecca A. 138
Henderson, William R. 347
Hendrickson, Anita E. 302, 328, 360
Henikoff, Steven 297
Henley, Ernest M. 151
Henley, Michael Bradford 362
Henning, Dale A. 196
Henry, Charles L. 279
Herbert, Steven K. 109
Herman, Clifford M. 386
Hernandez, Gonzalo 96
Herndon, S. Paul 368
Heron, Paula 152
Herrenkohl, Leslie R. 226
Herrenkohl, Todd 445
Herrick, James E. 444
Herring, Susan W. 189, 215, 217, 328
Herschensohn, Julia R. 128
Hershman, Marc 308, 317, 403
Herting, Jerald R. 175, 390
Hertling, Gunter H. 112
Hertzberg, Abraham 240
Herwig, Russell P. 354, 400
Hess, Alan C. 196
Heuving, Jeanne D. 186
Hevly, Bruce W. 114
Hevner, Robert F. 365
Hiatt, Peter 287
Hickey, Barbara M. 406
Hicks, Gregory A. 317
Hicks, Ramona R. 303, 357, 382
Higano, Celestia S. 349
Higgins, Chad 197
Higgins, Robert C. 196
Hilborn, Ray 306, 400
Hildebrand, Grant 42, 66
Hildebrandt, Jacob 347, 373
Hill, Charles William L. 196
Hill, Kristina 43, 49, 309
Hill, Paul T. 226, 419
Hill, Walter E. 354, 441
Hille, Bertil 296, 302, 373
Hille, Merrill B. 189, 292, 296
Hillel, Allen D. 363, 382
Hillier, Mark S. 197
Hinckley, Thomas M. 78, 278
Hinds, Stephen E. 84
Hirsch, Irl B. 347
Hirschman, Charles 175
Hirschmann, Jan V. 347
Hitti, Jane 359, 431
Hixson, William J. 64
Hjorth, Roland L. 317
Hlastala, Michael P. 310, 347
Ho, Rodney J. Y. 411
Hobbs, Peter V. 75
Hockenbery, David M. 297, 339, 349
Hodge, David C. 109, 246
Hodge, Frank D. 195
Hodge, Paul W. 73
Hodgson, Kevin T. 243, 278
Hodson, Jean Turnbaugh 221
Hodson, W. Alan 367
Hoff, Peter D. 182
Hoffer, Eric K. 379
Hoffman, Agnes 390
Hoffman, Alan Lowell 240
Hoffman, Allan S. 243, 310
Hoffman, Christopher 133
Hoffman, Martha A. 392
Hogan, Craig J. 73, 151
Hokanson, Randolph H. 137
Hol, Wilhelmus G. J. 296, 310, 326, 328, 371
Holcomb, Robin T. 406
Hollender, Lars Gosta 216
Holm, Bill 64
Holm, Vanja A. 368
Holman, Darryl J. 56
Holmberg, Leona A. 351
Holmes, King K. 347, 354, 430
Holmes, Mark L. 406
Holsapple, Keith A. 240
Holt, Bradley R. 243
Holt, Richard 268
Holt, Victoria L. 431, 436
Holton, James R. 75
Holtz, Robert Dean 246
Holzworth, Robert 96, 151
Hood, Leroy E. 252, 310, 335
Hooton, Thomas M. 347
Hooyman, Nancy 444
Hopkins, Paul B. 80
Horbett, Thomas A. 243, 310
Horita, Akira 371, 375
Horn, Barbara J. 390
Horn, Beverly M. 390
Horn, John R. 412
Horn, Michael 445
Hornbein, Thomas F. 325, 373
Horne, John K. 306, 400
Horner, Philip J. 303, 357
Horner, Richard R. 49, 247, 279
Hornung, Robin L. 351, 368
Horvath, Karen D. 387
Horwitz, Marshall S. 297, 349, 365
Hostetler, Paul S. 93
Hotchkiss, Mary A. 318
Hou, Jeffrey 49
Houze, Robert A. 75
Howard, Judith A. 175, 186
Howard, Philip 86
Howe, Bruce M. 406
Hoyle, Christine A. 392
Hruby, Antonin F. 90, 112
Hrutford, Bjorn F. 278
Hsu, Chih-Chi 257
Hsu, Li 424
Hu, Mary L. 64
Hu, Shiu-Lok 354, 411
Huang, Bu 445
Huang, Xuecong D. 257
Huber, Vandra Lee 196
Hudson, Leonard D. 344, 347
Hudson, Lois Phillips 106
Huebner, Colleen Ellen 391, 437
Huey, Raymond B. 189
Hughes, James P. 423
Hughes, Kelly T. 296, 354
Hujoel, Philippe P. 212, 431
Hume, Linda S. 317

Hunkins, Francis Peter 226
 Hunn, Eugene S. 55, 128, 168
 Hunt, D. Daniel 375, 436
 Hunt, Earl B. 160
 Hunt, Robyn 93
 Hunter, John C. 362, 379
 Huntington, Jane 333
 Huntsman, Lee L. 311
 Huppert, Daniel D. 101, 400, 403
 Hurley, Denzil 64
 Hurley, James Bryant 296, 302, 326
 Huston, John 317
 Hutterer, Karl L. 55
 Huwe, Ruth A. 197
 Hwang, Jenq-Neng 257
 Hyman, Barry 268, 419

I

Illman, Deborah L. 273
 Immel, Don T. 138
 Ingalls, Robert L. 151
 Ingebritsen, Christine 156, 171, 186
 Inglis, Andrew F, Jr. 363
 Inoue, Kanryu 265
 Iovita, Adrian 133
 Irby, David M. 342
 Iritani, Brian M. 330
 Irmscher, William F. 105
 Irving, Ronald S. 132
 Ishisaka, Anthony H. 444
 Isik, F. Frank 386
 Iverson, Richard M. 96
 Iwamoto, Satori 351, 376
 Izutsu, Kenneth 215, 216

J

Jackson, Dianah Leigh 166
 Jackson, Douglass L. 215, 216, 218
 Jackson, J. Carey 349
 Jackson, J. Craig 368
 Jackson, Kenneth L. 426
 Jackson, Kenneth M. 86
 Jackson, Lisa A. 431
 Jackson, W. A. Douglas 109
 Jacobs, Sue-ellen 55, 137, 186
 Jacobs-Young, Chavonda J. 279
 Jacobsen, Theodor S. 73
 Jacobson, Louis 325
 Jacobson, Phillip L. 42
 Jacobson, Robert L. 197
 Jacoby, Jean M. 247
 Jaegle, Lyatt 75
 Jaffe, Daniel A. 75
 Jaffe, Kenneth M. 356, 367, 382
 Jaffee, Ben-Joshua 444
 Jaffee, Martin S. 121, 143, 301
 Jagadeesh, Bharathi 303, 373
 Jain, Apurva 197
 Jain, Sanjeev 351
 James, Jennifer J. 383
 James, William 226
 Jandhyala, Vikram 258
 Janes, Joseph W. 288
 Jans, James P. 132
 Janssen, Donald J. 247

Jarboe, Thomas R. 151, 240
 Jardine, David 325, 368
 Jarolimek, John 226
 Jarosz, Lucy A. 109, 186
 Jarrett, Monica E. 390
 Jarvik, Gail P. 349, 431
 Jarvik, Jeffrey G. 357, 379, 436
 Jay, Stewart M. 317
 Jeck, Douglas A. 64
 Jecker, Nancy A. S. 148, 317, 344
 Jeffords, Susan E. 105, 186
 Jen, Alex K.Y. 265
 Jenekhe, Samson A. 80, 243
 Jenkins, Joseph R. 226
 Jenkins, Mark F. 93
 Jenkins, Michael G. 268
 Jensen, Lyle H. 326, 328
 Jensen, Marilee M. 392
 Jensen, Mark P. 382
 Jerome, Keith R. 341
 Jessup, Andrew T. 247
 Jhaveri, Nayna J. 109
 Jiambalvo, James 195
 Jiang, Shaoyi 243
 Jin, Lee-Way 365
 Jobe, Kathleen A. 349
 Johanson, Lennart N. 243
 John Stewart, Grace C. 351, 431
 Johnsen, Dennis O. 330
 Johnson, Barton S. 221
 Johnson, Brian Robert 43
 Johnson, Charles R. 105
 Johnson, Clark 390
 Johnson, David L. 257
 Johnson, David Odai 93
 Johnson, Donna 304, 437
 Johnson, Dudley 196
 Johnson, Eric S. 412
 Johnson, Gail 392
 Johnson, Glen H. 221
 Johnson, Gregory C. 406
 Johnson, Harlan Paul 96, 406
 Johnson, Jay A. 278, 306
 Johnson, Julie M. 49
 Johnson, Kay M. 351
 Johnson, Kurt Lewis 382
 Johnson, Merlin 375
 Johnson, Peter W. 427
 Johnson, Richard A. 196
 Johnson, Richard R. 114
 Johnson, Robert H. 219
 Johnson, Ronald A. 252, 288
 Johnston, Brian D. 368
 Johnston, Norman J. 42, 49, 51
 Jonas, Raymond A. 114, 166
 Jones, Bryan D. 155
 Jones, Christopher D. 121
 Jones, Diane Carlson 226
 Jones, Mary C. 391
 Jones, Robert C. 64
 Jones, Susan H. 43
 Jones, Thomas K. 368
 Jones, Thomas M. 196
 Jones, William P. 288
 Jonmarker, Christer S. R. 325

Jonsen, Albert R. 344
 Jonsson, Hannes 80, 151, 265
 Joondeph, Donald R. 217
 Joppa, Robert G. 240
 Jordan, Pamela L. 390
 Jorgensen, Jens E. 268
 Jory, Jon V. 93
 Joseph, Jutta C. 412
 Joslyn, Susan L. 162
 Joyner, Byron David 388
 Jumars, Peter A. 406
 Junge, Thomas 221
 Junghans, Arnd 152
 Junker, John M. 317
 Jurkovich, Gregory J. 386
 Jussila, Clyde F. 137

K

Kaczynski, Wlodzimierz M. 121, 403
 Kadel, Nancy J. 362
 Kadous, Kathryn K. 195
 Kahn, Michael 441
 Kahn, Miriam 55, 299
 Kahn, Peter H., Jr. 161
 Kahn, Steven Emanuel 347
 Kahr, Bart E. 80
 Kaiser, Robert J. 311
 Kaisse, Ellen 128, 301
 Kaja, Murali Krishna 339
 Kakiuchi, George H. 109
 Kalet, Ira J. 253, 311, 329, 343, 378
 Kalina, Robert E. 360
 Kalitzki, Judith Ann 198
 Kalman, David A. 426
 Kalonji, Gretchen 265
 Kaltsounis, Theodore 226
 Kamara, Avraham 196
 Kamenkovich, Igor V. 75
 Kang, Rebecca R. 390
 Kanny, Elizabeth M. 382
 Kano, Tamako-niwa 69
 Kapetanic, Breda 90
 Kapetanic, Davor 172
 Kaplan, Abraham 137
 Kaplan, Alex 341
 Kaplan, David B. 151
 Kaplan, Lev 152
 Kaplan, Sydney J. 105, 186
 Kappy, David L. 137
 Kapur, Kailash C. 262
 Kapur, Raj P. 297, 365, 368
 Kapur, Vishesh 351
 Karimi-Hakkak, Ahmad 143, 301
 Karl, Helen W. 325
 Karlin, Anna R. 252
 Karmy-Jones, Riyad 387
 Karpen, Richard S. 137
 Karpoff, Jonathan M. 196
 Karr, James 189, 246, 400, 419, 426
 Karras, Bryant Thomas 343, 437
 Kartin, Deborah 383
 Kartsonis, Anna D. 64, 66, 301
 Kasaba, Reşat 121, 175, 301
 Kashima, Tetsuden 175
 Kasprisin, Ronald J. 51

458 FACULTY INDEX

- Kasprzyk, Danuta M. 391
Kast, Fremont E. 196
Kato, Masashi 273
Katon, Wayne J. 333, 375, 436
Katsaros, Kristina B. 75
Katz, Aaron 294, 437
Katz, Lynn Fainsilber 161
Katze, Michael Gerald 296, 354
Kaufman, Joel D. 349, 427, 431
Kaup, Monika 106
Kaushansky, Kenneth 347
Kautz, Henry 129, 253
Kavanagh, Terrance J. 349, 427
Kawabori, Isamu 368
Kawamoto, Kevin Y. 86
Kawase, Mitsuhiro 406
Kazemi, Elham 227
Kearney, David J. 351
Keating, John P. 160
Kechley, Gerald 137
Keeler, John T. 155, 166
Keenan, Lynn 445
Kehl, Richard L. 64
Kehl, Theodore 252
Keifer, Matthew C. 349, 427
Keil, Richard G. 407
Keller, Patricia J. 215
Keller, Sarah L. 81, 152
Kelley, Deborah S. 407
Kelley, Jerry Lee 444
Kelly, Jean F. 390
Kelly, Kathryn A. 406
Kelly, Samuel E. 226
Kelly, William A. 356
Kemp, Christopher James 298, 365
Kemp, Susan 444
Kenagy, George James 189
Kennedy, Brian K. 327
Kennedy, Donally S. 168
Kennedy, J. Ward 347
Kennedy, Michael 391
Kennedy, S. Jane 195
Kennedy, Thelma T. 373
Kenney, Nancy J. 161, 186
Kenney, Richard L. 105
Kenny, George E. 354, 441
Kenny, Margaret 341
Kent, Joseph C. 247
Kerdeman, Deborah 226
Kerr, Donna H. 226
Kerr, F. Beth 161
Kerr, M. Kathleen 424
Kerr, Stephen T. 226, 299
Kerwin, William 379
Kesavatana-Dohrs, Wiworn 69
Kessler, William S. 407
Kestin, Mark 431
Kevorkian, Jirair 61
Keyes, Charles F. 55, 121
Keyt, David 148
Khalil, Fahad A. 101
Kharasch, Evan D. 325, 410
Kieckhefer, Gail M. 390
Kielbowicz, Richard B. 86
Kieling, William C. 268
Kiem, Hans-Peter 351
Kienast, Philip K. 197, 436
Kier, Elizabeth L. 156
Killien, Marcia G. 186, 390
Kim, Eunjung 391
Kim, Hyojoung 175
Kim, Jae H. 257
Kim, Jeehee 361
Kim, Jeffrey Y. 288
Kim, Jeong Han 133
Kim, Sara 333, 343
Kim, Soohee 69
Kim, Thomas A. 379
Kim, Yongmin 252, 257, 311, 379
Kimball, Ann M. 347, 430, 436
Kimball, Kathleen L. 227
Kimelman, David 189, 296, 326
Kimmey, Michael 347, 379
Kinahan, Paul E. 379
Kind, Silvia E. 137
King, Gregory J. 215, 217
King, James Richard 133
King, Mary-Claire 296, 335, 347, 430
Kingsbury, Martha 64, 66, 299
Kingsolver, Joel 189
Kinney, Gregory A. 383
Kinney, Lisa A. 214
Kinoshita, Yoshito 357
Kinyoun, James L. 360
Kippenhan, Charles J. 268
Kirkendall, Richard S. 114
Kirtley, Alan 318
Kiser, Edgar Vance 155, 175
Kissel, John C. 427
Kitahata, Mari M. 351, 437
Kitts, James A. 175
Kiviati, Nancy C. 347, 364
Kivlahan, Daniel R. 161, 375
Kiyak, H. Asuman 43, 161, 214
Klasterin, Theodore 197, 262, 294, 436
Klausenburger, Jurgen 128
Klawitter, Marieka 186, 294, 419
Klebanoff, Seymour 347
Klee, Victor 132
Klein, Eileen J. 368
Klein, Nancy A. 359
Kleit, Rachel G. 309, 419
Kletter, Gad B. 368
Klevit, Rachel E. 80, 296, 326
Klinger, Terrie 403
Kliot, Michel 357
Klockars, Alan J. 226
Knapp, Joan S. 92
Knapp, Michael S. 226
Knechtges, David R. 69
Knight, W. H., Jr. 317
Knopp, Robert H. 347, 359
Kobayashi, Albert S. 268
Koblitz, Neal I. 132
Kocan, Richard M. 400
Kochin, Levis A. 101
Kodadek, Sheila M. 390
Koehler, James K. 328
Koelle, David 341, 351, 441
Koenig, Hazel L. 65
Koenig, Jane Q. 427
Koeppell, Thomas D. 347, 430
Koerker, Donna J. 347
Koh, Duk-Su 373
Koh, Wui-Jin 359, 378
Kohen, Ruth 376
Kohlenberg, Robert J. 161
Kohler, Ted R. 386
Kohn, Alan J. 189
Kolb, Keith R. 43
Kolde, Endel-Jakob 197
Kolko, Beth E. 273
Konick, Willis 90
Kooperberg, Charles L. 423
Kopecky, Kenneth J. 423
Kopjar, Branko 294, 436
Kopp, David 138
Korg, Jacob 105
Korshin, Gregory 247
Kosaly, George 61, 268
Koski, Jennifer Lynch 196
Kot, Mark 62, 306
Kotha, Suresh 197
Koutsky, Laura A. 430
Kovacs, Julia A. 80
Kovacs, Sandor J. 133
Kovalesky, Andrea H. 391
Kovchegov, Yuri 152
Kowdley, Kris V. 349
Kozloff, Eugene N. 189
Kozuki, Yoriko 391
Kraft, George Howard 358, 382
Kramer, Karl D. 90, 172
Kramer, Steven 246
Kramlich, John C. 268
Kraus, Eric E. 358
Krebs, Edwin G. 326, 371
Kreiss, Joan K. 347
Kress, Victor C. 97
Krieger, John N. 388
Krieger-Brockett, Barbara 243, 407
Krishnan, Kannan M. 265
Kristal, Alan R. 304, 430
Krohn, Kenneth A. 80, 378, 379
Kronmal, Richard A. 181, 423
Kruckeberg, Arthur R. 78
Kruglyak, Leonid 297, 336
Krumme, Gunter 109
Kruzich, Jean 444
Kudenchuk, Peter J. 347
Kuechle, Melanie K. 351, 365
Kuga, Yasuo 257
Kuhl, Patricia K. 128, 161, 178, 302, 363
Kuhr, Christian S. 387, 388
Kukull, Walter A. 430, 436
Kumar, Vipin 263, 265, 268
Kummert, Richard O. 317
Kunze, Eric L. 406
Kunze, Kent 411
Kunzelman, Karyn S. 268, 311
Kuo, Cho-Chou 441
Kuo, Hsiang-Hui D. 175
Kuratani, John D. 358, 368
Kurath, Gael 441
Kurosaka, Mitsuru 240

