

Graduate School of Arts and Sciences

Programs and Policies

2005 – 2006



BULLETIN OF YALE UNIVERSITY

Series 101 Number 10 August 20, 2005

Bulletin of Yale University

Postmaster: Send address changes to Bulletin of Yale University,
PO Box 208227, New Haven CT 06520-8227

PO Box 208230, New Haven CT 06520-8230
Periodicals postage paid at New Haven, Connecticut

Issued seventeen times a year: one time a year in May, November, and December; two times a year in June; three times a year in July and September; six times a year in August

Managing Editor: Linda Koch Lorimer
Editor: David J. Baker
Editorial and Publishing Office: 175 Whitney Avenue, New Haven, Connecticut
Publication number (USPS 078-500)

Printed in Canada

The closing date for material in this bulletin was June 10, 2005.
The University reserves the right to withdraw or modify the courses of instruction or to change the instructors at any time.

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Cover: Hall of Graduate Studies. Photo by Nicholas Field.

Graduate School Offices

Admissions	432.2771; graduate.admissions@yale.edu
Alumni Relations	432.1942; julia.downs@yale.edu
Dean	432.2733; grad.dean@yale.edu
Finance and Administration	432.2739; alice.oliver@yale.edu
Financial Aid	432.2739; jennifer.brinley@yale.edu
General Information Office	432.2770; shalentia.moore@yale.edu
Graduate Career Services	432.2583; graduate.career.services@yale.edu
Graduate Teaching Center	432.2583; william.rando@yale.edu
McDougal Graduate Student Center	432.2583; mcdougal.center@yale.edu
Registrar (Deputy)	432.2743; stephen.goot@yale.edu
Teaching Fellow Program	432.2757; judith.hackman@yale.edu

Internet: www.yale.edu/graduateschool

Copies of this publication may be obtained from Graduate School Student Services and Reception Office, Yale University, PO Box 208236, New Haven CT 06520-8236. Cost is \$5.00 (U.S.), prepaid.

 The text has been printed on recycled paper.

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The President and Fellows of Yale University

President

Richard Charles Levin, B.A., B.LITT., PH.D.

Fellows

Her Excellency the Governor of Connecticut, *ex officio*.

His Honor the Lieutenant Governor of Connecticut, *ex officio*.

George Leonard Baker, Jr., B.A., M.B.A., *Palo Alto, California*.

Edward Perry Bass, B.S., *Fort Worth, Texas*.

Roland Whitney Betts, B.A., J.D., *New York, New York*.

Gerhard Casper, LL.M., PH.D., LL.D., *Atherton, California*.

Susan Crown, B.A., M.A., *Chicago, Illinois*.

Charles Daniel Ellis, B.A., M.B.A., PH.D., *New Haven, Connecticut*.

Jeffrey Powell Koplan, B.A., M.D., M.P.H., *Atlanta, Georgia (June 2009)*.

Maya Ying Lin, B.A., M.ARCH., D.F.A., *New York, New York (June 2008)*.

Margaret Hilary Marshall, B.A., M.ED., J.D., *Cambridge, Massachusetts (June 2010)*.

William Irwin Miller, B.A., M.B.A., *Columbus, Indiana (June 2011)*.

Indra Nooyi, B.S., M.B.A., M.P.P.M., *Greenwich, Connecticut*.

Barrington Daniel Parker, Jr., B.A., LL.B., *Stamford, Connecticut*.

Theodore Ping Shen, B.A., M.B.A., *Brooklyn Heights, New York (June 2007)*.

Janet Louise Yellen, B.A., PH.D., *Berkeley, California (June 2006)*.

The Officers of Yale University

President

Richard Charles Levin, B.A., B.LITT., PH.D.

Provost

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Vice President for Development

Ingeborg Theresia Reichenbach, STAATSEXAMEN

The Administration of the Graduate School

Jon Butler, PH.D., *Dean of the Graduate School*

Martin Klein, PH.D., M.P.H., *Associate Dean of the Graduate School*

Pamela Schirmeister, PH.D., *Associate Dean of the Graduate School*

Richard Sleight, PH.D., *Associate Dean of the Graduate School*

Edward Barnaby, PH.D., *Assistant Dean of the Graduate School*

Thomas Burns, PH.D., *Assistant Dean of the Graduate School*

Liza Cariaga-Lo, ED.D., *Assistant Dean of the Graduate School and Director,
Office for Diversity and Equal Opportunity*

Lisa Brandes, PH.D., *Assistant Dean for Student Affairs and Director, Student Life,
McDougal Graduate Student Center*

Jennifer Brinley, B.S., *Associate Director, Finance and Financial Aid*

Jill Carlton, PH.D., *Registrar, Faculty of Arts and Sciences*

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Robert Colonna, M.B.A., *Director of Admissions*

Howard el-Yasin, B.A., *Assistant Director, Teaching Fellow Program*

Joyce Fernandez, PH.D., *Associate Director, Science Education, Graduate Teaching Center*

Stephen Goot, M.A., *Deputy Registrar, Faculty of Arts and Sciences*

Judith Dozier Hackman, PH.D., *Director, Teaching Fellow Program*

Mary Johnson, PH.D., *Director, Graduate Career Services, McDougal Center and Dean's
Adviser on Career Education*