- Kuru, Selim Sirri 144, 301
 Kushmerick, Martin J. 373, 379
 Kuszler, Patricia Carol 294, 317, 344, 436
 Kutz, Jose Nathan 62
 Kuver, Rahul P. 351
 Kwiram, Alvin L. 80
 Kwok, Karl 412
 Kyes, Randall C. 56, 161
- L**
- La Spada, Albert R. 298, 303, 341
 Laakso, Janice 445
 Labbé, Robert F. 341
 Labiak, James M. 179
 Labitzke, Curt W. 65
 Labossiere, Paul E. 269
 Labyak, Susan 391
 LaChapelle, Edward R. 75, 96
 Lacroix, Andrea Z. 430
 Ladiges, Warren C. 330
 Ladner, Richard E. 252, 257
 Lafferty, William E. 294, 349, 436
 Laguardia, Eric 106
 Lagunoff, Michael 298, 339, 355
 Lai, Henry C. 311
 Laird, Charles D. 189, 292, 296, 335
 Lake, George Russell 73, 151
 Lakshminarayan, S. 347
 Lalani, Tasneem A. 379
 Lalonde, Bernadette 391, 436
 Lam, Annie Y. 412
 Lam, Arthur M. 325, 356
 Lamont, Richard J. 215, 354
 Lampe, Johanna W. 304, 431
 Lampe, Mary F. 341, 349, 354
 Lampe, Paul D. 297, 441
 Lampe, Thomas H. 375
 Landau, Barbara R. 329, 373
 Landel, Grace P. 343
 Landis, Carol A. 390
 Landolt, Marsha L. 400
 Lang, Gladys Engel 86, 155, 175
 Lang, Kurt 86, 175
 Langdale, Lorrie A. 386
 Langdon, Merle K. 66, 84
 Lange, Marc B. 148
 Lange, Paul Henry 388
 Langer, Steve G. 343, 379
 Lara, Jimmie Cano 354
 Laramore, George E. 378
 Larimer, Mary E. 162, 376
 Larsen, Otto 175
 Larson, Anne M. 351
 Larson, Bruce C. 278
 Larson, Eric B. 347, 436
 Larson, Margaret L. 391
 Larson, Roger V. 362
 Larson, Timothy 246, 427
 Latourelle, Elaine Day 43
 Lau, Tuen-Yu 86
 Lauritzen, Peter O. 257
 Lavelly, William R. 121, 175
 Lawarree, Jacques P. 101
 Lawson, Victoria A. 109, 168, 186
 Lawton, Thomas J. 365
- Laya, Mary B. 351
 Layton, David F. 309, 419
 Lazowska, Edward D. 252
 Lazzari, Marceline 444
 Le Blanc, Michael 423
 Le Resche, Linda A. 216
 Lebert, Edgar A. 43
 Leboeuf, Renee C. 304, 347, 441
 Lebsock, Suzanne D. 114
 Lecky, John H. 325
 LeCrone, Carol N. 341
 Ledbetter, Daniel J. 386
 Lee, Ann Sung-Hi 69
 Lee, Craig M. 407
 Lee, John M. 132
 Lee, Lorri A. 325
 Lee, Robert G. 278, 308
 Lee, Sum Ping 347
 Lee, Thomas W. 196
 Leffler, Keith B. 101
 Leggott, Penelope J. 218
 Legters, Lyman H. 121
 Lehman, Constance D. 379
 Lehmann, Justus F. 382
 Lehmann, Kenneth G. 349
 Leigh, James William 444
 Leigh, John A. 298, 355
 Leiner, Jacqueline 90, 166
 Leiner, Wolfgang 90
 Leiren, Terje I. 114, 170
 Lemire, Ronald J. 367
 Leney, Lawrence 278
 Lengua, Liliana J. 162
 Lentz, Gretchen M. 359, 388
 Lentz, Martha J. 391
 Leonetti, Donna 56
 Leopold, Estella B. 78, 292
 Leovy, Conway B. 75, 96
 Lepe, Xavier 221
 Leporace, Giuseppe 166
 Lepore, Paul C. 175
 Leppa, Carol J. 391
 Lernmark, Ake 296, 339, 347
 Leroux, Brian 212, 423, 427
 Leschine, Thomas M. 306, 403
 Lessard, Evelyn J. 407
 Lessler, Daniel 349, 436
 Lettenmaier, Dennis P. 246, 278
 Lev, Daniel S. 155
 Leveque, Randall J. 61
 Leverenz, James B. 358, 376
 Lerversee, John H. 333
 Levi, Margaret 155
 Levy, Adam E. 387
 Levy, David M. 287
 Levy, Fred J. 114
 Levy, Henry M. 252
 Levy, Rene H. 356, 411
 Levy, Rona L. 444
 Levy, Wayne C. 349
 Lewellen, Thomas 257, 379
 Lewin, Mark 368
 Lewis, Brian T. R. 406
 Lewis, Charlotte W. 368
 Lewis, David H. 379
- Lewis, Frances M. 390
 Lewis, Laurel J. 257
 Lewis, Linda L. 391
 Li, Wei 269
 Li, Xingde 311
 Lichtenstein, Joel E. 379
 Lidstrom, Mary E. 243, 296, 311, 354
 Liggitt, H. Denny 330
 Liles, W. Conrad 349
 Lilley, Marvin D. 407
 Limaye, Ajit P. 341, 351
 Lin, Kuen-Yuan 240
 Lin, Pansy C. 196
 Lin, Zhi 65
 Lincoln, Karen D. 445
 Lind, Douglas A. 132
 Lindenberg, Catherine S. 391, 444
 Linder, Thomas M. 373
 Lindhorst, Taryn 445
 Lindner, Armando 349
 Lindsley, Skyler 378
 Linehan, Marsha H. 161, 375
 Linenberger, Michael L. 349
 Lingafelter, Edward C. 80
 Lingappa, Jaisri 351, 441
 Linial, Maxine L. 296, 354
 Link, Jeanne 379
 Linker, David T. 311, 349
 Lipkin, Edward W. 349
 Lippert, Michaelene 412
 Lippke, Bruce R. 278
 Lipsky, Benjamin A. 347
 Liston, John 400
 Litfin, Karen T. 156
 Little, Dolores E. 390
 Little, James Wendell 382
 Little, Laura M. 162
 Little, Robert M. 217
 Liu, Chen-Ching 257
 Liu, Chuan-Fen 437
 Liu, Hui 257, 258
 Liu, Lee-Jane Sally 427
 Liu, Lenna L. 368
 Liu, Wen-Fang 101
 Livingston, Robert B. 347
 Livne, Eli 240
 Lober, William B. 343
 Lockard, Joan S. 161, 300
 Locke, Hubert G. 419
 Lockwood, Thomas 105
 Loeb, Lawrence A. 296, 326, 364
 Loeser, John D. 325, 356
 Loewenstein, Daniel F. 65
 Loftus, Elizabeth F. 161, 317
 Loftus, Geoffrey R. 161
 Logerfo Sr., James P. 347, 436
 Logsdon, Miles G. 407
 Logsdon, Rebecca G. 375, 391
 Longres, John F. 444
 Longstreth, W. T., Jr. 347, 358, 430
 Longyear, Christopher R. 106
 Lord, Jere J. 151
 Lory, Stephen 354
 Losh, David Paul 333
 Louie, Therese A. 198

460 FACULTY INDEX

- Lovasz, Laszlo 132
Love, William J. 268
Loveland, Joel E. 43, 49
Lovell, David Gilbert 391
Lovell, George I. 156
Lovett, Wendell H. 43
Lowe, Celia 56
Lowenbraun, Sheila 226
Loves, Laura N. 247
Lozano, Paula 368
Lubatti, Henry J. 151
Luby, James C. 258
Luchtel, Daniel L. 296, 427
Ludwig, Richard L. 51
Lukehart, Sheila A. 219, 347, 354, 441
Lumley, Thomas S. 424
Lundberg, Shelly J. 101
Lundin, Norman K. 64
Lundquist, Barbara R. 137
Lunneborg, Clifford E. 161, 181
Lupinetti, Flavian M. 386
Ly, Uy-loi 240, 257
Lyll, Marta 65
Lydon-Rochelle, Mona 391, 437
Lynge, Dana C. 333, 387
Lynn, Anne 325, 367
- M**
- MacCready, Parker 407
Maciejewski, Matthew L. 437
Mackay, Pierre A. 84, 143, 301
Mackie, Kenneth P. 302, 325, 373
Mackler, Bruce 367
Macklin, John W. 81
MacLachlan, Douglas 197
MacLaren, Aileen 391
MacLaren, Carol F. 343
MacRae, Gregory Anthony 247
Macy, Jane 445
Madden, Catherine M. 93
Madison, John J. 419
Madsen, David L. 226
Madtes, David K. 349
Magyary, Diane L. 186, 390
Mah, Feng-Hwa 101
Mahoney, Joseph P. 246
Mai, Jens-Erik 288
Maier, Henry W. 444
Maier, Ronald V. 386
Maiuro, Roland D. 376
Maizels, Nancy 296, 326, 339
Majeski, Stephen J. 155
Maki, Jeffrey H. 379
Makielski, Kathleen H. 363
Malatesta, Paul H. 196
Mallory, V. Standish 96
Malone, Kathleen E. 431
Malone, Stephen 96
Maloney, David G. 349
Maloy, Frances 196
Malte, Philip C. 268
Mamishev, Alexander V. 258
Manci, Lloyd A. 212, 424
Mandoli, Dina F. 79, 298
Mankoff, David A. 379
Mann, Frederick A. 361, 379
Mann, Gary N. 387
Mannering, Fred L. 246
Mannik, Mart 347
Manning, Scott C. 363
Manoil, Colin C. 296, 335
Mansfield, Louise W. 390
Mantle-Bromley, Corinne 226
Mantua, Nathan J. 75, 403
Manusov, Valerie L. 86
Manuwal, David 278
Manzo, Lynne C. 49
Mar, Brian W. 246
Mar, Monte 257
Maranville, Deborah 318
Maravilla, Kenneth R. 356, 379
Marcenko, Maureen 444
Marcuse, Edgar K. 367, 430
Marglin, Stephen I. 379
Margon, Bruce H. 73
Marks, Charles 148
Marks, Robert 257
Marlatt, G. Alan 161
Maronian, Nicole 363
Marra, Christina M. 349, 358
Marrazzo, Jeanne M. 351
Marro, Kenneth I. 379
Marsh, Christopher L. 386, 388
Marshall, Donald E. 132
Marshall, John C. 64
Marshall, Susan G. 368
Martay, Kenneth 325
Martell, Louise K. 391
Martin, Diane P. 294, 430, 436
Martin, Gary V. 349
Martin, George 296, 335, 364
Martin, Lynn D. 325, 368
Martin, Michael D. 212, 216, 431
Martin, Paul J. 347
Martin, R. Douglas 181
Martin, Roy W. 325
Martin, Seelye 406
Martin, Thomas G. 349, 427
Martin, Thomas R. 347
Martyn, Donald A. 311
Marzluff, John M. 279, 309
Mason, Alden 64
Mason, David 181
Mass, Clifford F. 75
Massagli, Teresa L. 368, 382
Massmann, Joel W. 247
Mastroianni, Anna C. 294, 318, 344, 437
Masuda, David 295, 343, 437
Matchett, William H. 105
Mathews, Stephen B. 400
Matsen, Frederick A., III 311, 361
Matsuda-Kiami, Izumi 69
Matsueda, Ross L. 175
Matsumoto, Alvin M. 347
Matsumoto, Dawn A. 195
Matthews, Dana C. 368
Matthews, Donald Rowe 155
Mattick, Arthur T. 240
Mattock, Alan 246
Matula, Thomas J. 258
Mauksch, Larry B. 333
Maxim, Peter E. 376
May, Peter J. 155, 308, 419
Mayer, George 265
Mayer, James M. 80
Mayer, Jonathan D. 109, 333, 347, 436
Mayerfeld, Jason 156
Maykut, Gary 75, 96
Maynard, Charles C. 436
Mayo, Michael Edward 388
Mayock, Dennis Edward 368
Mazza, James J. 226
McArthur, James R. 347
McCabe, Robin L. 137
McCaffree, Kenneth M. 101
McCallum, I. Stewart 96
McCann, Barbara S. 375, 436
McCann, Michael W. 155, 317
McCarthy, Michael P. 96
McCartin, Rosemarie E. 226
McCauley, Elizabeth 161, 375
McClellan, Jon M. 376
McClintock, Marshall 273
McColl, William D. 137
McCormick, Norman J. 268, 406
McCormick, Richard L. 114
McCormick, Wayne C. 349
McCoy, Richard B. 222
McCracken, J. David 105
McCrone, Donald J. 155
McCune, Jeannine S. 412
McCurry, Susan Melancon 376, 391
McCutchen, Deborah Elaine 226
McDavid, Brad 138
McDermott, Lillian C. 151
McDermott, Lois J. 162
McDermott, Mark N. 151
McDiarmid, John B. 84
McDonald, David W. 288
McDonald, George B. 347
McDonald, Ruth A. 368
McDougall, James K. 364
McDuff, Russell E. 406
McElrath, Margaret Juliana 296, 341, 347, 441
McElroy, Colleen J. 105, 186
McFall, Miles E. 376
McFeron, Dean E. 268
McGee, John S. 101
McGee, Steve R. 349
McGinnis, Kathleen M. 318
McGonagle, Lee Anne 341
McGovern, William M. 132
McGrath, Barbara B. 56, 391, 431
McIntire, James L. 419
McKay, Mark 197, 293
McKean, William T. 243, 278
McKenzie, Robert T. 114
McKnight, Barbara 423
McKnight, G. Stanley 296, 302, 371
McLaren, Brian 43, 301
McLaughlin, John F. 367
McLean, Sammy 90, 112
McMahon, Robert J. 161
McManus, Dean A. 406
McMillan, Jo Ann 382

- McMullen, W. Russell 349
 McMurtrie, Jacqueline 318
 McNamara, Robert J. 106
 McNeely, Marguerite J. 351
 McPhaden, Michael J. 406
 McTiernan, Anne 349, 431
 Meacham, Merle L. 226
 Meditch, James S. 257
 Medlar, Deborah L. 195
 Meekins, Gregg D. 358
 Meila-Predovicu, Marina 182
 Meischke, Hendrika W. 436
 Meissner, Mark H. 386
 Melby, Anna 373
 Meldrum, Deirdre R. 257, 268, 311
 Meltzoff, Andrew N. 161, 178, 375
 Melvin, Ann Jorns 368
 Melzer, Sanford M. 368, 436
 Mendiratta, Vicki 359
 Mengert, Terry J. 349
 Mercer, James A. 96
 Mercer, Jonathan L. 156
 Merendino, K. Alvin 386
 Merriam, George R. 347, 359
 Merrill, Ronald T. 96, 406
 Merritt, Ethan A. 326, 329
 Mesbahi, Mehran 240
 Mescher, Ann M. 269
 Meschke, John Scott 427
 Metinko, Andrew P. 368
 Meyer, Hedwige M. 166
 Meyer, Kerry E. 343, 391
 Meyers, Marcia 444
 Michael, Ernest A. 132
 Michaelian, Patricia 137
 Micklesen, Lew R. 128, 172
 Middaugh, Dan 216
 Migdal, Joel S. 121, 155, 301
 Migeon, Mary 351
 Mignon, Edmond 288
 Milam, Ann H. 360
 Miles, Edward L. 400, 403, 419
 Milgrom, Peter M. 211, 436
 Miller, Arthur D. 296, 364
 Miller, Bruce S. 400
 Miller, David E. 43
 Miller, Donald H. 51, 308
 Miller, Ernest G. 419
 Miller, Gerald A. 151
 Miller, Gregory 246
 Miller, Jane L. 388
 Miller, John W. 356, 358
 Miller, Leslie R. 359
 Miller, Marc 55, 308, 400, 403
 Miller, Richard A. 349
 Miller, Robert M. 179
 Miller, Samuel I. 296, 347, 354
 Miller, Sidney 444
 Miller, William 247
 Millet, Marietta 43
 Mills, William J. 362
 Milstein, Jerrold M. 358, 368
 Minah, Galen F. 43, 300
 Miner, Adah L. 178
 Minifie, Fred D. 178
 Minkoff, Debra C. 175
 Minoshima, Satoshi 379
 Mirza, Sohail K. 357, 362
 Mishalani, James K. 148
 Mitchell, Ellen S. 391
 Mitchell, Katharyne 109, 186
 Mitchell, Michael E. 388
 Mitchell, Pamela H. 294, 390, 436
 Mitchell, Stephen A. 132
 Mitchell, Terence R. 161, 196
 Mittler, John E. 355
 Miyamoto, Frank 175
 Miyamoto, John M. 161
 Miyaoka, Robert S. 379
 Mizokawa, Donald T. 226
 Mizumori, Sheri J. 161, 303
 Mobley, Curtis D. 406
 Mock, Charles N. 387, 431, 437
 Mockett, Paul M. 151
 Modell, Harold I. 373
 Modelski, George 155
 Modiano, Raimonda 90, 105
 Moe, Karen E. 376
 Moe, Roger E. 386
 Moeller, Thomas 303, 358
 Moens, Cecilia B. 189, 298, 303, 329
 Moffett, Benjamin C. 217
 Mofjeld, Harold 407
 Mohler, Richard Ernest J. 43
 Moinpour, Reza 197
 Moinzadeh, Kamran 197, 262
 Molbo, Doris M. 391
 Mones, Barbara 253
 Moniz, Donna M. 391
 Monk, George Stephen 133
 Monks, Stephanie 424
 Monnat, Raymond J., Jr. 296, 336, 364
 Monsen, Elaine R. 304, 347, 436
 Montano, Daniel E. 391
 Montgomery, David R. 96, 307
 Montgomery, R. Bruce 351
 Moody, Joycelyn K. 106, 186
 Moody, William J. 189, 296, 302
 Moolgavkar, Suresh H. 423, 430
 Moon, Randall T. 296, 302, 371
 Moore, Alton W. 217
 Moore, Christopher A. 179
 Moore, Dennis W. 406
 Moore, Donald E. 359, 431
 Moore, John T. 137
 Moore, Robert T. 133
 Moore, Ronald M. 148
 Morgan, Michael S. 243, 246, 427
 Morgansen, Kristi A. 240
 Morishima, James K. 226
 Morison, James H. 406
 Morita, June G. 182
 Moritz, William E. 257
 Morrill, Richard L. 109, 308
 Morris, Arval 317
 Morris, David R. 296, 326
 Morris, Morris D. 101
 Morris, Sharon L. 427
 Morris, Wanda Martina 175, 181
 Morrison, Diane M. 161, 444
 Morrison, James B. 268
 Morrison, Kenneth N. 221
 Morrison, Richard S. 302, 356
 Morrison, Steven J. 138
 Morrow, James Allen 132
 Morse, M. Patricia 189
 Morton, Thomas H. 215, 216
 Morton, William R. 330
 Mosca, Vincent S. 362
 Moseley, Stephen L. 298, 355, 368
 Moss, Albert A. 379
 Mottet, N. Karle 365, 427
 Motulsky, Arno G. 335, 347
 Motzer, Sandra Adams 391
 Moulton, R. Wells 243
 Moxon, Richard W. 196
 Moy, Patricia 86, 156
 Muchowski, Paul J. 298, 303, 371
 Muczynski, Kimberly Ann 351
 Mudumbai, Raghu 361
 Muecke, Marjorie A. 55, 390, 436
 Mueller, Beth A. 430
 Mueller, Fred J. 195
 Mugerauer, Robert 43, 308
 Muller, Charles 388
 Muller, Eric D. 326
 Mulligan, Kathleen A. 329
 Mulligan, Michael S. 387
 Mullins, James I. 298, 341, 347, 354
 Mulvihill, Eileen R. 365
 Mundt, Lenora B. 444
 Munet-Vilaro, Frances 391
 Murburg, Michele 376
 Murphy, Gretchen C. 437
 Murphy, Janet Haworth 368
 Murphy, Nanci L. 412
 Murphy, Shirley Ann 390
 Murray, James D. 61, 189
 Murray, James W. 80, 301, 406
 Murray, Karen F. 368
 Murry, Charles E. 298, 311, 365
 Murua, Alejandro E. 182
 Mussetter, Sally Ann 106
 Myers, Kathleen M. 376
 Myerson, David 365
 Myler, Peter J. 441
- N**
- Naeem, Shahid 189
 Nagda, Biren A. 445
 Nagourney, Warren 151
 Naiman, Robert J. 278, 400
 Nameroff, Mark A. 329
 Namioka, Isaac 132
 Napp, Jeffrey M. 407
 Narayanan, A. Sampath 365
 Narver, John C. 197
 Nash, Linda L. 114
 Nash, Richard A. 349
 Nason, James 55, 300
 Nathanson, Neil M. 296, 302, 371
 Nathens, Avery B. 387
 Natkin, Eugene 213
 Nece, Ronald E. 246
 Neel, Richard S. 226