Alice Oliver, *Director, Finance and Administration*

William C. Rando, PH.D., *Director, Graduate Teaching Center, McDougal Center and Dean's
Adviser on Teaching and Learning*

Calendar*

FALL 2005

August 22	Monday	New student orientation week begins
August 24	Wednesday	SPEAK test for international students in Ph.D. programs
August 25	Thursday	Matriculation ceremony
August 26	Friday	Fall-term Online Course Selection (OCS) begins. Orientation in departments for all new students begins
August 29	Monday	Orientation for all new Teaching Fellows.
August 30	Tuesday	Registration for returning students begins
August 31	Wednesday	<i>Fall-term classes begin, 8.30 A.M.</i>
September 14	Wednesday	Registration ends, 4.30 P.M.
October 21	Friday	Midterm
November 18	Friday	Fall recess begins, 5.20 P.M.
November 28	Monday	Classes resume, 8.30 A.M.
December 17	Saturday	<i>Fall term ends</i> Winter recess begins

SPRING 2006

January 9	Monday	Spring-term registration begins <i>Spring-term classes begin, 8.30 A.M.</i>
March 3	Friday	Midterm Spring recess begins, 5.20 P.M.
March 20	Monday	Classes resume, 8.30 A.M.
May 9	Tuesday	<i>Spring term ends</i>
May 21	Sunday	Graduate School Convocation
May 22	Monday	University Commencement

*A more extensive Schedule of Academic Dates and Deadlines is presented on pages 485–88.

A Message from the Dean

Welcome to the Graduate School of Arts and Sciences at Yale University, the first of its kind in North America. The Graduate School stands at the very heart of Yale's mission as a university, and this book, *Programs and Policies*, reveals the extraordinary breadth of opportunities for graduate study at Yale. As you peruse it, you likely will discover the intriguing ways in which graduate study differs from the undergraduate experience and the fulfillment brought by this intellectual progression. You have undertaken to explore a field in depth, master an area of inquiry, and learn to disseminate knowledge through classroom teaching. Graduate education culminates in a creative and original contribution in one's field of study representing the ability to participate in the advancement of human knowledge.

Yale's departments and programs constitute the center for most graduate student intellectual and social life at Yale and elsewhere. They comprise vital communities of scholars who share a common interest in advancing a particular discipline, and graduate students and faculty alike gain immeasurably from their intellectual and disciplinary collaborations. Yale's excellent laboratory facilities, unique museum collections, and tremendous library holdings all enrich the experience of a Yale University graduate education.

The Graduate School of Arts and Sciences has worked to extend and enrich the community life found within these disciplines. Through interdisciplinary programs and institutes, as well as the McDougal Graduate Student Center's seminars on teaching and career education that help graduate students prepare for their professional lives, the Graduate School enables students to connect with skilled experts with a shared commitment to careers in teaching, research, and an array of potential leadership opportunities.

Use *Programs and Policies* as a guide throughout your graduate study at Yale. It includes practical information about registration, financial aid, teaching experiences, University resources available to you, and the full range of assistance provided by the Graduate School. All of us in the Graduate School wish you good fortune as you pursue your advanced degree, and we want you to contact us if we can help you along the way. Graduate study is exhilarating and life-changing. For well over a century Yale has prepared men and women for truly extraordinary careers across many old, new, and evolving disciplines.

Jon Butler
Dean, Graduate School of Arts and Sciences
William Robertson Coe Professor of American Studies
and History
Professor of Religious Studies

The Graduate School of Arts and Sciences

The Yale Graduate School of Arts and Sciences is one of twelve schools composing Yale University and the only one that awards the degrees of Doctor of Philosophy, Master of Philosophy, Master of Arts, Master of Science, and Master of Engineering. The work of the Graduate School is carried on in the divisions of the Humanities, Social Sciences, and Biological and Physical Sciences. Fifty-four departments and programs offer courses of study leading to the Ph.D. degree. There are twenty-four programs that terminate with the master's degree.

Yale began to offer graduate education in 1847, and in 1861 it conferred the first Ph.D. degrees in North America. In 1876 Yale became the first American university to award the Ph.D. to an African American. The Graduate School of Arts and Sciences was formally established in 1892, when the first dean was appointed. It was in that same year that women were first admitted as candidates for the doctorate.

The Graduate School community has grown vigorously since the early twentieth century; today it comprises 2,500 graduate students and a faculty of 900 who are among the world's most distinguished teachers and scholars. Admission to the Graduate School is highly competitive; currently each entering class is made up of about 500 students.

The Graduate School's purpose is to educate students in research, scholarship, and teaching in the arts and sciences. Under the guidance of the faculty, graduate students engage in advanced study of a discipline and then proceed to generate new knowledge and ideas through research. They learn to disseminate this knowledge in scholarly publications and teaching. Yale's graduate students have built careers in colleges and universities, research laboratories, government, the nonprofit sector, and private industry. Their education equips them for leadership roles in all these callings.

Yale's standing as a great international research university is based on the strength and attractiveness of its graduate programs. The pursuit of advanced learning and new knowledge takes place in the departments and programs of the Graduate School. Thus it is the Graduate School that makes Yale a university. Furthermore, graduate students as scholars in training and apprentice teachers engage with undergraduates and the faculty. A shared sense of common purpose makes Yale a community of scholars, and a place for an unusually intimate exchange of ideas.

YALE AND THE WORLD

The Yale Graduate School has always comprised an international community, but it recognizes as well that now, more than ever, advanced scholarship must occur on transnational grounds. It is increasingly important that we prepare our students to participate in a global economy of research and knowledge and that we create institutional channels through which such participation can flourish. In addition to formal student exchanges that enable graduate students to perform research and fieldwork abroad, individual fac-

ulty members, departments, and the School participate in collaborative efforts with international partners.

Approximately one-third of full-time graduate students at Yale come from outside the United States. In addition, many international students come to the Graduate School as non-degree students in the Division of Special Registration (DSR). DSR students may undertake course work and/or research for periods of one term or one year. When appropriate the period may extend for a second year. These students are subject to the usual admissions procedure, are admitted to a department, and often work with a specific faculty member. Please see page 478 for additional information regarding international student life at Yale.

A Global University

In celebrating the Yale Tercentennial in 2001, President Richard C. Levin gave special weight to “Yale’s intention to become a truly global institution” by building on existing relationships and international activity. Since that time, the University has made great strides to intensify and broaden its efforts in the international arena. Exchanges of students, faculty, researchers, and fellows have grown significantly. Programs of study and research across the University increasingly incorporate international subject matter. To enhance all its initiatives in this direction, the administration has created a number of organizations and other specialized resources.

OFFICE OF INTERNATIONAL AFFAIRS

The most recently established organizational unit, inaugurated in 2003–2004, is the Office of International Affairs, which serves as an administrative resource to support the international activities of all schools, departments, offices, centers, and organizations at Yale; to promote Yale and its faculty to international audiences; and to increase the visibility of Yale’s international activities around the globe. Web site: www.yale.edu/oia/.

The Office of International Affairs joins a range of other institutional resources, including:

Yale Center for International and Area Studies (YCIAS)

See the description on pages 425–28.

Yale Center for the Study of Globalization

See the description on pages 429–30.

Office of International Students and Scholars (OISS)

See the description on pages 477–78.

YALE WORLD FELLOWS PROGRAM

www.yale.edu/worldfellows/

As Yale marked its 300th year, the University extended its worldwide reach by launching the Yale World Fellows Program. The program hosts twelve to eighteen Fellows at a time for a term of concentrated study and close contact on the Yale campus. The Fellows

Program is a unique opportunity for individuals from outside the U.S. with experience and outstanding leadership qualities to broaden their grasp of global challenges, update their professional expertise and leadership skills, and join a network of people who share an interest in enhancing international cooperation and development.

“YALE AND THE WORLD” ON THE WEB

<http://world.yale.edu/>

“Yale and the World” is a compilation, on the Yale Web site, of resources for international students, scholars, and other Yale affiliates interested in the University’s global initiatives.

RESOURCES FOR RESEARCH AND STUDY

Yale’s outstanding facilities for research and study include a university library system of nearly eleven million volumes, the Beinecke Rare Book and Manuscript Library, the Yale University Art Gallery, the Yale Center for British Art, the Office of Information Technology Services, departmental libraries and collections, and the extensive resources of the professional schools. The collections and services of the Research Libraries Group, which consists of Columbia, Harvard, and Yale universities and the New York Public Library, are also available to students.

Special research facilities for the sciences include the Bass Center for Molecular and Structural Biology, Josiah Willard Gibbs Research Laboratories, Kline Geology Laboratory, Sterling Chemistry Laboratory, Kline Biology Tower, Becton Engineering and Applied Science Center, the Class of 1954 Environmental Science Center, the Peabody Museum of Natural History, the Arthur W. Wright Nuclear Structure Laboratory, Arthur K. Watson Hall for computer science, the Boyer Center for Molecular Medicine, and the many other science laboratories throughout the campus.

THE DEAN

Jon Butler, 112 HGS, 432.2733, grad.dean@yale.edu

The dean of the Graduate School is appointed by the president of the University and is responsible for the educational mission of the Graduate School, its faculty, the quality of its programs, and the welfare of graduate students.

THE ASSOCIATE AND ASSISTANT DEANS

Martin Klein, Associate Dean, 114 HGS, 432.8093, m.klein@yale.edu

Dean Klein oversees Student Administrative Services, including the offices of Admissions and Finance and Administration, and assists in the coordination of Graduate Career Services, Student Life, and the Graduate Teaching Center. He serves as a liaison to the registrar and Office of Public Affairs, as well as coordinates planning and program development for the Graduate School.

Pamela Schirmeister, Associate Dean, 136 HGS, 432.7598, pamela.schirmeister@yale.edu

Richard G. Sleight, Associate Dean, 132 HGS, 432.2744, richard.sleight@yale.edu

Edward Barnaby, Assistant Dean, 135 HGS, 436.2628, edward.barnaby@yale.edu

Thomas Burns, Assistant Dean, 133 HGS, 432.1884, thomas.burns@yale.edu

The academic deans of the Graduate School are responsible for the administration of graduate programs, normally in consultation with the directors of graduate studies, and for the academic and personal well-being of students. They participate in decisions regarding admissions, financial aid, academic performance, and the application of the regulations and policies of the Graduate School.