462 FACULTY INDEX

- Neff, John 367
Neff, Margaret J. 351
Neighbor, William E., Jr. 333
Neiman, Paul E. 296, 347, 365
Nelp, Wil B. 347, 379
Nelson, Alan C. 311
Nelson, Ann E. 151
Nelson, Bradley H. 339
Nelson, Brian A. 257
Nelson, Bruce K. 96, 406
Nelson, Charles R. 101, 181
Nelson, James A. 379
Nelson, Jerold A. 288
Nelson, Judith Lee 347
Nelson, Karin M. 351
Nelson, Mary Lee 226
Nelson, Peter S. 298, 336, 351, 357, 365, 388
Nelson, Sidney D. 411
Nelson, Wendel 411
Nemati, Kamran M. 47, 247
Nepom, Gerald T. 339
Nerad, Maresi 226
Nesbitt, Elizabeth A. 97
Nester, Eugene W. 78, 292, 354
Nester, Theresa 341
Nesting, Andrew K. 171
Neumaier, John F. 303, 376
Neurath, Hans 326
Neuzil, Kathleen M. 351
Newell, David W. 357, 361
Newell, Laura L. 55
Newell, William T. 196
Newhall, Christopher 96
Newman, Lee A. 279
Newmeyer, Frederick J. 128
Newton, Jan A. 407
Nguyen, Kim O. 69
Nguyen, Toan D. 349
Nicholls, Jack I. 221
Nicholls, James Keith 43, 65
Nicholls, Stephen C. 386
Nichter, Charles A. 358
Nickerson, Deborah A. 311, 336
Nicolas, Peter 318
Nicosia, Roberto F. 365
Nielsen, Christopher P. 349
Nihan, Nancy L. 246
Nijenhuis, Albert 132
Nilsen, Thomas R. 86
Nittrouer, Charles 96, 307, 406
Noble, Kathleen D. 186
Nochlin, David 366
Noe, Jerre D. 252
Noegel, Scott B. 114, 121, 144, 301
Noges, Endrik 257
Nolen, Patricia A. 227
Nolen, Susan B. 227
Noreen, Eric W. 195
Nork, Sean E. 362
Norman, Jerry 69
Norman, Joe G., Jr. 80
Norris, Thomas E. 333, 342, 347, 436
North, Douglas C. 101
Northey, Robert A. 279
Norton, Susan J. 179, 363
Norton, Thomas J. 51
Norwood, Thomas H. 365
Nostrand, Howard L. 166
Notkin, David S. 252
Novacek, Steven A. 138
Novack, Alvin H. 367
Nowell, Arthur R. M. 406
Nunke, Ronald 132
Nurius, Paula S. 444
Nute, Peter E. 55
Nyasulu, Frazier W. 81
Nyberg, Folke E. 43
Nyerges, Timothy L. 109, 308
Nyquist, Jody D. 87
Nystuen, Jeffrey A. 407
- O**
- O'Brien, Kevin 349
O'Connor, Frederica W. 391
O'Connor, Kathleen A. 56
O'Donnell, Paul V. 350
O'Donnell, Sean 162, 303
O'Hara, Edgar 168
O'Kane, John 333, 362
O'Malley, Robert E., Jr. 62
O'Neal, Robert B. 220
O'Neil, Mary R. 114, 166
O'Neill, John 106
O'Neill, Kathleen M. 318
O'Sullivan, S. Finbarr 379
O'Sullivan, Teresa 412
O'Toole, Helen J. 65
Oberle, Mark W. 430, 436
Ochs, Hans D. 367
Ochsner, Jeffrey K. 43, 49, 51, 308
Oda, Dolphine 214
Odderson, Ib R. 382
Odegaard, Mary Ann 198
Odegard, Peggy Soule 412
Odell, Garrett M. 189
Odom, Robert I., Jr. 96
Ogihara, Toshiyuki 129
Ogilvie, Myrth 445
Ogston, Andrea S. 407
Oh, Seho 258
Ohta, Amy 69, 129
Ohta, Kaoru 69
Ohuchi, Fumio 151, 265
Ojemann, George A. 357
Ojemann, Linda M. 357
Okada, Erica Mina 198
Okumura, Ramona M. 383
Olavarria, Jaime F. 161, 303
Olerud, John E. 347, 361
Oliver, Lynn M. 333
Oliver, Marvin E. 65, 67
Olmstead, Marjorie A. 80, 151
Olmstead, Richard G. 79, 300
Olshansky, Ellen F. 391
Olson, Carin M. 350
Olson, David J. 155, 403
Olson, James M. 298, 368
Olson, Maynard V. 252, 292, 296, 335, 347
Olswang, Lesley B. 179
Olswang, Steven G. 226, 317
Oltman-Shay, Joan M. 407
Omiecinski, Curtis J. 296
Omnell, Karl-Ake 216
Onouye, Barry S. 43
Opheim, Kent E. 341
Opperman, Hal N. 64, 66
Oram, John Fisher 348
Orcutt, James C. 360, 363
Orians, Gordon H. 189
Orr, Rosemary J. 325
Osborne, M. Scott 132
Osborne, Oliver H. 390
Oshima, Junko 365
Oskin, Mark H. 253
Ostendorf, Mari 129, 257
Osterhout, Lee E. 129, 161, 303
Ostlund, Lyle E. 221
Ostmeier, Dorothee 112
Ostrander, Elaine A. 189, 298, 336
Ostrander, Kenneth H. 227
Oswald, Robert J. 213
Ott, Susan M. 350, 362, 365, 379
Otto, Catherine M. 325, 348
Overbaugh, Julie Maureen 296
Overland, James E. 75
Overney, Rene M. 243
Oviir, Tiina 213
Oxford, Monica L. 445
Oxorn, Donald C. 325, 350
Oyler, Mel R. 288
Ozols, Vilnis 133
Ozubko, Christopher 64
- P**
- Paauw, Douglas 348
Pace, Antonio 166
Pace, Clark B. 47
Padmanabhan, Venkata N. Z. 253, 258
Page, Roy C. 220, 365
Page, Stephen B. 419
Pagon, Roberta A. 348, 360, 367
Paine, Robert T. 189
Paladin, Angelisa M. 379
Palais, James B. 114, 121
Palczewski, Krzysztof 80, 296, 302, 360, 371
Palka, John M. 189, 292
Pallanck, Leo J. 298, 303, 336
Palleroni, Sergio A. 43, 49
Palmer, Jerry P. 348
Palmer, Richard 246
Palmieri, John 133
Palmiter, Richard D. 296, 302, 326
Palomo, Dolores J. 106
Paluska, Scott A. 333
Papayannopoulou, Thalia 348
Paris, Carolyn A. 368
Parisi, Marguerite T. 379
Park, David R. 351
Park, Jongsoo 357
Park, Julie R. 368
Park, Yoonsuk 215
Parker, Shanga Kyle Gerard 93
Parker, Walter C. 226
Parkhurst, Susan M. 298
Parkinson, Alan J. 441

- Parks, George K. 96
 Parks, Malcolm R. 86
 Parks, Richard 101
 Parmeter, R. Reid 240
 Parrish, Julia 190, 400, 403
 Parson, William W. 80, 326
 Parsons, Jack R. 444
 Parsons, Jeffrey D. 407
 Parsons, Marilyn 297, 441
 Pascal, Paul 84
 Pascualy, O. Marcella 376
 Passer, Michael W. 162
 Patrick, Donald L. 175, 382, 412, 430, 436
 Patrick, Julian 137
 Patrick, Maxine L. 390
 Patterson, David R. 161, 382, 386
 Patterson, Diana 391
 Patterson, Kathleen 365
 Patterson, Mark R. 106
 Patterson, Ronald G. 137
 Patterson, Ruth E. 304, 431
 Patton, Dorothy L. 328, 359, 360
 Patton, Harry D. 373
 Paulsen, C. Alvin 348
 Paun, Dorothy Ann 279, 412
 Pauwels, Heidi R. 69
 Pavlin, D. Janet 325
 Pavlin, Edward G. 325
 Paynter, Kirsten S. 383
 Pearce, Diana 445
 Pearlman, Alan S. 325, 348
 Pearlman, Robert A. 344, 348, 436
 Pearsall, Thomas P. 257
 Pearson, Carl E. 62
 Pearson, J. Steven 93
 Pease, Otis A. 114
 Peck, Cornelius J. 317
 Peckham, Percy D. 226
 Peckol, James 258
 Pecora, Peter 444
 Peden, Irene Carswell 257
 Pedigo, Robert D. 152
 Pejtersen, Annelise Mark 287
 Pekow, Cynthia A. 330
 Pellegrini, Carlos A. 386
 Pember, Don R. 86
 Pena, Devon G. 55
 Pendergrass, Thomas W. 368, 431
 Pendergrass, William R. 366
 Penson, David F. 388, 437
 Pepe, Margaret 423
 Pepping, Mary 376, 382
 Percival, Donald B. 182
 Perez-Garcia, John 279
 Perine, Peter L. 430, 441
 Perkel, David J. 190, 303, 363
 Perkins, James D. 386
 Perkins, John H., Jr. 253
 Perkins, Jonathan A. 363
 Perkins, Patrick 133
 Perlman, Michael D. 181
 Perlmutter, Steve I. 373
 Perrin, Edward 436
 Perry, Mary J. 406
 Persson, Gosta Rutger 220
 Peskind, Elaine R. 375
 Pesznecker, Betty L. 391
 Petersdorf, Effie Wang 350
 Petersdorf, Robert G. 348
 Petersdorf, Stephen H. 350
 Petersen, Karla Renee 392
 Petersen, Suzanne Helen 168
 Peterson, Arthur V. 423
 Peterson, David L. 278
 Peterson, Devereaux 218
 Peterson, Richard B. 196
 Petrie, Eric C. 376
 Petroff, Catherine 247
 Pettigrew, Karen E. 288
 Pettit, Elizabeth M. 175
 Pfaff, Steven J. 175
 Pham, Tony A. 303, 361, 376
 Phelps, Robert R. 132
 Phillipsen, Gerry F. 86
 Phillips, Ihsin Tsai-Yun 257
 Phillips, Keith M. 221
 Phillips, Leon A. 379
 Phillips, Mark H. 378
 Phillips, Sandra L. 221
 Pickett, Cheryl A. 351
 Pickford, Stewart G. 278
 Pierson, David John 348
 Pietsch, Theodore W. 189, 300, 400
 Pigott, George M. 400
 Pigott, William 196
 Pihoker, Catherine 368
 Pilat, Michael J. 243, 246
 Pilcher, Martha G. 197
 Pinsky, Linda E. 333, 343, 350
 Pinter, Joseph D. 358, 368
 Pirinjian, Goarik G. 214
 Pitchford, Susan 175
 Pitkethly, David T. 357
 Pittman, Rosemary 391
 Pitts, David Leroy 213
 Pizzuto, Eugene 64
 Plant, William J. 75
 Plecki, Margaret L. 227
 Plorde, James J. 341, 348
 Plotnick, Robert D. 101, 419
 Plough, Alonzo L. 436
 Plumb, Carolyn Sue 273
 Plummer, William T. 343
 Pocker, Yeshayau 80
 Pohlman, Timothy H. 386
 Poiger, Uta G. 114, 186
 Polack, Zoya M. 172
 Polifka, Janine E. 369
 Polissar, Nayak Lincoln 423
 Pollack, Daniel 133
 Pollack, Gerald H. 311
 Polyak, Stephen J. 341
 Poole, Jeanne E. 350
 Poolos, Nicholas P. 358
 Poovendran, Raadhakrishnan 258
 Pope, Charles E. 348
 Popovic, Zoran 253
 Popowics, Tracy 215
 Porte, Daniel, Jr. 348
 Porter, James Roscoe 388
 Porter, Peggy L. 298, 365
 Porter, Robert P. 257
 Porter, Stephen C. 96, 307
 Portin, Bradley S. 227
 Portman, Michael A. 368
 Posavad, Christine 341
 Posner, Karen L. 325
 Post, Robert M. 86
 Potter, John D. 430
 Potter, Karl H. 148
 Powell, Heidi Sara 351
 Powell, Janet M. 383
 Powers, Randall K. 373
 Poznanski, Kazimierz 121
 Praczukowski, Edward 65
 Prakash, Vikramaditya 43, 309
 Pratt, David T. 268
 Pratt, Wanda 288, 343
 Prentice, Ross L. 423
 Presland, Richard B. 215, 350
 Press, Oliver W. 328, 348
 Press, Randi J. 221
 Pressly, Thomas J. 114
 Preston, Thomas A. 348
 Prezhdo, Oleg 81
 Price Spratlen, Lois 390
 Price, Lillian M. 330
 Price, Thomas H. 348
 Priess, James R. 189, 298
 Prince, C. Edward 359
 Prins, David 179
 Prinz, Patricia 390
 Probstfield, Jeffrey L. 348, 430
 Proctor, Richard M. 65
 Prosisie, Theodore O. 86
 Prosterman, Roy L. 317
 Prutti, Brigitte 112
 Psaty, Bruce M. 348, 430, 436
 Puff, Robert D. 151
 Punt, Andre 306, 400
 Purcell, Mark H. 109
 Putkonen, Jaakko K. 97, 307
 Pyatok, Michael 43
 Pyle, Kenneth B. 114, 121
- Q**
- Qamar, Anthony 97
 Qian, Hong 62, 311
 Quan, Linda 367
 Quay, Paul D. 307, 406
 Quinn, Kevin M. 156
 Quinn, Lebris S. 350
 Quinn, Thomas P. 400
 Quinn, Thomas R. 73, 152
- R**
- Rabinovitch, B. Seymour 81
 Rabinovitch, Peter S. 297, 365
 Rabura, Horst M. 112
 Radant, Allen D. 376
 Radich, Jerald P. 350
 Radke, Lawrence F. 75
 Raedeke, Kenneth J. 279
 Raftery, Adrian Elmes 175, 182
 Raghu, Ganesh 341, 348

464 FACULTY INDEX

- Ragozin, David 132
Rahn, John 137
Raible, David W. 189, 298, 303, 329
Raines, Elaine W. 365
Rainey, Petrie M. 341
Raisys, Vidmantas A. 341
Rajendran, Joseph 379
Rajgopal, Shivaram 195
Ralph, David D. 350
Ramakrishnan, Lalita 298, 351, 355
Ramamurthy, Priti 186
Ramanathan, K V. 195
Ramasastry, Anita G. 318
Ramey, Judith A. 262, 272
Ramsay, Douglas S. 161, 217, 218
Ramsey, Bonnie W. 367
Ramsey, Paul G. 348
Ramsey, Scott D. 350, 412
Ramulu, M. 262, 268
Randell, Brooke P. 391
Raneda-Cuartero, I. 168
Ransom, Bruce Robert 302, 358, 373
Rao, Rajesh P. N. 253, 303
Rao, Y. Krishna 265
Raskind, Murray 375
Raskind, Wendy H. 350, 362, 376
Rathod, Pradipsinh K. 81
Ratner, Buddy D. 243, 311
Rattray, Maurice 406
Raucher, Stanley 81
Raugi, Gregory J. 350
Rausch, Michael W. 361
Rausch, Robert L. 330, 441
Rawlings, David J. 339, 368
Raymond, Charles F. 96, 307
Reay, Donald T. 365
Redd, Tina 93
Redding, Gregory J. 367
Reddy, Chandan C. 106
Redeker, Charles C. 257
Reed, Brian 106
Reed, Dorothy 246
Reed, May J. 350
Reed, Richard J. 75
Reed, Stephen G. 441
Reed, Susan D. 359, 431
Rees, Jane 304, 369, 437
Rees, Thomas 179, 363
Regnier, Michael 311
Reh, Thomas A. 297, 302, 329, 357, 360
Rehr, John J. 151
Reiber, Gayle 431, 436
Reichard, Sarah E. 279
Reichenbach, Dennis D. 365
Reid, Brian J. 297, 335, 348
Reid, Brian R. 81, 326
Reid, Philip J. 81
Reidy, Michael A. 365
Reilly, Dominic F. 350, 382
Reiner, Alexander P. 431
Reinert, Otto 90, 105
Reinhall, Per G. 263, 268
Reinhardt, William P. 81, 151
Reitan, Henry M. 226
Remley, Paul G. 106, 171
Rensberger, John M. 96
Reoux, Joseph P. 376
Reshetar, John S, Jr. 155
Resing, Joseph A. 407
Resler, William M. 195
Resnick, Herman 444
Rettie, Allan E. 411
Rey, William H. 112
Reynolds, Joel Howard 182
Rhines, Peter B. 75, 406
Rhoads, Caroline S. 351
Rhodes, Lorna A. 56, 186, 436
Rice, Edward M. 196
Rice, Steven J. 195
Richards, Gail E. 367
Richards, Henry J. 376
Richards, Jane M. 162
Richards, Todd L. 311, 379
Richardson, Barbra Ann 424
Richardson, Laura P. 368
Richardson, Mary L. 294, 391, 436
Richardson, Michael L. 361, 379
Richardson, Thomas S. 182
Richey, Cheryl A. 186, 444
Richey, Eugene 246
Richey, Jeffrey E. 278, 307, 406
Richman, Robert J. 148
Ricker, Neil L. 243, 278
Riddell, Stanley R. 348
Riddiford, Lynn M. 189, 297, 302
Riedel, Eberhard K. 151
Rieke, Frederick Martin 303, 361, 373
Rieke, Luvern V. 317
Ries, Richard K. 375
Riley, Donald E. 388
Riley, James J. 62, 268
Rippeth, Julie D. 376
Riser, Stephen C. 407
Riskin, Eve A. 257
Ritcey, James A. 257
Rivara, Frederick P. 367, 431
Rivara, J'may B. 445
Rivenburgh, Nancy 86, 156
Roberts, Elizabeth A. 445
Roberts, Frank A. 220
Roberts, James Michael 297, 326
Roberts, Jean Valerie 148, 186
Roberts, Marilyn C. 297, 441
Roberts, Norman H. 263
Roberts, Theodore S. 357
Robertson, H. Thomas 348
Robertson, Iain M. 49, 279
Robertson, Paul B. 220
Robertson, R. G. Hamish 151
Robertson, William O. 367
Robinovitch, Murray 215, 220
Robins, Lynne S. 333, 343
Robinson, Bruce H. 81
Robinson, Farrel R. 303, 329
Robinson, Lawrence R. 363, 382
Robinson, Nancy M. 375
Rocap, Gabrielle L. 407
Rockafellar, R. T. 62, 132, 262
Rodgers, William H. 317
Rodieck, Robert W. 360
Rodriguez, Patricia 227
Rodriquez, Arthur A. 382
Roeder, Charles W. 246
Roelink, Henk 298, 303, 329
Roffman, Roger Alan 444
Rogers, Margaret A. 179
Rohde, Steffen 133
Rohn, Peter H. 156
Rohrer, John 43
Rohrmann, Charles A. 379
Rohrschneider, Larry R. 297, 365
Rohwer, Sievert A. 189
Rojas, Eddy M. 47
Roley, V. Vance 196
Rolfe, George R. 43, 47, 51
Romano, Joan 376
Rombauer, Marjorie D. 317
Rooke, G. Alec 325
Root, Richard K. 348
Rorabaugh, William J. 114
Rose, Elaine 101, 186
Rose, Norman J. 81
Rose, Richard M. 161
Rose, Timothy M. 215, 298, 355, 441
Rosen, Henry 348
Rosenbaum, David M. 368, 379
Rosenblatt, Roger A. 333, 436
Rosendaal, Frits R. 431
Rosenfeld, Michael E. 297, 304, 365, 441
Rosenthal, Geoffrey L. 368
Rosenzweig, Jim E. 196
Rosinbum, Ralph 137
Rosner, Arnold S. 43
Ross, Austin, Jr. 294, 436
Ross, Brian K. 325
Ross, Luana K. 186
Rossano, August T. 246
Rosse, Cornelius 329
Rossel, Sven H. 90, 170
Rossing, Mary Anne 431
Rossini, Anthony J. 424
Rostomily, Robert C. 357
Roth, Gerald J. 348
Roth, Mark 298, 327
Rothberg, Joseph E. 151
Rottle, Nancy D. 49
Roulston, Maria Carmen 343
Rousseau, John 65
Routt, Milton L. 362
Rowell, Loring B. 373
Roy, Sumit 257
Roy-Byrne, Peter 375
Royce, William F. 400
Royer, Charles T. 419, 437
Rubel, Edwin W. 161, 302, 357, 363, 373
Rubenfeld, Gordon 351
Rubens, Craig E. 354, 367
Rubenstein, Jeffrey E. 221
Rubin, Brian Paul 366
Rubin, Cyrus E. 348
Rubino, Nancy I. 166
Rudd, Michael 162
Rudensky, Alexander Y. 298, 339
Rudkin, Alison H. 190
Ruesink, Jennifer 190