Dean Schirmeister and Dean Barnaby oversee Ph.D. and terminal master's programs in African American Studies; African Studies; American Studies; Archaeological Studies; Classics; Comparative Literature; East Asian Languages and Literatures; East Asian Studies; Economic History; Economics; English Language and Literature; European and Russian Studies; Film Studies; French; Germanic Languages and Literatures; History; History of Art; History of Medicine and Science; International and Development Economics; International Relations; Italian Language and Literature; Management; Medieval Studies; Music; Near Eastern Languages and Civilizations; Philosophy; Political Science; Religious Studies; Renaissance Studies; Slavic Languages and Literatures; Sociology; Spanish and Portuguese; and Urban Education Studies.

Dean Sleight and Dean Burns oversee Ph.D. and terminal master's programs in Anthropology; Applied Mathematics; Astronomy; Biological and Biomedical Sciences; Cell Biology; Cellular and Molecular Physiology; Chemistry; Computational Biology and Bioinformatics; Computer Science; Ecology and Evolutionary Biology; Engineering and Applied Science (Applied Physics, Biomedical Engineering, Chemical Engineering, Electrical Engineering, Environmental Engineering, Mechanical Engineering); Epidemiology and Public Health; Experimental Pathology; Forestry & Environmental Studies; Genetics; Geology and Geophysics; Immunobiology; Investigative Medicine; Linguistics; Mathematics; M.D./Ph.D. Program; Microbiology; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; Neurobiology; Neuroscience; Pharmacology; Physics; Psychology; and Statistics

Liza Cariaga-Lo, Assistant Dean; Director, Office for Diversity and Equal Opportunity, 127 HGS, 432.0763, liza.cariaga-lo@yale.edu

The assistant dean and director of the Office for Diversity and Equal Opportunity oversees all aspects of recruiting and retaining a diverse student body in the Graduate School. Please see the description of this office below for additional details.

Lisa Brandes, Assistant Dean for Student Affairs; Director, Office of Student Life, 122 HGS, 432.2583, lisa.brandes@yale.edu

The assistant dean for student affairs directs programs organized by the McDougal Fellows and supervises events such as New Student Orientation and Commencement. She coordinates graduate student services; serves as the students' advocate and liaison for graduate housing, dining services, health services, athletics, security, parking and transit; and provides confidential consultations to address student questions and complaints.

DIRECTORS OF GRADUATE STUDIES (DGS)

A senior faculty member, appointed by the dean, serves as director of graduate studies (DGS) for each department or program. The directors of graduate studies are responsible for the satisfactory administration of the programs of graduate study and function as advisers and guides to all graduate students in their respective department and programs. They help graduate students to plan an appropriate course of study and research, and advise on and approve course schedules. The DGS acts as the liaison between each student in the department or program and the Office of the Dean.

OFFICE FOR DIVERSITY AND EQUAL OPPORTUNITY

Liza Cariaga-Lo, Assistant Dean, Director, 127 HGS, 432.0763,
liza.cariaga-lo@yale.edu
www.yale.edu/graduateschool/diversity

The Office for Diversity and Equal Opportunity's mission is to expand the diversity of the student body and to enhance the intellectual experience of the entire scholarly community. The office coordinates efforts to recruit and retain students of color, women, and other diverse groups at Yale Graduate School. The assistant dean works collaboratively with departments and programs to support the needs of these students as they pursue graduate study. The assistant dean advises prospective and current minority graduate students, directs the Summer Undergraduate Research Fellowship (SURF) Program, Post-Baccalaureate Research Education Program (PREP), oversees Diversity Recruitment Days, writes and administers grants, and provides reports on the Graduate School's progress in recruiting and retaining diverse students. Graduate Diversity Fellows within the office are also appointed annually to assist the office in the development and implementation of a wide array of programs, such as application seminars, mentoring programs, discussions and lectures presented by diverse scholars, and social and cultural events. An Advisory Committee, appointed by the dean, meets regularly to discuss and review the office's programmatic efforts.

TEACHING

The Teaching Fellow Program

Judith Dozier Hackman, Director, 139 HGS, 432.2757, judith.hackman@yale.edu

The Teaching Fellow Program is the principal framework at Yale in which graduate students learn to become effective teachers. Learning to teach and to evaluate student work is fundamental to the education of graduate students. The Teaching Fellow Program provides opportunities for graduate students to develop teaching skills, under faculty guidance, through active participation in the teaching of Yale undergraduates. Teaching fellows who encounter problems or difficulties related to their teaching roles are encouraged to meet with the director of the Teaching Fellow Program or their associate dean.

THE MCDUGAL GRADUATE STUDENT CENTER

Hall of Graduate Studies, 432.BLUE (2583)
www.yale.edu/graduateschool/mcdougal/

Facilities and Services

A generous gift from Mr. Alfred McDougal '53, a Yale alumnus, and his wife, Ms. Nancy Lauter, enabled Yale to create the McDougal Graduate Student Center in 1997. The McDougal Center provides space and programs for building intellectual, cultural, and social community, as well as facilitating professional development activities across the departments of the Graduate School.

The facilities of the McDougal Center, which is housed in HGS, enhance student life in many ways. The restored Common Room has a lounge with comfortable furnishings and the student-run Blue Dog Cafe, which serves coffee and light foods. Other center facilities include large meeting rooms, a seminar room, a recreation room with children's corner, an ITS student computing cluster with printer and copier, telephones, information kiosks, lockers, and vending machines, a music room, and the Resource Library. The Center also has offices for the McDougal Fellows, Diversity Fellows, and Graduate Teaching Center student staff, the Graduate Student Assembly, as well as the directors and staff of Graduate Student Life, Graduate Career Services, and Graduate Teaching Center, described below.

The McDougal Center, which is open days, evenings, and weekends during the academic term, provides members of the Graduate School community with a place of their own on campus. The Center also welcomes postdoctoral appointees, faculty, staff, and alumni/ae of the Graduate School, as well as members of the larger Yale graduate and professional school community. Graduate student groups and departments may request to reserve space by contacting the Center office.

Graduate Student Life

Lisa Brandes, Director, Graduate Student Life and Assistant Dean for Student Affairs
HGS 122, 432.2583
mcdougal.center@yale.edu
www.yale.edu/mcdougal/studentlife

The Office of Graduate Student Life is responsible for student life programs in the McDougal Center and student services in the Graduate School. McDougal Graduate Fellows and staff produce a wide array of student life programs, including coffeehouses, arts, music, sports and cultural events, health and wellness sessions, outings, literary and academic writing programs, community service opportunities, monthly happy hours, dances, and events for various student groups. Graduate Student Life provides advice and support to graduate student organizations, which may sponsor events at the Center. Activities are announced in the weekly e-mail *McDougal Notes* (www.yale.edu/graduateschool/mcdougal), through specialized e-mail lists, and on the McDougal Center Student Life Web calendar at the site listed above.

The Office of Graduate Student Life also coordinates general campus services for graduate students, serving as the student advocate and departmental liaison for graduate housing, dining services, health services, athletics, security, and parking and transit. The director and staff are available to answer questions or help with any problems that students may have, including speaking individually about issues concerning their life at Yale and other personal matters and concerns. This office maintains a Web site of information and links about graduate student services (www.yale.edu/graduateschool/studentlife/). The Student Life office also organizes recruitment activities, new student orientation, dean's events, Commencement, and other events for the Graduate School community.

The McDougal Graduate Teaching Center

William C. Rando, Director, Graduate Teaching Center and Dean's Adviser on Teaching and Learning
125 HGS, 432.2583, william.rando@yale.edu, mcdougal.teaching@yale.edu
Joyce Fernandez, Associate Director, Science Education, Graduate Teaching Center
www.yale.edu/mcdougal/teaching

The Graduate Teaching Center offers a full range of training, consultation, and development services to teachers and teaching fellows at Yale. The director and staff of fifteen graduate teaching consultants are available throughout the year and in a variety of capacities, providing assistance and training for brand-new teachers as well as experienced members of the faculty. Each year the Center offers a comprehensive program of teaching workshops, dealing with topics such as effective discussion leading, classroom management, lecturing, and course design. The Center also organizes four- to six-week courses in the fundamentals of teaching in each of four areas: humanities, social sciences,

sciences, and foreign languages. Through its Spring Teaching Forum and lecture series, the GTC also provides a venue for members of the Yale community to discuss issues in undergraduate education and to explore the latest in teaching innovation. Anyone teaching at Yale can contact the Center for an individual consultation at any time. Classroom visitations and videotaping are also available. The GTC works closely with academic departments to design discipline-specific training for teaching fellows and new faculty. The GTC publishes *Becoming Teachers: The Graduate Student Guide to Teaching at Yale* as well as *Tales from the Classroom*, which presents teaching cases from Yale as short, illustrated comics. Graduate students interested in the activities organized by the GTC should visit the Web site and sign up for the GTC listserv, *TeachingNotes*.

Graduate Career Services

Mary Johnson, Director, Graduate Career Services and Dean's Adviser on Career Education.

124 HGS, 432.2583, mcdougal.careers@yale.edu

www.yale.edu/mcdougal/teaching

Graduate Career Services (GCS) is a comprehensive career center for students and alumni/ae of the Graduate School and for postdoctoral fellows. Through individual counseling, a full schedule of programs each term, on-campus recruiting, videotaped interview practice, and a library of print resources as well as career-related Web links, the office assists graduate students and alumni/ae with career education, decision making, and planning. It helps them think about what they want to do, know what is out there, make career decisions, and know how to search for a job. The GCS director consults with directors of graduate studies to develop programs that supplement the department's role in the professional development of students pursuing an academic career. For graduate students considering nonacademic careers, the director initiates programs and develops links with employers who seek graduate students' skills. GCS encourages students to begin using the services of the office early in their graduate careers in order to increase their opportunities upon the completion of their degree.

Dossier Service

126 HGS, McDougal Center, 432.8850, fax 432.8356, dossier@yale.edu

www.yale.edu/graduateschool/careers/dossier.html

Students and alumni/ae applying for academic or nonacademic positions may use the dossier service. The dossier contains students' letters of recommendation and an official transcript of Yale graduate work. On request, a dossier will be sent to employers, agencies, and schools considering a student or alumnus/a for permanent or short-term positions, and for grants and fellowships. The director of Graduate Career Services oversees the Dossier Service.