- Ruohola-Baker, Hannele 298, 327, 336
 Russ, Joanna 105
 Russell, David A. 240
 Russell, David W. 350
 Russell, Kenneth J. 378
 Russo, Joan E. 376
 Rutherford, G. Scott 51, 246, 308
 Rutherford, Suzanne L. 298
 Rutledge, Joe C. 341
 Rutter, Carolyn 424
 Ruzicka, Jaromir 81
 Ruzzo, Walter L. 252
 Ryan, Clare 279, 309, 403, 419
 Ryan, Dennis M. 43, 51
 Ryan, Michael J. 351
 Ryan, Rosemary 444
 Rysdyk, Rolf 240
- S**
- Saari, John C. 326, 360
 Sabath, Daniel E. 341, 350
 Sabine, Christopher L. 407
 Sack, Richard O. 96
 Sackett, Gene P. 161
 Sahr, John D. 97, 257
 Saks, Toby 137
 Salama, Nina R. 298
 Salas, Elizabeth 114, 186
 Salazar, Mary K. 390
 Sale, George E. 365
 Sale, Roger H. 105
 Salehi-Esfahani, Haideh 101, 301
 Sales, Anne 391, 437
 Salesin, David Henry 252
 Salomon, Richard G. 69
 Salzman, Timothy O. 137
 Samadpour, Mansour 427
 Samii, Ali 357, 358
 Sampson, Paul D. 182, 306
 Samudrala, Vaikuntanath V. 298, 355
 Samuelson, Merrill 86
 Sanborn, E. Sue 179
 Sandall, Susan R. 227
 Sanders, Jean E. 367
 Sanders, Joan Elizabeth 268, 311, 382
 Sandmaier, Brenda M. 350
 Sandwith, Colin J. 268
 Saneto, Russell P. 358
 Sanford, Thomas B. 406
 Sangeorzan, Bruce J. 361
 Santana, Luis F. 373
 Santianez, Nil 168
 Saperstein, David A. 361
 Sappington, Jeremy L. 295, 437
 Sarachik, Edward S. 62, 75, 406
 Sarason, Irwin G. 161
 Sarasvathy, Saras D. 197
 Sarikaya, Mehmet 265
 Sasaki, Tomikazu 81
 Sasanoff, Robert 43
 Sasso, Eric H. 350
 Sauer, Geoffrey F. 273
 Saunders, David R. 348
 Savage, Martin J. 152
 Saver, Barry G. 333
 Sawhill, Roy 246
 Sawin, Robert 386
 Sax, Gilbert 161
 Saxberg, Borje O. 196
 Saxon, Andrew J. 376
 Saxton, Matthew 288
 Sbragia, Albert J. 90, 166
 Schaad, Douglas C. 343
 Schaeffer, Walter H. 278
 Schall, Lawrence D. 196
 Scharenberg, Andrew M. 339, 368
 Schaufelberger, John E. 47
 Schauman, Sally 49
 Scheidel, Thomas M. 86
 Scheier, Shirley E. 65
 Scheingold, Stuart A. 155
 Schenkman, Kenneth A. 311, 325, 368
 Schepp, Karen G. 391
 Scher, Allen M. 373
 Scher, Maryonda 376
 Schick, Michael 151
 Schiess, Peter 278
 Schiller, Harvey S. 341
 Schindler, Daniel E. 190, 400
 Schlosser, Ann E. 198
 Schmale, Gregory A. 362
 Schmer, Gottfried 341
 Schmid, Peter J. 62
 Schmidt, Benjamin 114
 Schmidt, Rodney 350, 365
 Schmiedl, Udo P. 379
 Schmitt, David R. 175
 Schmitt, Thomas G. 197, 293
 Schnapp, Lynn M. 350
 Schnapper, Eric 317
 Schneeweiss, Ronald 333
 Schneider, Jerry 246
 Schoene, Robert B. 348, 361
 Scholz, Friedrich-Wilhelm 182
 Schrag, Clarence 175
 Schramm, Oded 132
 Schreuder, Gerard Fritz 278, 306
 Schroeder, Carole A. 186, 391
 Schubach, William H. 350
 Schubert, Mark M. 216, 363
 Schubert, Wolfgang M. 81
 Schubiger, Gerold A. 189, 297, 335
 Schuetze, Scott 351
 Schuffler, Michael D. 348
 Schulte, Scott J. 379
 Schumacher, Scott A. 318
 Schurr, J. Michael 81, 311
 Schuyler, Philip D. 137, 301
 Schwartz, Anna L. 391
 Schwartz, Daniel T. 243
 Schwartz, Ilene Sharon 179, 226
 Schwartz, Jeffrey L. 378
 Schwartz, Michael W. 348
 Schwartz, Pepper J. 175, 186
 Schwartz, Robert S. 348
 Schwartz, Stephen Marc 431
 Schwartz, Stephen Mark 297, 311, 348, 365
 Schwarze, Ulrike 351, 366
 Schwedhelm, E. Ricardo 222
 Schwid, Howard A. 325
 Schwindt, Peter C. 373
 Scott, Bert G. 195
 Scott, C. Ronald 348, 367
 Scott, Craig S. 342
 Scott, David R. M. 278
 Scott, David T. 376
 Scott, George W. 65
 Scott, Joseph W. 175
 Scott, Terry B. 343
 Scott, William George 196
 Scribner, Belding H. 348
 Seabloom, Robert 246
 Seales, Marc A. 137
 Searle, Leroy F. 90, 106
 Sears, Laurie J. 114, 186
 Sebesta, Sam L. 226
 Sechen, Carl M. 257
 Secord, David L. 190
 Sefcik, Stephan E. 195
 Seferis, James C. 243
 Segal, Jack 132
 Sehmsdorf, Henning K. 90, 171
 Seidler, Gerald T. 152
 Seifer, Sarena 437
 Seitz, Steven M. 253
 Seixas, Noah S. 427
 Self, Steven G. 423
 Seligmann, Claus 43
 Semke, Jeanette 444
 Sengupta, Rimli 253
 Sever, Lowell E. 431
 Seymour, Allyn H. 400
 Shadel, Willard F. 86
 Shadlen, Marie-Florence 351
 Shadlen, Michael N. 303, 358, 373
 Shaffer, Peter S. 152
 Shaffrey, Christopher I. 357, 362
 Shah, Maully J. 369
 Shahn, Judith 93
 Shankar, Venkataraman 247, 309
 Shankland, Stuart J. 350
 Shannon, Sarah E. 344, 391
 Shapiro, Linda G. 252, 257, 342
 Shapiro, Michael C. 69
 Sharar, Samuel R. 325
 Sharpe, Grant William 278
 Sharpe, Stephen R. 151
 Shaviro, Steven 90, 105
 Shaw, Alan Cary 252
 Shaw, Cheng-Mei 365
 Shaw, Dennis 379
 Shaw, Spencer G. 287
 Sheffield, John V. L. 350
 Shell-Duncan, Bettina 56, 437
 Shen, Danny D. 411, 412
 Shen, I-yeu (Steve) 268
 Sheppard, Craig 137
 Sheppard, Lianne 423, 427
 Sherk, Helen 303, 329
 Sherman, David R. 298, 441
 Sherrard, Donald J. 348
 Sherrer, Robert E. 268
 Sherris, John C. 354
 Sherry, David Dan 368
 Shevlin, Terrence J. 195

466 FACULTY INDEX

- Shi, Chuan Jin 258
 Shibata, Dean K. 379
 Shields, David 105
 Shields, Laurence E. 359
 Shipley, George A. 168
 Shiu-Thornton, Sharyne 437
 Shoda, Yuichi 161
 Shorack, Galen 132, 182
 Shores, Donna J. 195
 Shores, Molly M. 376
 Shreve, Ronald L. 307, 406
 Shugerman, Richard P. 368
 Shuhart, Margaret C. 351
 Shulman, Howard M. 365
 Shulman, Robert 105
 Shuman, Frank R. 407
 Shumlak, Uri 240
 Shumway-Cook, Anne 382
 Shy, Kirkwood K. 359, 431
 Siantz, Mary Lou 390
 Sibley, Carol Hopkins 297, 335
 Sibley, Thomas H. 400
 Sidhu, Manrita K. 379
 Sidles, John Arthur 268, 361
 Sie, Kathleen C. Y. 363
 Siebert, Joseph Robert 365
 Siegel, Andrew F. 182, 196, 197
 Sielert, Vern 138
 Sievers, Eric L. 369
 Sigelmann, Rubens A. 257
 Sigurdsson, Snorri 81
 Sikma, Suzanne 391
 Siks, Geraldine B. 93
 Silber, John R. 357
 Silberberg, Eugene 101
 Silbergeld, Daniel L. 357, 365
 Silberstein, Sandra V. 105, 129, 186
 Silver, David M. 87
 Simenstad, Charles A. 400
 Simkin, Peter A. 348, 361
 Simmons-O'Neill, Elizabeth 106
 Simon, Adam F. 156
 Simon, Gregory E. 376
 Simon, Julian A. 81, 298
 Simoni, Jane M. 162
 Simonian, Peter Todd 362
 Simonson, Harold P. 105
 Simpson, Andrea Y. 156
 Simpson, Caroline Chung 106, 186
 Simpson, Maria Quinlan 92
 Simpson, Roger A. 86
 Simpson, Terri A. 391
 Simpson, Tracy L. 376
 Sinanan, Mika N. 258, 386
 Singh, Kunwar P. 69
 Singh, Narendra Pal 311
 Singh, Nikhil Pal 114
 Sires, Bryan S. 360, 363
 Sirotnik, Kenneth A. 226
 Siscovick, David S. 348, 431
 Sivaramakrishnan, K. 56
 Sjavik, Jan 171
 Skalski, John R. 278, 306, 400
 Skelley, Grant T. 288
 Skerrett, Shawn J. 350
 Skowronek, Felix E. 137
 Slattery, John T. 411
 Sleicher, Charles A. 243
 Sletten, Ronald S. 97, 307
 Slichter, Sherrill J. 348
 Slimp, Jefferson C. 382
 Sloan, Kevin L. 376
 Slough, John T. 240
 Small, Robert 43
 Smidchens, Guntis I. 171
 Smith, Albert J. 227
 Smith, Angela 148
 Smith, Charles B. 348
 Smith, Charles W. 64
 Smith, Charles Z. 317
 Smith, Curtis Scott 343, 350
 Smith, Dale E. 221
 Smith, Douglas G. 362
 Smith, Eric A. 55
 Smith, Eugene H. 106
 Smith, Gerald R. 297, 335, 365
 Smith, Hart F. 132
 Smith, John P. 227
 Smith, Kendra 369
 Smith, Kevin L. 362
 Smith, Lynwood S. 400
 Smith, Mark A. 156
 Smith, Mark S. 368
 Smith, Nathan J. 361, 367
 Smith, Orville A. 373
 Smith, Ronald E. 161
 Smith, S. Paul 132
 Smith, Sharyl G. 288
 Smith, Sheryllyn 369
 Smith, Steven Rathgeb 156, 419
 Smith, Stewart W. 96
 Smith, William O. 137
 Smoll, Frank L. 161
 Smull, Bradley F. 75
 Snover, Kurt Albert 151
 Snow-Smith, Joanne 64, 66
 Snowden, Mark B. 376
 Snyder, Jack 363
 Snyder, Lawrence 252
 Sohng, Sue 444
 Sokol, Vilem 137
 Sokoloff, Naomi B. 143, 186, 301
 Solberg, Ramona L. 64
 Solchany, JoAnne E. 391
 Soldanova, Jaroslava M. 172
 Solomyak, Boris 132
 Soma, Mani 257, 311
 Somani, Shabir M. 412
 Sommers, Earl E. 216
 Sonenberg, Maya 106
 Song, Kit M. 362
 Song, Michael 197
 Sorensen, Clark W. 56, 121
 Sorensen, Larry B. 151
 Soriano, Philippe 298
 Sotero De Menezes, Marcio 358, 369
 Souders, Jennifer E. 325
 Soules, Michael R. 359
 Souter, Michael J. 325
 Souza, Pamela E. 179
 Spach, David H. 350
 Spadoni, Leon R. 359
 Spafford, Michael C. 64
 Spain, David H. 55
 Spain, William 303, 358, 373
 Sparke, Matthew 109, 121
 Spelman, Francis A. 311
 Speltz, Matthew L. 161, 375
 Spence, Alexander M. 348, 357, 358, 365
 Spieker, Susan J. 161, 390
 Spielberg, Freya 333
 Spigner, Clarence 437
 Spindel, Robert C. 257, 406
 Spitzer, Ada 391
 Spivak, Boris 151
 Spratlen, Thaddeus H. 197
 Sprugel, Douglas George 278
 Spyridakis, Dimitris 247
 Spyridakis, Jan 272
 Srebnik, Debra S. 376
 St. Pierre, Louise M. 65
 Stacey, Robert C. 114
 Stacey, Robin C. 114, 186
 Stadius, Michael L. 350
 Stadler, David R. 335
 Stage, Scott A. 227
 Staheli, Lynn T. 362
 Stahl, David A. 246, 354
 Stahl, William L. 358, 373
 Staiger, Thomas O. 351
 Staley, James T. 297, 354
 Stamatatos, Leonidas 441
 Stamatoyannopoulos, George 297, 335, 348, 365
 Stamm, Keith R. 86
 Stamm, Walter E. 348, 431
 Standal, Timothy 226
 Stanford, Janet L. 431
 Stang, Robert George 265
 Stanley, Robert B. 363
 Stanton, John F. 246
 Stanton, Robert B. 106
 Stapleton, Ann E. 350
 Stapleton, F. Bruder 367
 Stark, Rodney 175
 Starkebaum, Gordon A. 348
 Starr, Lawrence 137
 Startz, Richard 101
 Staryk, Steven S. 137
 Staten, Henry J. 90, 105, 148
 Staton, Ann Q. 86
 Staub, Christian 43
 Stayton, Patrick S. 297, 311
 Stearns, Elizabeth P. 198
 Stecher Hansen, Marianne T. 171, 186
 Steele, Cynthia 90, 168
 Steene, Birgitta 90, 170
 Steensma, Harvey K. 197
 Stehman-Breen, Catherine O. 351, 431
 Stehr-Green, Paul 431
 Steig, Eric J. 97, 307
 Stein, Julie K. 55, 300, 307
 Stein, Sarah A. 114, 121
 Steinbach, Gideon 350
 Steinberg, Kenneth P. 350
 Steiner, James C. 213