Resource Library

120 HGS, McDougal Center

www.yale.edu/graduateschool/mcdougal/resourcelibrary.html

The Resource Library, a self-service facility, provides information for graduate students, postdoctoral appointees, and faculty on fellowships, research and travel funding, and information on teaching, careers, writing, academic life, and professional development. The Fellowship Collection of the library contains grant directories and fellowship announcements, and an online site of links, announcements, and searchable databases, including the Graduate School's Fellowship Database. Materials may be consulted in the library or checked out for use in the Center.

OFFICE OF FINANCE AND ADMINISTRATION

Alice Oliver, Director, 131 HGS, 432.2739, alice.oliver@yale.edu

The Office of Finance and Administration is responsible for all financial transactions in the Graduate School, overseeing both financial aid and operating activities. Working with the dean and others, the office develops and monitors all Graduate School budgets and expenditures, maintaining compliance with internal and external policies and regulations. The office provides support to the dean and Graduate School supervisory staff in hiring, training, and related human resources activities of the School. The office is a resource to Graduate School, University, and external organizations seeking interpretation of policies and regulations and providing guidance about procedures, reporting, and interactive systems.

OFFICE OF FINANCIAL AID

Jennifer Brinley, Associate Director, 130 HGS, 432.7980, jennifer.brinley@yale.edu
www.yale.edu/graduateschool/financial

The Office of Financial Aid is a resource to graduate students, departments, and non-Yale organizations needing guidance or assistance regarding financial aid policies and the administration of fellowships and student loan programs. The office oversees and maintains financial and data management systems and disburses all graduate student financial aid.

OFFICE OF GRADUATE ADMISSIONS

Robert Colonna, Director, 117B HGS, 203.432.2771, graduate.admissions@yale.edu
www.yale.edu/graduateschool/admissions/

The Office of Graduate Admissions coordinates and oversees all aspects of application to the Graduate School for individuals seeking master's and doctoral degrees, as well as for nondegree study. The Office of Graduate Admissions also works with the associate deans and academic departments to provide relevant information and decisions to applicants.

REGISTRAR'S OFFICE

Stephen Goot, Deputy Registrar, 142 HGS, 432.2743, stephen.goot@yale.edu

The Registrar's Office maintains the academic records of all students in the Graduate School. In addition, the Registrar's Office develops course and classroom schedules and oversees registration, tuition charges, academic holds, dissertation submission, final clearance at graduation, and release of diplomas for Commencement. Students should consult this office to report changes in name or Social Security number, to request transcripts, or to certify their enrollment in the Graduate School. Students can change their address listing at www.yale.edu/sis.

COMMITTEES

Currently five standing committees are concerned with the policies and procedures of the Graduate School; as with all standing committees, their deliberations are confidential. Student members of these committees are selected by the Graduate Student Assembly.

The Executive Committee: A committee of faculty members and graduate students, chaired by the dean, advises the dean on broad matters of policy and procedure and makes recommendations to the faculty of the Graduate School.

The Degree Committees: There are three degree committees, serving the divisions of humanities, social sciences, and biological and physical sciences. The degree committees, composed of members of the division's faculty and chaired by the dean, meet twice a year and are responsible to the faculty of the Graduate School for maintaining standards of graduate education in the School and for recommending candidates for degrees. They review special academic problems of individual students and, when appropriate, the educational programs of the departments.

Dean's Advisory Committee on Student Grievances: Composed of three students, three faculty members, normally one from each division, and one administrator of the Graduate School, the committee reviews complaints brought by graduate students against a member of the faculty or administration of the Graduate School (see the description of grievance procedures on page 457).

The Grievance Board for Student Complaints of Sexual Harassment: Composed of two faculty members, two graduate student members, an administrator of the Graduate School, and a person with counseling experience, the board exists to support an atmosphere of mutual tolerance and respect in the Graduate School. It is responsible for addressing complaints of sexual harassment brought by graduate students against administrators, faculty of the Graduate School of Arts and Sciences, other instructors of graduate students, postdoctoral appointees, or other graduate students (see the description of grievance procedures on page 457).

The Committee on Regulations and Discipline: Composed of three graduate students, three faculty members, normally one from each division, and an associate dean, the committee reviews violations of the regulations governing academic and personal conduct (see pages 455–56).

GRADUATE STUDENT ASSEMBLY (GSA)

B43 HGS, 432.8893
graduate.student.assembly@yale.edu
www.yale.edu/assembly

Students in the Graduate School are represented collectively by the Graduate Student Assembly, which provides a forum for students to address issues across the Graduate School and University. It consults with the dean and other administrators on proposed changes in Graduate School policy, raises concerns expressed by the student body, and nominates the student members of all Graduate School standing committees. Representatives to the assembly are elected by students in individual departments and degree programs. Each department or program has at least one student representative, with additional representatives allotted proportionally by size of the student population.

GRADUATE-PROFESSIONAL STUDENT SENATE (GPSS)

gpss@yale.edu
www.yale.edu/gpss/

Founded in 1971, the Graduate-Professional Student Senate (GPSS) fosters discussion and the exchange of ideas among the graduate and professional student population. All graduate and professional students are eligible to become senators. Senators are chosen each year by their respective schools. The GPSS meets every two weeks throughout the academic year, and meetings are open to the graduate and professional school community. Members serve on and make appointments to University committees, meet with University officials and Yale Corporation members, sponsor informational workshops and conferences, organize lectures and social events, and assist in community service events. Additionally, the GPSS oversees operation of the Graduate-Professional Student Center at Yale (GPSCY), at 203 York Street, which includes office and meeting spaces for graduate-professional student organizations, and the Gryphon's Pub.