- Steiner, Robert A. 189, 297, 303, 359, 373
 Stella, Nephi 298, 303, 371, 376
 Stelzner, Matthias G. 386
 Stempien-Otero, April S. 351
 Stenchever, Morton A. 359
 Stenkamp, Ronald E. 81, 298, 327, 329
 Stensel, H. David 246
 Stenzel, George 278
 Stephens, Karen G. 341, 350, 365
 Stephens, Matthew 182
 Stern, Edward A. 151
 Stern, Eric J. 350, 379
 Sternberg, Richard 406
 Stettler, Reinhard F. 278
 Stevens, Dennis L. 348
 Stevens, Nancy G. 333, 431
 Stevens, Reed R. 227
 Stevenson, James G. 367
 Stevick, Robert D. 105
 Stewart, Brent K. 311, 342, 379
 Stewart, Douglas 348
 Stewart, Forrest Mark 348
 Stewart, Richard J. 97
 Stiefel, Doris 216
 Stiens, Steve A. 383
 Stier, Florence E. 444
 Stillman, Dennis 295, 437
 Stirling, Charles E. 373
 Stivelman, John C. 350
 Stoddard, Barry L. 298, 327
 Stoebe, Thomas Gaines 265
 Stoebeck, William B. 317
 Stoel-Gammon, Carol 129, 179
 Stoelinga, Mark T. 75
 Stoll, Henry 343
 Stolov, Walter C. 382
 Stone, Jessica 198
 Stone, John O. H. 97, 307
 Storch, Laila 137
 Storch, Richard L. 262
 Storer, Barry E. 423
 Storm, Daniel R. 297, 303, 371
 Storm, Derek 151
 Storti, Duane W. 62, 269
 Stout, Edgar L. 132
 Stout, James W. 368, 437
 Stovel, Katherine W. 175
 Stowitschek, Joseph James 226
 Strand, Stuart E. 246, 278
 Strandjord, Thomas P. 368
 Stratton, John R. 348
 Strauss, David 43
 Strausser, Howard 247
 Strayer, George D. 226
 Streatfield, David C. 43, 49, 51, 308
 Street, Robert E. 240
 Streissguth, Ann P. 161, 375
 Streissguth, Daniel M. 43
 Streitberger, William R. 105
 Strickland, Carolyn J. B. 391
 Stritikus, Tom 227
 Strong, Dennis Fulton 197
 Strong, Roland K. 298, 339
 Stroup, Sarah C. 84
 Strozer, Judith R. 129
 Stuart, Kenneth Daniel 297, 354, 441
 Stubbs, Christopher 73, 151
 Stuetzle, Werner 182, 252
 Stuver, Minze 96
 Stuve, Eric M. 81, 243
 Stygall, Gail 106, 186
 Su, Judy Y. 325
 Suci, Dan 253
 Sugg, Nancy K. 350
 Sullivan, Jeremiah J. 197
 Sullivan, John B. 132
 Sullivan, Mark D. 344, 376
 Sullivan, Sean 348, 412, 436
 Sullivan, Woodruff T, II 73, 114
 Sulzbacher, Stephen 227, 368, 376
 Sumi, Shuzo Mark 358, 365
 Sun, Ming-Ting 257
 Sundem, Gary L. 195, 294
 Sundsten, John Wallin 329
 Sunindyo, Saraswati 176, 187
 Surawicz, Christina M. 348
 Sutermeister, Robert A. 196
 Sutton, Paul R. 351
 Sutton, Sharon E. 43, 49, 51, 444
 Sutton, Stuart A. 288
 Swalla, Billie J. 189, 298
 Swanson, Brian 97
 Swanson, Donald A. 96
 Swanson, Kristen M. 390
 Swanson, Paul E. 365
 Swanson, Phillip D. 348, 358
 Swanson, Terry W. 97, 307
 Swartzman, Gordon Leni 306, 400
 Swenson, Erik R. 348
 Swisher, Elizabeth M. 359
 Swisshelm, Karen 365
 Sybert, Virginia 348
 Sydow, John D. 93
 Sylvester, John 62, 132
 Sylvester, Robert O. 246
 Symons, Jordan 369
 Synovec, Robert E. 81
 Syrjala, Karen L. 376
 Szablya, John F. 257
 Szabo, La Verne 341
 Sze, Raymond W. 379
 Szkody, Paula 73
 Szot, Patricia 376
- T**
- Taber, Richard D. 278
 Tabet, Stephen R. 351
 Taggart, Jennifer 133
 Taggart, Raymond 268
 Tait, Jonathan F. 341, 350, 365
 Tajima, Emiko A. 445
 Takagi, Calvin Y. 444
 Takamori, Akio 65
 Takasugi, Julie E. 379
 Takayama, Thomas K. 388
 Takeda, Fumiko 69
 Takenaka, Toshiko 318
 Talbott, William J. 148
 Talner, Lee B. 379
 Tamimi, Hisham K. 359
 Tamura, Hirokuni 197
 Tan, Yong 197
 Tanimoto, Steven L. 252, 257
 Taplin, Stephen H. 333
 Tapper, David 386
 Tapscott, Stephen J. 298, 358, 365
 Tarczy-Hornoch, Peter 343, 368
 Tarhouni, Ali A. 196
 Taricani, Jo Ann 137
 Tarlinskaya, Marina 129
 Tarr, Phillip I. 354, 367
 Taub, Frieda B. 400
 Taya, Minoru 257, 265, 268
 Taylor, Catherine S. 227
 Taylor, Edward, Jr. 227
 Taylor, James A., Jr. 368
 Taylor, Janelle S. 56, 187
 Taylor, Michael John 155
 Taylor, Norman J. 64
 Taylor, Paul C. 148
 Taylor, Quintard 114
 Taylor, Thomas R. 333
 Taylor, Veronica 317
 Taylor, Victoria M. 437
 Teather, Edward Charles 444
 Teitz, Carol Claire 362
 Teller, David C. 326
 Teller, Davida Y. 161, 303, 373
 Temkin, Nancy R. 357, 423
 Tempel, Bruce L. 297, 303, 348, 363, 371
 Tencer, Allan Fred 362
 Teri, Linda 161, 375, 390
 Terman, Gregory W. 303, 325
 Terrel, Ronald L. 246
 Terry, Carole R. 137
 Thalberg, Stanton P. 227
 Thiel, Philip 43
 Thomas, Carol G. 114
 Thomas, David B. 431
 Thomas, David P. 278
 Thomas, E. Donnell 348
 Thomas, James H. 297, 303, 335
 Thomas, Karen A. 391
 Thomas, Lynn M. 114, 187
 Thomas, Mary Durand 391
 Thomas, Rekha R. 133
 Thomas, Robert P. 101
 Thome, Diane 137
 Thompson, Arthur R. 348
 Thompson, Elizabeth A. 182, 335, 423
 Thompson, Engelberta 436
 Thompson, Frances Elaine A. 390
 Thompson, Gary 179
 Thompson, John (Jack) R. 294, 437
 Thompson, John A. 350
 Thompson, Luanne 407
 Thompson, Marie D. 179, 226
 Thompson, Mary Lou 423
 Thompson, Richard J. 419
 Thompson, William H. 351
 Thomson, Jennifer B. 227
 Thorning, David R. 365
 Thornquist, Mark Daniel 424
 Thornton, Judith Ann 101
 Thorsos, Eric I. 258

468 FACULTY INDEX

- Thorud, David B. 278
Thouless, David 151
Thouless, Margaret E. 298, 330, 441
Thummel, Kenneth E. 411
Tillman, James E. 75
Tirschwell, David L. 358
Tkachuk, Douglas C. 366
Todaro, George J. 365, 441
Toews, John E. 114
Tollefson, James W. 105, 129
Tolnay, Stewart E. 175
Tomba, Martin 252
Tonelli, Mark R. 344, 351
Toolson, L. Brian 221
Torii, Keiko 79, 298
Toro, Tatiana 133
Tosh, Martin 424
Toshima, Michelle 383
Tostberg, Robert E. 226
Towe, Arnold L. 373
Townes, Brenda D. 375
Townes, David A. 351
Townsend, James R. 121, 155
Townsend, John D. 222
Townsend, Michael E. 148, 318
Trager, William F. 81, 411
Trahms, Cristine M. 304, 369
Trainor, Thomas A. 151
Trask, Barbara J. 297, 311, 335
Traxler, Beth A. 298, 355
Tremblay, Kelly L. 179
Trence, Dace L. 351
Treser, Charles D. 427
Troia, Gary A. 227
Troll, Mark 258
Troster, Alexander I. 357, 376
Trout, Deborah L. 93
True, Lawrence D. 365
Truelove, Edmond L. 216
Truman, James W. 189, 297, 303
Trumble, Thomas E. 362, 386
Trupin, Eric W. 375
Tsang, Leung 257
Tseng, Paul Yun 132
Tsu, Vivien D. 431
Tsuang, Debby W. 376, 431
Tsukada, Matsuo 78
Tsukiyama, Toshio 298, 327
Tsutsui, Michio 69, 273
Tu, Shin-Ping 351
Tucker, Gary J. 375
Tufts, Paul Dewitt 137
Tukey, Harold B. 278
Tuncel, Selim 132
Tung, Ka Kit 62
Tupper, Kari Lynn 187
Turck, Marvin 348
Turecek, Frantisek 81
Turk, Dennis C. 325
Turkiyyah, George 247
Turnblom, Eric 279, 306
Turner, Daniel J. 198
Turner, Judith A. 375, 382
Turnovsky, Michelle H. L. 101
Turnovsky, Stephen J. 101
Tuttle, Mark E. 263, 268
Tynan, Cynthia T. 407
- U**
- Uehara, Edwina 444
Uhlmann, Gunther A. 132
Uldall, Karina K. 376
Ullman, Joan Connelly 114
Unadkat, Jashvant D. 411
Underwood, Douglas M. 86
Unis, Alan S. 161, 376
Unsworth, Martyn J. 97
Untermann, Richard K. 51
Untersteiner, Norbert 75, 96
Urban, Nicole D. 436
- V**
- Vaezy, Shahram 311
Vagners, Juris 62, 240, 257
Valadez, James R. 227
Valencia, Sheila Denise W. 226
Valentinetti, Aurora, 93
Vallieres, Eric 386
Van Belle, Gerald 423, 427
Van Blaricom, Amy Lee 359
Van Brederode, Johannes 358
Van Citters, Robert L. 348, 373
Van Den Berg, Sara J. 106
Van Den Berghe, Pierre L. 175
Van Dyck, Robert S., Jr. 152
Van Hoosier, Gerald 330
van Kolck, Ubirijara 152
Van Volkenburgh, Elizabeth 78, 292, 297
Van Voorhis, Wesley C. 297, 348, 441
Vanags, Andris 43
Vanblaricom, Glenn R. 279, 400
Vance, Eugene 90, 166
Vance, Joseph A. 97
Vandenbosch, Robert 81
Vanderstoep, Ann 376, 431
Varani, Gabriele 81, 297, 326
Varley, Christopher K. 376
Vasquez, James A. 227
Vater, Youri L. 325
Vaughan, Miceal F. 91, 106
Vaughan, Thomas L. 431
Vaughn, Lea B. 318
Vavilala, Monica S. 325, 369
Vedder, Nicholas 362, 387
Veenstra, David 412
Veith, Richard 375
Velikonja, Joseph 109
Venkatraman, Manorama M. 391
Verdugo, Pedro 215, 311, 348
Verhoef, Douglas R. 222
Verhulst, Johan 376
Verlinde, Christophe L. M. J. 298, 327, 329
Vernez Moudon, Anne 43, 49, 51, 308
Verrier, Edward D. 386
Vesper, Karl H. 196, 268, 403
Vessella, Robert L. 354, 365, 388
Vesselle, Hubert J. 379
Vesztergombi, Katalin 133
Vicini, Paolo 311
Victoria, Maria de Lourdes 318
- Vilches, Oscar E. 152
Villacres, Enrique C. 376
Vincent, Inez J. 365
Vincenzi, Frank F. 371
Viney, Christopher 311
Virgin, Jeffrey B. 366
Vitaliano, Peter P. 161, 375
Vitiello, Michael V. 161, 375, 390
Vivekanandan, J. 258
Vogel, Viola 152, 298, 311
Vogt, Daniel 279
Vogt, Kristiina 278
Vokos, Stamatia P. 152
Volwiler, Wade 348
Von Der Emde, Gerhard 162, 190, 303
Vontver, Louis A. 359
Voyles, Joseph B. 112, 129
- W**
- Waaland, J. Robert 78
Wacker, Norman J. 106
Waddell, Paul A. 51, 109, 247, 309, 419
Wadden, Douglas J. 64
Waddington, Edwin D. 96, 307
Wagar, John Alan 278
Wager, L. Wesley 175
Waggener, Thomas R. 279
Waggie, Kimberly S. 330
Wagner, Amy W. 376
Wagner, Edward H. 436
Wagoner, David R. 105
Wahl, Patricia W. 423
Wakefield, Jonathan Clive 182, 424
Wakimoto, Barbara T. 189, 292, 297, 335
Wald, Anna 341, 351, 431
Walden, Von P. 75
Waldhausen, John H. 387
Walker, Edward A. 333, 359, 375
Walker, Jamie 64
Walker, Joel T. 114, 144, 301
Walker, Richard B. 78
Walker, William O., Jr. 368
Wallace, Carol A. 368
Wallace, James F. 348
Wallace, John M. 75
Wallerstein, George 73
Wallner, Kent E. 378
Walsh, Kenneth A. 326
Walsh, Walter J. 318
Walter, John C. 114
Walters, Karina 444
Wang, Ching-Hsien 90
Wang, Ching-Yun 424
Wang, Edith H. 298, 371
Wang, Joanne 411
Warashina, M. Patricia 64
Ward, Deborah 186, 391
Ward, Michael D. 155
Ward, Nicholas G. 375
Ward, Peter D. 73, 96, 189
Ward, Richard J. 325
Ware, Carol B. 330
Warfield, Virginia 133
Warme, Lars G. 91, 171
Warner, Garth 133

- Warner, Mark J. 407
 Warnick, Barbara P. 86, 272
 Warnick, Myron E. 221
 Warren, Edus Houston 351
 Warren, John R. 176
 Warren, Jonathan W. 121
 Warren, Stephen G. 75, 96, 307
 Washington, Kathleen A. 383
 Wasley, Patricia A. 226
 Wasser, Samuel K. 189, 279, 359
 Wassink, Alicia Beckford 129
 Watanabe, Jill M. 351
 Watkins, Sandra L. 348, 367
 Watson, Eileen L. 215, 371
 Watson, Nathaniel F. 358
 Watts, Carolyn A. 101, 294, 419, 436
 Watts, Gordon T. 152
 Waugh, Daniel Clarke 114, 121, 301
 Weatherley, Richard A. 444
 Weaver, Edward M. 363
 Weaver, Marcia R. 437
 Webb, Eugene 121
 Weber, Stanley S. 412
 Webster, John M. 106
 Webster-Stratton, Carolyn 390
 Wedgwood, Ralph J. 367
 Weeks, Robin J. 97
 Weigle, David S. 350
 Weigler, Benjamin J. 330, 431
 Weinbaum, Alys E. 106, 187
 Weinberger, Edward 367, 379
 Weiner, Alan 297, 326
 Weinstein, Philip 161, 212, 218
 Weis, Joseph G. 175
 Weiss, Avery H. 361, 368
 Weiss, Michael D. 358
 Weiss, Noel S. 431
 Welch, Eugene B. 246
 Weld, Daniel Sabey 252
 Weller, Cass 148
 Wellner, Jon A. 182, 423
 Wells, Norma J. 212, 215
 Wells, William L. 195
 Welman, Valentine S. 65
 Welton, William E. 294, 437
 Wenderoth, Mary Pat 190
 Wener, Mark H. 341, 350
 Wenk, Edward 246
 Wenke, Robert J. 55, 301
 Werner, Lynne A. 179, 363
 Wessells, Hunter 388
 West, Carolyn M. 187
 West, G. Alexander 357
 West, James D. 172
 West, Stephen D. 279
 Westerlund, Frank 51
 Weston, Donna 392
 Westrum, Lesnick E. 161, 297, 303, 329, 357
 Westwater, Michael J. 133
 Wetherall, David James 253
 Wettlaufer, John 152
 Weymuller, Ernest A, Jr. 363
 Wheatley, John J. 198
 Wheeler, Bayard O. 196
 Wheeler, Brannon M. 144, 301
 Wheeler, Deborah 122
 Whelan, John F. 198
 Whelan, Michael F. 387
 Whimbey, Estella 350
 Whisler, Howard C. 78
 White, J. Emily 431
 White, Myron 272
 White, Owen R. 226
 White, Richard 114
 White, Theodore C. 298, 441
 White-Traut, Rosemary 391
 Whiteaker, Grace B. 288
 Whitehill-Ward, John 64
 Whiteley, Arthur H. 189
 Whiting, Susan H. 156
 Whitney, Joanne D. 390
 Whitney, Robert A. 330
 Whitsett, Stan F. 376
 Whittaker, James 444
 Whittemore, Osgood J. 265
 Whorton, James C. 344
 Wibbels, Erik M. 156
 Wickizer, Thomas M. 294, 436
 Wickman, James A. 197
 Wicks, Andrew C. 197
 Widdison, Elizabeth 195
 Wieczorek, Marek K. 65, 67
 Wiehl, Lis W. 318
 Wight, Thomas 297, 365
 Wijsman, Ellen M. 348, 423
 Wilbur, D. Scott 378
 Wilcock, William S. D. 97, 407
 Wilensky, Alan J. 357, 358
 Wilets, Lawrence 152
 Wiley, Hannah 92
 Wilke, Sabine 112
 Wilkerson, John D. 156
 Wilkerson, John F. 152
 Wilkes, Richard Jeffrey 152
 Wilkie, Diana J. 390
 Wilkinson, Charles W. 376
 Willerford, Dennis M. 339, 350
 Willett, Sean D. 97
 Wilgerodt, Mayumi 392
 Williams, Donald T. 226
 Williams, Kevin L. 407
 Williams, Michael A. 114, 121, 143, 301
 Williams, Michelle A. 431
 Williams, Richard C. 226
 Williams, Robert W. 152
 Williams, Thomas R. 273
 Williams, Walter 419
 Willows, A. O. Dennis 189, 297, 303
 Willson, Richard 350
 Wilson, Anthony J. 362, 379
 Wilson, Christopher B. 297, 339, 367
 Wilson, David B. 133
 Wilson, Denise M. 258
 Wilson, Lawrence G. 376
 Wilson, Lizabeth A. 287
 Wilson, Steven E. 329, 360
 Wilson, William R. D. 263, 268
 Winans, Edgar V. 55
 Windschitl, Mark A. 227, 292
 Winebrenner, Dale P. 97, 258
 Wineburg, Samuel S. 114, 226
 Wingerson, Dane K. 376
 Wingfield, John C. 189, 303
 Winglee, Robert M. 96, 152, 240
 Winn, H. Richard 303, 357, 373
 Winn, Robert K. 373
 Winn, William David 137, 226, 272, 300
 Winterbottom, Daniel M. 43, 49
 Winters, Kraig B. 62
 Winterscheid, Loren C. 386
 Wipf, Joyce E. 350
 Wiseman, Robert W. 379
 Wissmar, Robert C. 279, 400
 Witham, Barry B. 93
 Withers, Suzanne D. 109, 309
 Witherspoon, Gary J. 55
 Witherspoon, Robert P. 350
 Wolak, Jan 268
 Wolcher, Louis E. 318
 Wolcott, John R. 93
 Wolf, Fredric M. 342, 436
 Wolf, Kathleen L. 49, 279
 Wolf, Norman S. 297, 330, 365
 Wolf-Wilets, Vivian 390
 Woffle, Dael L. 419
 Womack, William M. 376
 Wong, Christine 121
 Wong, Emily Y. 351
 Wong, Kar-Yiu 101
 Wong, Shawn H. 105
 Woo, Tony C. 263, 268
 Wood, Brent L. 341
 Wood, Douglas E. 387
 Wood, Francis C, Jr. 350
 Wood, Robert W. 350, 437
 Woodgate, Rebecca A. 407
 Woodman, Darrell J. 81
 Woodruff, Gene L. 243
 Woodrum, David E. 367
 Woods, James S. 427
 Woods, Nancy 186, 390
 Woods, Susan L. 390
 Woodward, Kathleen 105
 Woodworth, Robert T. 196
 Woody, Andrea I. 148, 187
 Woolfrey, Ann E. 369
 Wooster, Warren S. 403
 Wootton, Peter 378
 Wordeman, Linda 298, 373
 Worthington, Philip 214
 Wortley, W. Victor 166
 Wott, John A. 279
 Wright, George 333
 Wright, Jeffrey A. 343, 368
 Wright, Mary C. 115
 Wright, Richard A. 129
 Wright, Robin K. 65, 67, 300
 Wright, Robin L. 189, 298, 336
 Wu, Daniel Y. 351
 Wulff, Donald H. 87
- X**
- Xia, Younan 81, 265
 Xia, Zhengui 298, 303, 371, 427
 Xu, Wenqing 298, 329

470 FACULTY INDEX**Y**

Yablonka-Reuveni, Zipora 297, 329
Yaffe, Laurence G. 152
Yager, Paul 81, 243, 311
Yalch, Richard F. 198
Yamamura, Koza 121
Yamane, Ann 383
Yanez, Norbert David, III 424
Yang, Anand A. 121
Yang, Claire C. 358, 388
Yantis, Phillip A. 179
Yao, Meng Chao 189, 297
Yao, Michelle S. 378
Yasui, Yutaka 424
Yates, John R., II 336
Yee, Cassian 351
Yee, Hsian-Pei 258
Yee, Shirley J. 114, 186
Yee, Sinclair S. 257
Yeh, Harry H. 62, 246
Yen, Joyce Wen-Hwei 263
Yerxa, Fendall Winston 86
Yeung, Raymond S. 350, 365, 387
Yorkston, Kathryn 179, 382
Yost, Michael G. 427

Young, Elton 297, 326, 335
Young, Glennys J. 114, 121
Young, Heather M. 391
Young, John T. 64
Yowell, Donna Lynne 166
Yu, David T. 383
Yuan, Chun 257, 258, 311, 379
Yuan, Yu 133
Yue-Hashimoto, Anne O. 69, 129
Yueh, Bevan 363, 437
Yuodelis, Ralph A. 221
Yuter, Sandra Ellyn 75

Z

Zabinsky, Zelda 246, 257, 263, 268
Zabowski, Darlene 279
Zager, Richard A. 348
Zagona, Karen T. 129
Zagotta, William N. 297, 303, 373
Zahn, Claudia 138
Zahorjan, John 252
Zarbl, Helmut 297, 365
Zarina, Astra 43
Zatzick, Douglas F. 376
Zeh, Judith 182, 306, 341