Departments and Programs

This section provides information on all departments and programs of the Graduate School of Arts and Sciences. Each listing provides a roster of faculty, special admissions and degree requirements for that department or program, and the courses offered in 2004–2005. The requirements appearing in the *Graduate School of Arts and Sciences Programs and Policies* take precedence over any statements published separately by individual departments and programs.

The degree requirements of the Graduate School itself appear later in this publication, on pages 436–47. These apply to all students in the Graduate School, although there are variations in the pattern of their fulfillment in individual departments and programs. The requirements of the Graduate School may change from time to time. If a requirement changes within the period normally required for completion of a student's course of study, the student will normally be given the choice of completing either the new or the old requirement.

The requirements of individual departments also may change from time to time, with the approval of the Graduate School. After such approval has officially been given, students in that department or program will receive written notification. All changes in departmental degree requirements occurring after the publication closing date of the *Graduate School of Arts and Sciences Programs and Policies* are posted in the Faculty of Arts and Sciences Registrar's Office, 246 Church Street, third floor.

The course listings and instructors that follow reflect information received by the registrar as of the publication date and are subject to change without notice. Students are advised to consult the Graduate School's publication *2005 Fall Term Course Offerings*, or www.yale.edu/courseinfo/ for the most recent information.

Fall-term courses are indicated by the letter "a," spring-term courses by the letter "b." Yearlong courses have no letter designation or list both "a" and "b." Course numbers followed by a superscript "u" are also open to undergraduates in Yale College. Courses in brackets are not offered during the current academic year. Course information is also available at www.yale.edu/courseinfo.

AFRICAN AMERICAN STUDIES

493 College, 432.1170

M.A., M.Phil., Ph.D.

Chair

Robert Stepto

Director of Graduate Studies

Gerald Jaynes (493 College, gerald.jaynes@yale.edu)

Professors

David Blight, Hazel Carby, William Foltz, Glenda Gilmore, Ezra Griffith, Jonathan Holloway, Matthew Jacobson, Gerald Jaynes, Serene Jones, Christopher L. Miller, Joseph Roach, Robert Stepto, John Szwed, Robert Thompson

Associate Professors

Elizabeth Alexander, Kamari Clarke, David Krasner, Susan Lederer, Patricia Pessar

Assistant Professors

Jennifer Baszile, Khalilah Brown-Dean, Terri Francis, Ange-Marie Hancock, Kellie Jones, Alondra Nelson, Naomi Pabst, Diana Paulin, Lloyd Pratt, Michael Veal

Lecturers

Kathleen Cleaver, Flemming Norcott, Gerald Thomas

Fields of Study

African American Studies offers a combined Ph.D. in conjunction with several other departments and programs. Departments and programs which currently offer a combined Ph.D. with African American Studies are: American Studies, Anthropology, English, Film Studies, French, History, History of Art, Political Science, Psychology, Religious Studies, Sociology, and Spanish and Portuguese. Within the field of study, the student will select an area of concentration in consultation with the directors of graduate studies of African American Studies and the joint department or program. An area of concentration in African American Studies may take the form of a single area study or a comparative area study: e.g., Caribbean or African American literature, a comparison of African American literature in a combined degree with the Department of English; an investigation of the significance of the presence of African cultures in the New World, either in the Caribbean or in Latin and/or South America in a combined degree with the Spanish and Portuguese department. An area of concentration may also follow the fields of study already established within a single discipline, e.g., race/minority/ethnic studies in a combined degree with Sociology. An area of concentration must either be a field of study offered by a department or fall within the rubric of such a field. Please refer to the description of fields of study of the prospective joint department or program.

Special Admissions Requirements

Strong undergraduate preparation in a discipline related to African American studies; writing sample; description of the fields of interest to be pursued in a combined degree. This is a combined degree program. To be considered for admission to this program you must indicate both African American Studies and *one* of the participating departments/programs listed above. Additionally, please indicate both departments on all supporting documents (personal statement, letters of recommendation, transcripts, etc.).

Special Requirements for the Ph.D. Degree

Students will be subject to the combined Ph.D. supervision of the African American Studies department and the relevant participating department or program. The student's academic program will be decided in consultation with an adviser, the director of graduate studies of African American Studies, and the director of graduate studies of the participating department or program and must be approved by all three. Students are required to take four designated core courses in African American Studies. Core courses are (1) Theorizing the Racial Formation of the United States in the Early Twenty-First Century (AFAM 505a/AMST 643a/HIST 772a), which is a required course for all *first-year* graduate students in the combined program; (2) Research in African American History and Culture to Emancipation (AFAM 819a/HIST 711a) and/or Research in Twentieth-Century U.S. History (AFAM 709b/AMST 709b/HIST 736b); (3) Race and Ethnicity (AFAM 814a/PLSC 823a); (4) Research Workshop (AFAM 895). After completion of course work, students will be required to attend the one-year research workshop during their third year. This research workshop is intended to support preparation of the dissertation proposal. Each student will be expected to present his or her dissertation prospectus during that year. The research workshop will also feature seminars in which students present chapters of their dissertations-in-progress. The expectation is that this workshop will be voluntarily attended by students even during terms when they are not required to register for it. The workshop will be an important part of each graduate student's professionalization and will serve as a vital stimulus to intellectual activity.