Zeitler, Teresa Taylor 247
Zerbe, Richard O. 308, 318, 419
Zerr, Danielle M. 369
Zhang, Jian James 133
Zhang, Miqin 265
Zhao, Lue-Ping 424, 431
Zhao, Tianchi 152
Zhou, Yongpin 197
Zhu, Tuofu 341
Ziadeh, Farhat J. 90, 144, 301
Zick, Gregory L. 257
Ziegler, Steven F. 339
Zierler, Brenda 294, 392, 437
Zierler, R. Eugene 386
Zimmer, Phyllis Arn 392
Zimmerman, Frederick J. 437
Zimmerman, Jerry J. 325, 367
Ziskind, Andrew A. 350
Zivot, Eric W. 101
Zoellner, Lori A. 162
Zoller, William H. 81
Zsigmondy-Liedmann, Denes 137
Zuberbuhler, Douglas 43
Zumbrunnen, Craig 109, 301
Zumeta, William M. 226, 419
Zunt, Joseph R. 358

Index

A

Academic assessment, 23
 Academic calendar, 4
 Academic English Program, 36
 Academic session, 23
 "Access" Program for Older Adults, 22
 Accounting, 195
 Accreditation of University, 23
 Adding classes, 18
 Address change, 19
 Admission
 fees, 21
 graduate, 10
 Aeronautical Laboratory (UWAL), 239
 Aeronautics and Astronautics, 239
 Aerospace and Energetics Research Program (AERP), 239
 African Studies, 123
 Afro-American Studies. *See* American Ethnic Studies, 54
 Akkadian, 144
 Altaic, 69
 American Ethnic Studies, 54
 American Indian Studies, 54
 Americas, History of, 117
 Ancient and Medieval History, 115
 Anesthesiology, 324
 Annual drop, 18
 Anthropology, 55
 Apartments, single-student, 26
 Application, for graduation, 16
 Applied Mathematics, 61
 Applied Physics Laboratory, 30, 398
 Aquatic and Fishery Sciences, 398
 Arabic, 145
 Aramaic, 146
 Archaeology, 59
 See also Classics, 84
 Architecture, Department of, 41
 Architecture and Urban Planning, College of, 40
 Art, 64
 Art History, 66
 Arts and Sciences, College of, 54
 Asia, History of, 116
 Asian American Studies. *See* American Ethnic Studies, 54
 Asian Languages and Literature, 68
 Asian Law, 316
 Asian Studies, 121
 Assessment, academic, 23
 Associated Students of the University of Washington, 28
 Astronomy, 73
 ASUW. *See* Associated Students of the University of Washington, 28
 Athletics, 25. *See also* Recreational sports, 29
 Atmospheric Sciences, 74
 Attendance restrictions, 18
 Auditors, 18, 21

B

Behavior, Neurobiology and, 301
 Behavioral Sciences, Psychiatry and, 374
 Biochemistry, 326
 Biocultural Anthropology, 60
 Bioengineering, 310
 Biological Structure, 328
 Biology, 77
 Human, 337
 Molecular and Cellular, 295
 Oral, 214
 Biology Teaching, 292

Biomedical Informatics, 342
 Biophysics, Physiology and, 372
 Biostatistics, 422
 Biotechnology, Molecular, 334
 Board of Regents, 1
 Botany, 78
 Bothell campus, 24, 37
 Bulgarian, 172
 Burke Memorial Washington State Museum, 24, 30
 Business Policy, 201
 Business, International, 197
 Business Administration, School of, 193
 Business Administration Research Methods, 200
 Business Career Center, 193
 Business Communication, 200
 Business Economics, 195

C

Calendar, academic, 4
 Canadian Studies, 123
 Candidacy, 16
 Candidate's Certificate, 16
 Career Services, Center for, 27
 Cellular Biology, 295
 Center for Career Services, 27
 Center for Experimental Nuclear Physics and Astrophysics, 30
 Center for International Trade in Forest Products, 277
 Center for Law and Justice, 17
 Center for Quantitative Science in Forestry, Fisheries, and Wildlife, 398
 Center for Statistics and Social Sciences, 184
 Center for Streamside Studies, 277, 399
 Center for Urban Horticulture, 275, 276, 277
 Centers, Institutes, and Other Research Organizations, 31
 Central Asian Studies, 120
 Ceramic Engineering, 267
 Certificate programs, 23
 Chemical Engineering, 242
 Chemistry, 80
 Chicano Studies. *See* American Ethnic Studies, 54
 Childcare program, 27
 China Studies, 120
 Chinese, 70
 Civil and Environmental Engineering, 245
 Classical Linguistics, 84
 Classics, 83
 Communication
 Business, 200
 Department of, 85
 Technical, 272
 Community Medicine. *See* Public Health and Community Medicine, 422
 Comparative Literature, 90
 Comparative Medicine, 330
 Comparative Religion, 120
 Computer Science and Engineering, 251
 Computer use, 29
 Computing resources, 24
 Concurrent degree programs, 14
 Conduct code, 29
 Conjoint courses, 331
 Conservation Biology Policy, 292
 Construction Management, 46
 Continuing Medical Education, 324
 Continuous enrollment, in Graduate School, 14
 Coptic. *See* Egyptian, 145
 Counseling Center, Student, 27
 Course and laboratory fees, special, 21
 Course descriptions, key to, 39
 Course designators, 39
 Course numbers, key to, 39
 Courses, adding and dropping, 18
 Credit designation, key to, 39
 Credit/no credit grade, 13
 Criminology. *See* Laws, Society, and Justice, 159
 Croatian-Serbian, 172
 Curriculum and Instruction, 227
 Czech, 173

D

Daily, The, 28
 Dance, 92
 Danish, 171
 Danz Fund, 17
 Degrees
 graduate, 9
 policies, 13
 requirements, 15, 16
 Dental Hygiene, 211
 Dental Public Health Sciences, 211
 Dentistry, School of, 208
 Digital Arts and Experimental Media, 92
 Disabled Student Services, 27
 Dissertation, 16
 Distance learning, 23, 36
 Doctoral degree requirements, 16
 Doctoral supervisory committee, 16
 Dormitories. *See* Residence halls, 26
 Drama, 93
 Dropping a course, 18

E

E-Business. *See* Electronic Business, 201
 Earth and Space Sciences, 95
 East Asian Studies, 124
 East European Studies, 120
 Economics, 100
 Business, 195
 Ecosystem Sciences Division, 276
 Education
 College of, 224
 Teaching certificates, 224
 Medical, 342
 Music, 141
 Educational Assessment, Office of, 24
 Egyptian, 145
 Electrical Engineering, 256
 Electronic Business, 201
 Employment opportunities, 12
 Endodontics, 213
 Engineering, College of, 238
 Engineering Research, Office of, 238
 English, 104
 English as a Second Language, 24, 36
 English proficiency, 11
 Enrollment Confirmation Deposit, 11, 19
 Enrollment requirement, 14
 Entrepreneurship, 201
 Environment, Organization and, 206
 Environment, Program on the, 313
 Environmental Engineering, 245
 Environmental Health, 426
 Environmental Horticulture and Urban Forestry, 281
 Environmental Management, 292
 Environmental Studies. *See* Environment, Program on the, 313
 Epidemiology, 430
 Estonian, 171
 Ethics, Medical, 344
 Ethnic Cultural Center (ECC), 24
 Ethnic studies. *See* American Ethnic Studies, 54
 European History, 118
 European Studies, 125
 Evans School of Public Affairs, 417
 Evening and distance learning degree programs, 23, 36
 Evening classes, 23
 Evening degree programs, 23, 36
 Examinations
 by Office of Educational Assessment, 24
 for admission, 11
 for graduate degrees, 15, 16
 for Graduate study, 11
 Expenses, estimated, 19
 Experimental College, 29
 Experimental Education Unit, 225
 Experimental Nuclear Physics and Astrophysics, Center for, 30
 Extension, UW, 36

F

Faculty, key to entries, 39
 Faculty/staff tuition reduction, 22
 Family housing, 26
 Family Medicine, 332
 Fee forfeiture, 22
 Fee payment, 20
 Fee refund, 22
 Fees, 21
 Fellowships, 11
 Field stations, 32
 Final examination, 15, 16
 Finance and Business Economics, 195
 Financial aid, 11
 Financial obligations, 22
 Finnish, 171
 Fisheries. *See* Aquatic and Fishery Sciences, 398
 Forest Engineering, 282
 Forest Management, 283
 Forest Resources, College of, 275
 French Linguistics, 130
 French Studies, 166
 Friday Harbor Laboratories, 30
 Full-time status, 18
 Funding for research, 30

G

General Catalog, using, 4
 Genetics, 334
 Genome Sciences, 334
 Geography, 108
 Geological Sciences. *See* Earth and Space Sciences, 95
 Geophysics. *See* Earth and Space Sciences, 95
 Germanics, 111
 Global Trade, Transportation, and Logistics Studies, 293
 GOMAP. *See* Graduate Opportunities and Minority Achievement Program, 12
 GPA. *See* Grade-point average
 GPSS. *See* Graduate and Professional Student Senate, 29
 Grade-point average, 13
 Grading options, 13
 Grading system, 13
 for medical students, 324
 Graduate admissions, 10
 Graduate and professional Student Senate (GPSS), 29
 Graduate courses, 13
 Graduate degree policies, 13
 Graduate nonmatriculated program, 36
 Graduate nonmatriculated students, 10
 Graduate Opportunities and Minority Achievement Program (GOMAP), 12
 Graduate Program Coordinator, 13
 Graduate School, 8
 admission policies, 10
 degree programs, 9
 language competency for, 11, 14
 scholarship requirements, 11, 14
 Graduate School Fund for Excellence and Innovation, 17
 Graduate student
 defined, 10
 service appointments, 11
 Graduate study, 8
 Greek, 85
 Gynecology, Obstetrics and, 359

H

Half-time student defined, 18
 Hall health primary Care Center, 24
 Harborview Medical Center, 31
 Hardship withdrawal, 13
 Hazard Mitigation Planning and Research, Institute for, 40
 Head and Neck Surgery. *See* Otolaryngology, 363

Health insurance, 27
 Health Sciences Libraries (HSL), 26
 Health Services, 434
 Health Services Administration, 294
 Hearing Sciences, 178
 Hebrew, 146
 Henry Art Gallery, 25, 30
 Hindi, 71
 History, 113
 of the Americas, 117
 of Asia, 116
 Ancient and Medieval, 115
 Medical, 344
 Music, 142
 Honors, School of Medicine, 324
 Horticulture, 281
 Housing, 26
 Housing and Food Services, 26
 HUB (Student Union Building), 28
 Human Biology, 337
 Human Resources Management, 203
 Humanities, 119
 Husky Union Building, 28
 Hygiene, Dental, 211

I

Icelandic, Old, 171
 Identification cards, student, 19
 Immunology, 338
 Incomplete, grade of, 13
 Independent study. *See* Distance learning, 36
 Indian, 71
 Indian Studies. *See* American Indian Studies, 54
 Individual Ph.D. Programs, 17
 Industrial Engineering, 262
 Infirmary. *See* Hall Health Primary Care Center, 24
 Informatics, 288
 Biomedical, 342
 Information Management and Technology, 289
 Information School, 286
 Information Science, 289
 Information Systems, 203
 Institute of Forest Resources, 275
 Institutes. *See* Centers, Institutes, and Other Research Organizations, 31
 Insurance, health, 27
 Insurance for foreign students, 27
 Intercollegiate athletics, 25
 Intercollege programs, 310
 Interdisciplinary Engineering Studies Program, 238
 Interdisciplinary Graduate Degree Programs, 292
 International Business, 197
 International Programs and Exchanges, Office of, 25
 International Services Office, 28
 International students, admission of, 11
 International Studies, 119
 Interschool or Intercollege Programs, 310
 Intramural sports. *See* Recreational sports, 29
 Italian Studies, 166

J

Japan Studies, 120
 Japanese, 71
 Technical, 272
 Jewish Studies, 126
 Juris Doctor Program, 316

K

Korea Studies, 120
 Korean, 72

L

Laboratory fees, 21
 Laboratory Medicine, 340
 Landscape Architecture, 48
 Language competence requirements and examinations, 11, 14

Language Learning Center, 25
 Late Add Period, 18
 Late Course Drop Period, 18
 Latin, 85
 Latin American Studies, 126
 Latvian, 171
 Law, School of, 316
 Law and Justice, Center for, 17
 Law Librarianship, 287
 Laws, Society, and Justice, 159
 Leadership and Policy Studies, Educational, 230
 Lectureships and professorships, 17
 Lee Memorial Forest, 276
 Legal Services, Student, 28
 Libraries, University, 25
 Library and Information Science, School of. *See* Information School, 286
 Lighting Applications Laboratory, 41
 Linguistics, 128
 Literature, Comparative, 90
 Lithuanian, 171
 Loans, graduate, 12

M

Management and Engineering Division, 276
 Management and Organization, 196
 Management Science, 197
 Marine Affairs, 403
 Law and, 317
 Marketing and International Business, 197
 Master of Arts for Teachers, 16
 Master's degree requirements, 15
 Materials Science and Engineering, 264
 Mathematics, 131
 Mathematics, Applied. *See* Applied Mathematics, 61
 Maxillofacial Surgery, 214
 Meany Studio Theatre, 26
 Mechanical Engineering, 267
 MEDEX Northwest, 321, 353
 Medical Center, University of Washington, 31
 Medical Education and Biomedical Informatics, 342
 Medical History and Ethics, 344
 Medical Scientist Training Program, 323
 Medical Student Research Training Program, 324
 Medicinal Chemistry, 410
 Medicine
 Department of, 346
 Oral, 216
 School of, 321
 Medieval History, 115
 Metallurgical Engineering, 267
 Meteorology. *See* Atmospheric Sciences, 74
 Microbiology, 354
 Middle Eastern Studies, 120
 Molecular and Cellular Biology, 295
 Molecular Biotechnology, 334
 Monahan Findley Lake Reserve and Research Area, 276
 Museology, 299
 Museum, Burke, 24, 30
 Music, 136

N

Near and Middle Eastern Studies, 300
 Near Eastern Languages and Civilization, 143
 Neck Surgery. *See* Otolaryngology, 363
 Neurobiology, 147
 and Behavior, 301
 Neurological Surgery, 356
 Neurology, 357
 Noncredit classes, 36
 Non-thesis programs, 15
 Nonmatriculated students, 10
 Nontraditional grading options, 13
 Norwegian, 171
 Nuclear Magnetic Resonance Facility, 30
 Nursing, School of, 389
 Nutritional Sciences, 304

O

Obstetrics and Gynecology, 359
 Occupational Therapy, 321, 380
 Ocean and Fishery Sciences, College of, 398
 Oceanographic research vessels, 31
 Oceanography, 404
 Odegaard Undergraduate Library (OUGL), 26
 Olympic Natural Resources Center, 276, 277, 399
 On-leave
 Graduate School requirement, 14
 registration fee, 21
 Operations Management, 206
 Ophthalmology, 360
 Oral and Maxillofacial Surgery, 214
 Oral Biology, 214
 Oral Medicine, 216
 Organization and Environment, 206
 Organizational Behavior, 203
 Orthodontics, 217
 Orthopaedics, 361
 Orthotics, 381
 Otolaryngology, 363

P

Pack Experimental Forest, 275
 Paper Science and Engineering, 284
 Pathobiology, 440
 Pathology, 364
 Pediatric Dentistry, 218
 Pediatrics, 367
 Penthouse Theatre, 16
 Periodontics, 219
 Permission guidelines, 18
 Persian, 146
 Pharmaceuticals, 411
 Pharmacology, 370
 Pharmacy
 Department of, 411
 School of, 410
 Philosophy, 148
 Physical Therapy, 321, 381
 Physics, 150
 Physiology and Biophysics, 372
 Placement Center. *See* Center for Career Services, 27
 Playhouse, The, 26
 Polish, 173
 Political Science, 154
 Portuguese Studies, 168
 Preservation Planning and Design Certificate Program, 40
 Procedures and fees, 18
 Program descriptions, key to, 39
 Program on the Environment, 313
 Prosthetics and Orthotics, 381
 Prosthodontics, 221
 Psychiatry and Behavioral Sciences, 374
 Psychology, 160
 Educational, 233
 Public Affairs, Daniel J. Evans School of, 417
 Public Health and Community Medicine, School of, 422
 Public Health Genetics, 433

Q

Quantitative Ecology and Resource Management, 305, 398
 Quantitative Methods, 206
 Quantitative Science, 314
 Quaternary Research Center, 307

R

Radiation Oncology, 378
 Radiology, 378
 Recreational sports, 29
 Registration, 18

Registration, after admission, 11
 Rehabilitation Medicine, 380
 Religion, Comparative, 120
 Remote Sensing Applications Laboratory, 40
 Repeating courses, 13
 Research, Office of, 30
 Research facilities, 26
 Residence
 classification, 19
 graduate student requirements, 14
 Residence halls, 26
 Resources and facilities, 24
 Restorative Dentistry, 221
 Romance Languages and Literature, 166
 Romance Linguistics, 131
 Romanian, 168, 173
 Rome Center, 40
 Rural/Underserved Opportunities Program (RUOP), 324
 Russian, 173
 Russian, East European, and Central Asian Studies, 120

S

Sanskrit, 72
 Satisfactory/not satisfactory grade, 13
 Scandinavian Studies, 170
 Scholarship, 11
 Serbian. *See* Croatian-Serbian, 172
 Sexual harassment complaint procedure, 29
 Slavic Languages and Literatures, 172
 Social Work, School of, 443
 Society and Justice. *See* Laws, Society, and Justice, 159
 Sociology, 174
 Software copyright policy, 29
 South Asian Studies, 121
 South Campus Center, 28
 Southeast Asian Studies, 127
 Spanish Linguistics, 131
 Spanish Studies, 168
 Special education, 235
 Special programs and facilities, 17
 Special Services, Office of, 28
 Speech and Hearing Clinic, 31
 Speech and Hearing Sciences, 178
 Speech Communication. *See* Communication, 85
 Sports. *See* Recreational sports, 29
 Statistics, 181
 Statistics and Social Sciences, Center for, 184
 Strategic Management, 207
 Student activities and organizations, 28
 Student Activities Office, 28
 Student Affairs, Office of the Vice President for, 27
 Student Conduct Code, 29
 Student Counseling Center, 27
 Student directory, 28
 Student education records, University policy on, 29
 Student Financial Aid, Office of, 28
 Student government, 28
 Student Health Insurance Program, 27
 Student legal services, 28
 Student organizations, 28
 Student publications, 28
 Student rights and responsibilities, 29
 Student services, 27
 Student Union facilities, 28
 Summer quarter, 23
 Surgery, Department of, 386
 Suzzallo and Allen Libraries, 25
 Swedish, 172
 Symbols and abbreviations, key to, 39

T

Tacoma campus, 38
 Taxation, 317
 Teacher Education Program, 236
 Teaching certificate, requirements for, 224

Technical Communication, 272
 Technical Japanese, 272
 Test of English as a Foreign Language (TOEFL), 11
 Testing. *See* Educational Assessment, Office of, 24
 See also Examinations
 Thai, 72
 Theatres, 26
 Theory and criticism, Ph.D. program in, 90
 Thesis program, 15
 Thompson Research Center, 276
 TOEFL. *See* Test of English as a Foreign Language, 11
 Traineeships, 11
 Transcripts, 19
 Transfer credit, 15
 Transportation, 26
 Transportation Studies, 293
 Tuition, cancellation of, 21
 Tuition exemptions and reductions, 22
 Tuition, fees, and special charges, 19
 Tuition rates, 20
 Turkic, 147
 Turkish, 147

U

U-PASS, 26
 Ukrainian, 174
 United States History. *See* Americas, History of, 117
 University conjoint courses, 314
 University Libraries, 25, 31
 University of Washington Press, 17
 Unrestricted drop period, 18
 Urban Design and Planning, 50, 308
 Urban Design Certificate Program, 40
 Urban Forestry, 281
 Urology, 388
 UW Bothell, 24, 37
 UW Tacoma, 24, 38

V

Veterans and children of totally disabled veterans, 19
 Veterans' educational benefits, 19
 Vietnamese, 72
 Visiting graduate students, 10

W

Walker-Ames Fund, 17
 Washington Cooperative Fish and Wildlife Research, 399
 Washington Sea Grant Program, 298
 Washington state employees tuition reduction, 22
 Western Regional Aquaculture Center, 399
 Withdrawal, complete, 18
 Withdrawal, hardship, 13
 Withdrawal policy, graduate, 14
 Women Studies, 185
 Women's Center, 26
 Work study graduate assistantships, 12
 WWAMI program, 323

X

X-Ray Beamline Facility, 31

Z

Zoology, 189

Index to Prefixes

ARCHITECTURE AND URBAN PLANNING, COLLEGE OF

ARCH	ARCHITECTURE
CEP	COMMUNITY AND ENVIRONMENTAL PLANNING
CM	CONSTRUCTION MANAGEMENT
L ARCH	LANDSCAPE ARCHITECTURE
URBDP	URBAN DESIGN AND PLANNING

ARTS AND SCIENCES, COLLEGE OF

AAS	ASIAN AMERICAN STUDIES
AES	AMERICAN ETHNIC STUDIES
AFRAM	AFRO-AMERICAN STUDIES
AIS	AMERICAN INDIAN STUDIES
AKKAD	AKKADIAN
ALTAI	ALTAI
AMATH	APPLIED MATHEMATICS
ANTH	ANTHROPOLOGY
ARAB	ARABIC
ARAMIC	ARAMAIC
ARCHY	ARCHAEOLOGY
ART	ART
ART H	ART HISTORY
ASIAN	ASIAN LANG AND LITERATURE
ASTR	ASTRONOMY
ATM S	ATMOSPHERIC SCIENCES
BIO A	BIOCULTURAL ANTHROPOLOGY
BIOL	BIOLOGY
BOTANY	BOTANY
BULGR	BULGARIAN
C LIT	COMPARATIVE LITERATURE
CHEM	CHEMISTRY
CHIN	CHINESE
CHSTU	CHICANO STUDIES
CL AR	CLASSICAL ARCHAEOLOGY
CL LI	CLASSICAL LINGUISTICS
CLAS	CLASSICS
COM	COMMUNICATION
CR SB	CROATIAN-SERBIAN
CS&SS	CENTER FOR STATISTICS AND THE SOCIAL SCIENCES

CZECH	CZECH
DANCE	DANCE
DANISH	DANISH
DRAMA	DRAMA
DXARTS	DIGITAL ARTS AND EXPERIMENTAL MEDIA

ECON	ECONOMICS
EGYPT	EGYPTIAN
ENGL	ENGLISH
ESS	EARTH AND SPACE SCIENCES
ESTO	ESTONIAN
EURO	INT ST: EUROPEAN
FINN	FINNISH
FRENCH	FRENCH
FRLING	FRENCH LINGUISTICS
GEOG	GEOGRAPHY
GERMAN	GERMAN
GREEK	GREEK
HEBR	HEBREW
HINDI	HINDI
HIST	HISTORY
HSTAA	HISTORY OF THE AMERICAS
HSTAM	ANCIENT AND MEDIEVAL HISTORY
HSTAS	HISTORY OF ASIA
HSTEU	MODERN EUROPEAN HISTORY
HUM	HUMANITIES
INDN	INDIAN
INDON	INDONESIAN
ITAL	ITALIAN
JAPAN	JAPANESE
KOREAN	KOREAN
LATIN	LATIN
LATV	LATVIAN
LING	LINGUISTICS
LITH	LITHUANIAN
LSJ	LAW, SOCIETIES, AND JUSTICE

MATH	MATHEMATICS
MUHST	MUSIC HISTORY
MUSAP	APPLIED MUSIC
MUSED	MUSIC EDUCATION
MUSEN	MUSIC ENSEMBLE
MUSIC	MUSIC
NBIO	NEUROBIOLOGY
NEAR E	NEAR EASTERN LANGUAGE AND CIVILIZATION

NORW	NORWEGIAN
PHIL	PHILOSOPHY
PHYS	PHYSICS
POL S	POLITICAL SCIENCE
POLSH	POLISH
PRSN	PERSIAN
PSYCH	PSYCHOLOGY
RELIG	INT ST: COMPARATIVE RELIGION
RMN	ROMANIAN
ROLING	ROMANCE LINGUISTICS
ROMAN	ROMANCE LANGUAGES AND LITERATURE

ROMN	ROMANIAN
RUSS	RUSSIAN
SCAND	SCANDINAVIAN
SIS	INTERNATIONAL STUDIES
SISA	INT ST: ASIAN
SISAF	INT ST: AFRICAN
SISCA	INT ST: CANADA
SISEA	INT ST: EAST ASIAN
SISJE	INT ST: JEWISH STUDIES
SISLA	INT ST: LATIN AMERICAN
SISME	INT ST: MIDDLE EAST
SISRE	INT ST: RUSSIA, EAST EUROPE, AND CENTRAL ASIA

SISSA	INT ST: SOUTH ASIA
SISSE	INT ST: SOUTHEAST ASIA
SLAV	SLAVIC
SLAVIC	SLAVIC LANGUAGES AND LITERATURES

SNKRT	SANSKRIT
SOC	SOCIOLOGY
SPAN	SPANISH
SPHSC	SPEECH AND HEARING SCIENCE
SPLING	SPANISH LINGUISTICS
STAT	STATISTICS
SWED	SWEDISH
THAI	THAI
TKIC	TURKIC
TKISH	TURKISH
VIET	VIETNAMESE
WOMEN	WOMEN STUDIES
ZOOL	ZOOLOGY

BUSINESS ADMINISTRATION, SCHOOL OF

ACCTG	ACCOUNTING
ADMIN	ADMINISTRATION
B A	BUSINESS ADMINISTRATION
BA RM	BUSINESS ADMINISTRATION RESEARCH METHODS
B CMU	BUSINESS COMMUNICATIONS
B ECON	BUSINESS ECONOMICS
B POL	BUSINESS POLICY
EBIZ	E-BUSINESS
ENTRE	ENTREPRENEURSHIP
FIN	FINANCE
HRMOB	HUMAN RESOURCES MANAGEMENT AND ORGANIZATIONAL BEHAVIOR
I BUS	INTERNATIONAL BUSINESS
I S	INFORMATION SYSTEMS
MGMT	MANAGEMENT
MKTG	MARKETING
O E	ORGANIZATION AND ENVIRONMENT
OPMGT	OPERATIONS MANAGEMENT
QMETH	QUANTITATIVE METHODS
ST MGT	STRATEGIC MANAGEMENT

DENTISTRY, SCHOOL OF

D HYG	DENTAL HYGIENE
DENT	DENTISTRY
DPHS	DENTAL PUBLIC HEALTH SCIENCES
ENDO	ENDODONTICS
O S	ORAL AND MAXILLOFACIAL SURGERY
ORALB	ORAL BIOLOGY
ORALM	ORAL MEDICINE
ORTHO	ORTHODONTICS
PEDO	PEDIATRIC DENTISTRY

PERIO	PERIODONTICS
RES D	RESTORATIVE DENTISTRY

EDUCATION, COLLEGE OF

EDC&I	CURRICULUM AND INSTRUCTION
EDLPS	EDUCATIONAL LEADERSHIP AND POLICY STUDIES
EDPSY	EDUCATIONAL PSYCHOLOGY
EDSPE	SPECIAL EDUCATION
EDTEP	EDUCATION (TEACHER PREP)
EDUC	EDUCATION

ENGINEERING, COLLEGE OF

A A	AERONAUTICS AND ASTRONAUTICS
CEE	CIVIL AND ENVIRONMENTAL ENGINEERING
CER E	CERAMIC ENGINEERING
CHEM E	CHEMICAL ENGINEERING
CSE	COMPUTER SCIENCE AND ENGINEERING
E E	ELECTRICAL ENGINEERING
ENGR	ENGINEERING
IND E	INDUSTRIAL ENGINEERING
M E	MECHANICAL ENGINEERING
MEIE	MECHANICAL ENGINEERING INDUSTRIAL ENGINEERING
MET E	METALLURGICAL ENGINEERING
MSE	MATERIALS SCIENCE AND ENGINEERING
T C	TECHNICAL COMMUNICATION

FOREST RESOURCES, COLLEGE OF

CFR	COLLEGE OF FOREST RESOURCES
ESC	ECOSYSTEM SCIENCE AND CONSERVATION
EHUF	ENVIRONMENTAL HORTICULTURE AND URBAN FORESTRY
F E	FOREST ENGINEERING
F M	FOREST MANAGEMENT
PSE	PAPER SCIENCE AND ENGR

THE INFORMATION SCHOOL

IMT	INFORMATION MANAGEMENT AND TECHNOLOGY
INFO	INFORMATICS
INSC	INFORMATION SCIENCE
LIS	LIBRARY AND INFORMATION SCIENCE

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

GTTL	GLOBAL TRADE, TRANSPORTATION, AND LOGISTICS STUDIES
MCB	MOLECULAR AND CELLULAR BIOLOGY
MUSEUM	MUSEOLOGY
NEUBEH	NEUROBIOLOGY AND BEHAVIOR
NUTR	NUTRITIONAL SCIENCES
QERM	QUANTITATIVE ECOLOGY AND RESOURCE MANAGEMENT
QUAT	QUATERNARY STUDIES

INTERSCHOOL OR INTERCOLLEGE PROGRAMS

BIOEN	BIOENGINEERING
ENVIR	PROGRAM ON THE ENVIRONMENT
Q SCI	QUANTITATIVE SCIENCE
UCONJ	UNIVERSITY JOINT

LAW, SCHOOL OF

LAW	LAW
LAW A	LAW A
LAW B	LAW B
LAW E	LAW E
LAW T	LAW T

MEDICINE, SCHOOL OF

ANEST	ANESTHESIOLOGY
B STR	BIOLOGICAL STRUCTURE
BIOC	BIOCHEMISTRY
C MED	COMPARATIVE MEDICINE
CONJ	CONJOINT COURSES
FAMED	FAMILY MEDICINE
GENET	GENETICS
HUBIO	HUMAN BIOLOGY
IMMUN	IMMUNOLOGY
LAB M	LABORATORY MEDICINE
MBT	MOLECULAR BIOTECHNOLOGY

MED MEDICINE
 MEDED MEDICAL EDUCATION AND BIOMEDICAL INFORMATICS
 MEDEX MEDEX NORTHWEST
 MHE MEDICAL HISTORY AND ETHICS
 MICROM MICROBIOLOGY (MEDICINE)
 NEUR S NEUROLOGICAL SURGERY
 NEURL NEUROLOGY
 OB GYN OBSTETRICS AND GYNECOLOGY
 OPTH OPHTHALMOLOGY
 ORTHP ORTHOPAEDICS
 OTOHN OTOLARYNGOLOGY-HEAD AND NECK SURGERY
 P BIO PHYSIOLOGY AND BIOPHYSICS
 PATH PATHOLOGY
 PBSCI PSYCHIATRY AND BEHAVIORAL SCIENCES
 PEDS PEDIATRICS
 PHCOL PHARMACOLOGY
 R ONC RADIATION ONCOLOGY

RADGY RADIOLOGY
 REHAB REHABILITATION MEDICINE
 SURG SURGERY
 UROL UROLOGY

NURSING, SCHOOL OF

NCLIN NURSING CLINICAL
 NMETH NURSING METHODS
 NURS NURSING

OCEAN AND FISHERY SCIENCES, COLLEGE OF

FISH FISHERIES SCIENCE
 OCEAN OCEANOGRAPHY
 SMA SCHOOL OF MARINE AFFAIRS

PHARMACY, SCHOOL OF

MEDCH MEDICINAL CHEMISTRY
 PCEUT PHARMACEUTICS
 PHARM PHARMACY

PUBLIC AFFAIRS, DANIEL J. EVANS SCHOOL OF

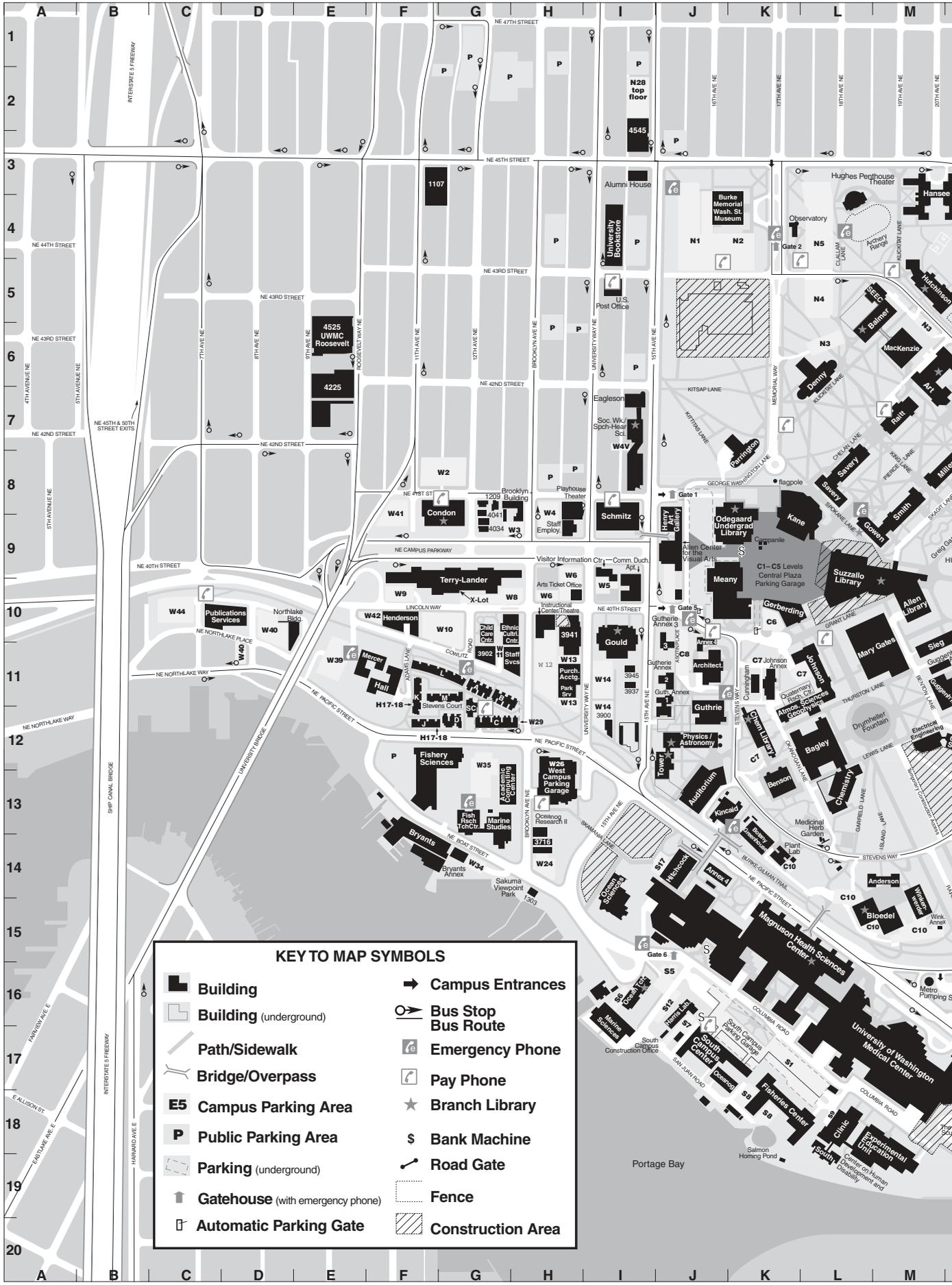
PB AF PUBLIC AFFAIRS

PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF

BIOST BIOSTATISTICS
 ENV H ENVIRONMENTAL HEALTH
 EPI EPIDEMIOLOGY
 HSERV HEALTH SERVICES
 HSMGMT HEALTH SERVICES MANAGEMENT
 PABIO PATHOBIOLOGY
 PHG PUBLIC HEALTH GENETICS

SOCIAL WORK, SCHOOL OF

SOC WF SOCIAL WELFARE (UNDERGRADUATE)
 SOC WL SOCIAL WELFARE (GRADUATE)
 SOC W SOCIAL WORK (MSW)



KEY TO MAP SYMBOLS

- | | |
|---|--|
|  Building |  Campus Entrances |
|  Building (underground) |  Bus Stop |
|  Path/Sidewalk |  Bus Route |
|  Bridge/Overpass |  Emergency Phone |
|  Campus Parking Area |  Pay Phone |
|  Public Parking Area |  Branch Library |
|  Parking (underground) |  Bank Machine |
|  Gatehouse (with emergency phone) |  Road Gate |
|  Automatic Parking Gate |  Fence |
| |  Construction Area |



University of Washington
Campus & Vicinity
January 2002



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UNIVERSITY OF WASHINGTON

BUILDINGS, DEPARTMENTS, OFFICES, AND POINTS OF INTEREST

POLICE DEPARTMENT TELEPHONE 206-543-9331 ANY TIME

Academic and Professional Programs, 5001 - 25th Ave NE	off map	Dance Department, Meany Hall	10-J
Academic Computer Center (ACC), 3737 Brooklyn Ave NE	13-G	Dempsey Indoor	15-R
Admissions, Schmitz Hall, 1410 NE Campus Pkwy	9-I	Denny Hall (DEN)	6-L
Aerodynamics Lab (ADL)	12-N	Dentistry, Magnuson Health Sciences Center	15-K
Aeronautics and Astronautics, Guggenheim Hall	11-N	Douglas Research & Conservatory (DRC), Urban Horticulture Center, 3501 NE 41 St	7-Z
Aerospace and Engineering Research Building (AER)	12-N	Douglas Annexes 1-5	7-Z
Aerospace Studies, Clark Hall	7-O	Drama, Hutchinson Hall	5-M
Allen Center for the Visual Arts (AVA) addition to Henry Gallery	9-J	Drama Library, Hutchinson Hall	5-M
Allen Library (ALB)	10-M	Drama Scene Shop, 3941 University Way NE	10-H
Alumni House, 1415 NE 45th St	3-I	Drumheller Fountain	12-M
Anderson Hall (AND)	14-M	Eagleson Hall (EGL), 1417 NE 42nd St	7-I
Anthropology, Denny Hall	6-L	East Asia Library, Gowen Hall	9-M
Applied Mathematics Department, Guggenheim Hall	11-N	Economic Research Institute, Savery Hall	8-L
Applied Physics Laboratory, Henderson Hall	10-F	Economics, Savery Hall	8-L
Arboretum, over Montlake Bridge to Washington Park	off map	Edmundson Pavilion (EDP), 3870 Montlake Blvd	14-Q
Archery Range	4-L	Education, Miller Hall	8-N
Architecture, Gould Hall	11-I	Education Assessment Center, Schmitz Hall	9-I
Architecture and Urban Planning Library, Gould Hall	11-I	Educational Television KCTS-TV, Seattle Center	off map
Architecture Hall (ARC)	11-J	Electrical Engineering/Computer Sciences (EEI)	12-N
Art Building (ART)	6-M	Emergency Telephone 3-J, 13-G, 13-I, 14-J, 11-K, 4-N, 9-N, 16-N, 9-P, 6-R, 9-R, 14-R, 18-Q and at all Gate Houses	12-N
Art Library, Art Building	6-M	Engineering, Loew Hall	11-O
Arts and Sciences, Communications	8-O	Engineering Annex (EGA)	12-O
Arts Ticket Office, 4001 University Way NE	10-H	Engineering Library (ELB), Engineering-Library Building	11-O
Asian Languages and Literature, Gowen Hall	9-M	English, Padelford Hall	8-O
Associated Students (ASUW), (HUB) Student Union Building	10-N	English Language Programs 4909 25th Ave N.E.	off map
Astronomy, Physics-Astronomy Building	13-J	5001 25th Ave N.E.	off map
Astronomy-Physics Library, Physics-Astronomy Building	13-J	Environmental Health and Safety, Hall Health Center	9-O
Atmospheric Sciences, Atmospheric Sciences-Geophysics Building (ATG)	12-K	Environmental Safety Storage Building (ESB)	5-W
Attorney General's Division, Gerberding Hall (Suite 101)	10-K	Ethnic Cultural Center (ECC), 3931 Brooklyn Ave. NE	10-H
Bagley Hall (BAG)	12-L	Faculty Center (FAC)	10-O
Balmer Hall (BLM)	5-M	Fisheries, Fisheries Center (FIS)	18-K
Bank Cash Machines		Fishery Science Building (FSH)	12-F
Student Union Building (HUB)	10-N	Fisheries-Oceanography Library, Oceanography Teaching Building	16-I
I-Wing, Magnuson Health Sciences Center, 1st Floor	15-J	Fisheries Research Institute, Fisheries Center	18-K
Odegaard Undergraduate Library	9-K	Fisheries Teaching and Research Center (FTR), 1104 NE Boat St	14-G
South Campus Center	17-J	Flag Pole	8-K
University of Washington Medical Center	18-N	Fluke Hall (FLK), Washington Technology Center	9-P
Baseball Grandstand (BSG)	11-S	Food Services Facilities By George, Odegaard Undergraduate Library	9-K
Benefits Office, Staff Services Building	11-G	E-Court Cafe	6-L
Benson Hall (BNS)	13-K	Haggett Hall	5-P
Bioengineering, Aerospace and Engineering Research Building & Harris Lab	16-J	Hospital Cafeteria	18-M
Biology Program, Hitchcock Hall	14-J	South Campus Center	17-J
Blakeley Village, 4747 - 30th Ave NE	off map	Terry Cafe	10-G
Bloedel Hall (BDL)	15-M	Forest Resources, Institute of, Anderson Hall	14-M
Book Store, 4326 University Way NE	4-I	Forest Resources, Anderson Hall	14-M
Branch, Student Union Building (HUB)	10-N	Forest Resources Library, Bloedel Hall	15-M
Branch, South Campus Center (SOCC)	17-J	Friday Harbor Laboratories, Kincaid Hall	13-J
Botany, Hitchcock Hall	14-J	Genetics, Magnuson Health Sciences Center	15-K
Botany Greenhouse (BGH)	14-K	Geography, Smith Hall	9-M
Brechemin Auditorium, Music Building	7-N	Geography Library, Smith Hall	9-M
Brooklyn Building (BRK), 4045 Brooklyn Ave. NE	8-H	Geological Sciences, Johnson Hall	11-L
Bryants Building (BRY), 1101 NE Boat St	14-F	Geophysics, Atmospheric Sciences-Geophysics Building	12-K
Bryants Annex	14-G	Gerberding Hall (GRB), formerly Administration Building	10-K
Building Construction, Gould Hall	11-I	Germanics, Denny Hall	6-L
Burke Memorial Washington State Museum (BMM)	4-J	Golf Driving Range (GDR), 4209 Mary Gates Memorial Drive	6-T
Business Administration, Mackenzie Hall	6-M	Gould Hall (GLD), 3949 - 15th Ave NE	11-I
Business Administration Library, Balmer Hall	5-M	Gowen Hall (GWN)	9-M
Business and Finance, Gerberding Hall	10-K	Graduate School Communications Building	8-N
Campanile	9-K	Graves Annex (SBA)	14-Q
Canoe House (CNH)	19-R	Graves Building (TGB), 3910 Montlake Blvd	13-Q
Capital Projects Office, University Facilities Building	10-O	Graves Field	4-W
Cashier's Office, Schmitz Hall	9-I	Guggenheim Hall (GUG)	11-N
Center for Quantitative Sciences in Forestry, Fisheries, and Wildlife, 3737 -15th Ave NE	15-I	Guthrie Annexes 1, 2, 3, and 4 (GA1, GA2, GA3, and GA4)	12-J, 11-J
Center for Studies in Demography and Ecology, Savery Hall	8-L	Guthrie Hall (GTH)	12-J
Center on Human Development and Disability (CHDD)	19-M	Haggett Hall (HGT)	5-P
Central Plaza Garage (CPG), Central Plaza	9-K	Hall Health Center (HLL)	9-O
Central Stores, Plant Services Building	2-Q	Hanse Hall (HNS)	3-M
Ceramic and Metal Arts Facility (CMA), 4205 Mary Gates Memorial Dr	5-X	Harris Hydraulics Laboratory (HHL)	17-J
Ceramic Engineering, Roberts Hall	14-O	Health Sciences Annex 4, 1705 NE Pacific	15-K
Chemical Engineering, Benson Hall	13-K	Health Sciences Center, Magnuson Health Sciences Center	15-K
Chemical Oceanography	16-I	Health Sciences Library, Magnuson Health Sciences Center	15-K
Chemistry, Bagley Hall	12-L	Henderson Hall (HND), 1013 NE 40th St	10-F
Chemistry Building (CHB)	13-L	Henry Art Gallery (HAG)	9-J
Chemistry Library (CHL), Chemistry Library Building	12-K	History, Smith Hall	9-M
Child Care Center (CCC)	10-G	Hitchcock Hall (HACK), 1521 NE Pacific	14-J
Civil Engineering, More Hall	14-O	Hospital (UWMC), University of Washington Medical Center	17-M
Clark Hall (CLK)	7-O	HUB (Student Union Building)	10-N
Classics, Denny Hall	6-L	Hutchinson Hall (HUT)	5-M
Classroom Support Services, Kane Hall	9-L	Institute for Marine Studies, Marine Studies	14-G
Climbing Rock	19-Q	Institute for Public Policy and Management, 324 Parrington Hall	8-K
Commodore-Duchess Apartments, (CDA) 4009 -15th Ave. NE	10-I	Instructional Center/Theater (ICT), 1307 NE 40th St	10-H
Communications (CMU), Communications Building	8-N	Instructional Media Services, Kane Hall	9-L
Comparative Literature, Padelford Hall	8-O	Intercollegiate Athletics, Graves Building	13-Q
Comptroller, Gerberding Hall	10-K	International Pacific Halibut Commission, Oceanography Teaching Bldg, Room 251	16-I
Computer Science, Sieg Hall	11-M	International Services Office, Schmitz Hall	9-I
Computer Sciences/Electrical Engineering (EEI)	12-N	International Studies, Thomson Hall	9-N
Condon Hall (CDH), 1100 NE Campus Parkway	8-F	Intramural Activities Building (IMA), 3924 Montlake Blvd	12-Q
Conference and Management, 5001 - 25th Ave NE	off map	Isaacson Hall (ISA), 3501 NE 41st St	7-Y
Conibear Shellhouse (CSH)	13-R	Jacob Lawrence Gallery, Art Building	6-M
Continuing Education, (See University Extension)	off map	Johnson Annex A (JHA)	11-K
Copy Centers B36 Gerberding Hall	10-K	Johnson Hall (JHN)	11-L
115 Balmer Hall	5-M	Kane Hall (KNE)	9-L
Center on Human Development and Disability	19-M	Keep Washington Green Association, Anderson Hall	14-M
B042 Communications Building	8-N	Kincaid Hall (KIN)	13-J
235 Condon Hall	8-G	Kirsten Aeronautical Laboratory (KIR)	11-N
202 Engineering Library	11-O	KUOW Radio, Communications Building	8-N
A206 and E220 Health Sciences	15-K	Lander-Terry Halls (LTH), 1201 NE Campus Parkway	10-G
122 Lewis Hall	6-N	Landscape Architecture, Gould Hall	11-I
127 Odegaard Library	9-K	Language Learning Center, Denny Hall	6-L
B18 Schmitz Hall	9-I	Laurel Village, 4200 Mary Gates Memorial Drive	4-X
560 Suzzallo Library	10-L		
BB381 University Hospital	17-L		
EE104 University Hospital	17-M		
Counseling Center, Schmitz Hall	9-I		
Cunningham Hall (ICH), Cunningham Gallery	11-K		
Cyclotron Shop, North Physics Laboratory	5-P		

Law, Condon Hall	8-F
Law Library, Condon Hall	8-F
Lewis Hall (LEW)	6-N
Lewis Annexes 1, 2 and 3	6-O, 5-O, 7-O
Library and Information Science, Suzzallo Library	10-L
Linguistics, Padelford Hall	8-O
Loew Hall (LOW)	11-O
Lost and Found (HUB)	1-O-N
Mackenzie Hall (MKZ)	6-M
Magnuson Health Sciences Center, 1750 NE Pacific St.	15-K
Magnuson Health Sciences Center, Annex 4 (HSH)	15-K
Mailing Services, Publications Services Building	10-C
Marina Apartments, 1104 NE Boat St	13-F
Marine Resources, 3716 Brooklyn Ave NE	14-H
Marine Sciences Building (MSB), 1501 NE Boat St	17-I
Marine Studies Building (MAR), 3707 Brooklyn Ave. NE	14-G
Mary Gates Hall (MGH)	11-L
Materials Science and Engineering, Roberts Hall	14-O
Mathematics, Padelford Hall	8-O
Mathematics Research Library, Padelford Hall	8-O
McCarthy Hall (MCC)	4-O
McMahon Hall (MCM)	7-O
Meany Hall (MNY)	10-J
Mechanical Engineering Building (MEB)	12-O
Medical Clinic, Hall Health Center	9-O
Medicinal Plant Garden	14-L
Medicine, Magnuson Health Sciences Center	15-K
Memorial Way	3-K
Mercer Hall, (MCR), 1009 NE Pacific St.	11-F
Merrill Hall, (MER), 3501 NE 41st St.	7-Y
Message Center (Telex), B042 Communications Building	8-N
Military Science, Clark Hall	7-O
Miller Hall (MLR)	8-N
Miller Library, Merrill Hall	7-Y
Mining, Metallurgical and Ceramic Engineering, Roberts Hall	14-O
Minority Affairs, Schmitz Hall	9-I
Mueller Hall (MUE)	14-N
More Hall (MOR)	14-O
More Hall Annex	13-O
Music (MUS), Music Building	7-N
Music Library, Music Building	7-N
Naval Sciences, Clark Hall	7-O
Near Eastern Languages and Literature, Denny Hall	6-L
New Fisheries Building	12-F
New Oceanography Building	14-I
Nordstrom Tennis Center (NTC)	14-R
North Physics Laboratory	4-P
Northlake Building (NLB), 814 NE Northlake Place	10-D
Northwest Center for Research on Women (NCROW), Cunningham Hall	11-K
Northwest Horticultural Society Hall (NHS), 3501 NE 41st St	7-Y
Northwest Technology Center, Fluke Hall	9-P
Nuclear Engineering, Benson Hall	13-K
Nursing, Magnuson Health Sciences Center	15-K
Observatory (OBS)	4-K
Oceanography, Oceanography Teaching Building (OTB)	16-I
Oceanography Building (OCE)	17-J
Ocean Sciences Building (OCN)	15-I
Oceanography-Fisheries Library, Oceanography Teaching Building, 1503 NE Boat St	16-I
Odegaard Undergraduate Library (OUG)	9-K
Office Machine Maintenance Shop, 3733 Pacific Lane	13-G
Ombudsman (HUB), Student Union Building	10-N
Pacific Apartments, 3748-60 University Way NE	13-I
Padelford Hall (PDL)	8-O
Padelford Parking Garage (PPG)	8-P
Parking	
C-Areas	central campus
E-Areas	east campus
N-Areas	north campus
S-Areas	south campus
W-Areas	west campus
Parking Services, 3901 University Way NE	11-H
Parrington Hall (PAR)	8-K
Penthouse Theatre (HPT)	4-L
Pharmacy, Magnuson Health Sciences Center H-Wing	15-K
Philosophy, Savery Hall	8-L
Philosophy Library, Savery Hall	8-L
Physical Plant Office Building (PPO)	10-O
Physics/Astronomy Building (PAB)	13-J
Physics/Astronomy Library, Physics-Astronomy Building	13-J
Placement Center, Loew Hall	11-O
Plant Laboratory (PLT)	14-K
Plant Operations Building (POB)	11-O
Plant Operations Annexes 1-7	11-O, 13-O
Plant Services Building (PSD), 4515 - 25th Ave. NE	2-Q
Playhouse Theater (PHT), 4045 University Way N.E.	8-H
Political Science, Gowen Hall	9-M
Political Science Library, Smith Hall	9-M
Post Office, U.S., 4244 University Way NE	5-I
Postal Center, Self-Service, (HUB) Student Union Building	10-N
Power Plant	12-O
Practice Field	14-R, 11-R
President's Office, Gerberding Hall	10-K
Printing, Publications Services Building	10-C
Psychology, Guthrie Hall	12-K
Public Affairs, Parrington Hall	8-J
Public Health and Community Medicine, Magnuson Health Sciences Center	15-K
Publications, (PSV) Publications Services Building, 3900 7th Ave NE	10-C
Purchasing and Accounting Building (PCH), 3917 University Way NE	11-H
Quad, Liberal Arts Quad	8-M
Quaternary Research Center, Atmospheric Sciences-Geophysics Building	11-K
Radio Broadcast Services and KUOW, Communications Building	8-N
Rainier Vista	15-N
Raitt Hall (RAI)	7-M
Real Estate Office, 1326 - 5th Ave.	off map

Regents, Board of, Gerberding Hall	10-K
Registrar, Schmitz Hall	9-I
Roberts Annex (RAX)	14-O
Roberts Hall (ROB)	14-O
Romance Languages and Literature, Padelford Hall	8-O
Russian House (RUS), 2104 NE 45th St.	3-N
Sakuma Viewpoint	14-G
Salmon Homing Pond	19-K
Savery Hall (SAV)	8-L
Scandinavian Languages and Literature, Raitt Hall	7-M
Schmitz Hall (SMZ), 1410 NE Campus Parkway	9-I
Seafirst Executive Education Center and Foster Library (SEEC)	5-L
Shellhouse Annex (SHA)	13-S
Sieg Hall (SIG)	11-M
Slavic Languages and Literature, Smith Hall	9-M
Smith Hall (SMI)	9-M
Soccer Field	10-S
Social Work (SWS), Social Work/Speech and Hearing Sciences Bldg., 4101 - 15th Ave NE	7-I
Social Work Library, Social Work/Speech and Hearing Sciences Building	7-I
Sociology, Savery Hall	8-L
South Campus Center (SOCC)	17-J
South Campus Parking Garage (SPG)	17-K
Speech Communication, Raitt Hall	7-M
Speech and Hearing Clinic, Social Work/Speech and Hearing Sciences Building	7-I
Stadium (STD), 3800 Montlake Blvd. NE	16-Q
Staff Employment (SEB) 1320 NE Campus Parkway	9-H
Staff Services Building, (SSB), 3903 Brooklyn Ave NE	11-G
Statistics Department, Padelford Hall	8-O
Stevens Court (STC), 3801 Brooklyn Ave	11-G
Student Affairs, Schmitz Hall	9-I
Student Employment, Schmitz Hall	9-I
Student Financial Aid, Schmitz Hall	9-I
Student Health Center, Hall Health Center	9-O
Student Housing, Schmitz Hall	9-I
Student Union Building (HUB)	10-N
Studio Theatre, Meany Hall	10-J
Summer Arts Festival Office, Communications Building	8-N
Summer Quarter Office, (See University Extension)	off map
Suzzallo Library (SUZ)	10-L
Swimming Pools	
Edmundson Pavilion	14-Q
Hutchinson Hall	5-M
Intramural Activities Building	12-Q
Sylvan Theater and Columns	13-N
Telephones	10-C, 13-H, 11-J, 17-J, 4-K, 5-K, 11-L, 5-M, 7-N, 4-O, 13-O, 17-O, 16-P, 19-R, 6-S
Telephone Emergency 3-J, 13-G, 13-I, 14-J, 11-K, 4-N, 9-N, 16-N, 9-P, 6-R, 9-R, 14-R, 18-Q and at all Gate Houses.	
Television Satellite Earth Terminal	5-O
Tennis Courts	5-N, 11-Q, 13-Q, 15-R
Terry-Lander Halls, (LTH) 1201 NE Campus Parkway	10-G
Thomson Hall (THO)	9-N
Transportation Services (TSB)	1-Q
Triangle Parking Garage (TPG)	17-N
Undergraduate Advising Center, 9 Communications Building	8-N
University District Building, 1107 NE 45th St	3-G
University Facilities Building (UFB)	10-O
University of Washington Medical Center (UWMC), 1959 NE Pacific St	17-M
4225 Roosevelt Way	6-E
University Police, Bryant Building	14-F
University Press, 1326 - 5th Ave NE	off map
University Records Center, (URC), 3902 Cowlitz Rd. NE	11-G
University Relations and Development, Gerberding Hall	10-K
Urban Horticulture Center (UHF), 3501 NE 41st St	7-Y
Urban Horticulture Fieldhouse	8-Z
Urban Planning, Gould Hall	11-I
Veterans Affairs and Special Services, Schmitz Hall	9-I
Virginia Merrill Bloedel Hearing Research Center, Center on Human Development and Disability Clinic	19-M
Visitor Entrance	8-J
Visitors Information Center, 4014 University Way NE	10-I
Walter Chapin Simpson Center for the Humanities, Communications Building	8-N
Washington Monument (Statue)	9-J
Washington Sea Grant Program, 3716 Brooklyn Ave NE	14-H
Washington Technology Center, Fluke Hall	9-P
Waterfront Activities Center (WAC)	18-R
Wilcox Hall (WIL)	14-O
Wilson Annex (WLA)	15-N
Wilson Ceramic Laboratory (WCL)	15-O
Winkenwerder Annex (WNX)	15-M
Winkenwerder Forest Sciences Laboratory (WFS)	15-M
Women's Fastpitch Softball Field	16-R
Women's Information Center Cunningham Hall	11-K
Zoology, Kincaid Hall	13-J
Emergency Numbers:	
Police/Fire/Medical Emergency	Telephone 911 (or 9-911)
University Police (Non-emergency)	206-543-9331
Campus Emergency News and Information	206-547-INFO (or KIRO 710 AM radio)
Emergency Procedures:	
Fire/FireAlarm: Evacuate building via stairs and assemble with others. Do not use elevators.	
Earthquake: Inside: Stay inside, drop, cover, & hold. Outside: Stay outside & move to open area.	
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