Qualifying examinations and the dissertation proposal will be administered jointly by the program and participating department and must be passed within the time required by the participating department. The total number of courses required will adhere to the requirements of the participating department or program. For details of these requirements see the special requirements of the combined Ph.D. for the particular department printed in this publication. Students will be required to meet the foreign language requirements of the participating department (see Policies and Regulations: Degree Requirements in this publication). Students will not be admitted to candidacy until all requirements, including the dissertation prospectus, have been met and approved by the Graduate Studies Executive Committee of the African American Studies department and the participating department. If a student intends to apply for this combined Ph.D. in African American Studies and another department, he or she should contact the prospective department and request a description of all Ph.D. requirements and courses.

The faculty in African American Studies consider teaching to be an essential component of graduate education, and students therefore will teach in their third and fourth years.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the joint Ph.D.). Students will be awarded a combined M.A. degree in African American Studies and the relevant participating department or program upon successful completion of *all* course work except the Research Workshop, which is taken in the student's third year of study. See also Graduate School requirements, pages 436–47.

Program materials are available upon request to the Director of Graduate Studies, African American Studies, Yale University, PO Box 203388, New Haven CT 06520-3388.

Courses

AFAM 505a, Theorizing the Racial Formation of the United States in the Early Twenty-First Century. Jonathan Holloway.

W 1.30–3.20

A designated core course for students in the joint Ph.D. program; also open to students in American Studies and History. The interdisciplinary seminar includes readings from the fields of critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AMST 643a, HIST 772a.*

AFAM 525b^U, Psychosocial Study of Black Autobiography. Ezra Griffith.

W 2.30–4.20

Autobiographies of black men and women analyzed especially for an understanding of their coping mechanisms, with attention to problems, satisfactions, disappointments, grief, and fulfillments.

[AFAM 542a^U, Comparative Approaches to Recounting Stories of Black Lives.]

AFAM 557a^U, Introduction to Jazz Studies. John Szwed.

T 1.30–3.20

An overview of the music and its cultural history, with consideration of the influences of jazz on the visual arts, dance, literature, and film; an introduction to the scholarship and methods of jazz studies. *Also ANTH 681a^U.*

AFAM 563a^U, Ralph Ellison in Context. Robert Stepto.

W 1.30–3.20

This seminar pursues close readings of Ralph Ellison's essays, short fiction, and novels, *Invisible Man* and *Juneteenth*. The "in context" component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African American Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. The texts include Ellison, *The Collected Essays, Flying Home and Other Stories, Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison's Invisible Man*; A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. *Also AMST 921a^U.*

[AFAM 573a, Transnationalism, Modernity, and Diaspora.]

AFAM 588b^u, Autobiography in America. Robert Stepto.

M 1.30–3.20

At least a dozen North American autobiographies are studied, mostly from the “American Renaissance” to the present. Discussion of various autobiographical forms and strategies as well as of various experiences of American selfhood and citizenship. Slave narratives, spiritual autobiographies, immigrant narratives, autobiographies of childhood or adolescence, relations between autobiography and class, region, or occupation. *Also AMST 710b^u.*

AFAM 595b, Intersections in American Literature. Robert Stepto.

T 1.30–3.20

This seminar studies key developments in American and African American prose literature when texts purported to be of different literary or cultural traditions intersect to form the full blossoming of that development. We discuss Indian captivity narratives, slave revolt narratives, female servant narratives, written folktales, passing novels, and modernist fiction. Careful attention is paid to texts that not only converse with each other but also bear a precursor-successor relationship. We are therefore more attentive than usual to how texts pair up for discussion. The course traverses from the nineteenth century to the twentieth through an extensive discussion of Twain’s *The Adventures of Huckleberry Finn* and Ellison’s *Invisible Man*. Prior to that, the authors studied include Mary Rowlandson, John Marrant, Herman Melville, Frederick Douglass, Charles Johnson, Harriett Jacobs, Hannah Cullwick, Joel Chandler Harris, and Charles Chesnutt. We also discuss Nella Larsen, F. Scott Fitzgerald, William Faulkner, and Toni Morrison. Admittedly, this could be (and is on some level) a “Race and American Literature” course; in this regard, influential studies such as Eric Sundquist’s *To Wake the Nations* have led to its design. But ideally we expect to push beyond that consideration in many discussions. Students are expected to complete a seminar-length essay (25 pages or so) and to participate in one or more presentation groups. Alternatives to the long paper (such as two shorter papers, etc.) can be considered, especially when they abet what students wish to get out of the course. *Also AMST 651b.*

AFAM 596a, African American Poets of the Modern Era. Robert Stepto.

T 1.30–3.20

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic, and blues poems. Poets studied include Paul Laurence Dunbar, Langston Hughes, Sterling Brown, Gwendolyn Brooks, Margaret Walker, and Robert Hayden. The classes include sessions at Beinecke Library for the inspection and discussion of original editions, manuscripts, letters, and other archival materials. *Also AMST 641a, ENGL 947a.*

AFAM 637a, Improvisation. John Szwed.

Th 1.30–3.20

Beginning with examples from music, dance, ritual, theater, film, literature, and the arts, this seminar draws on social theory, ethnography, linguistics, computer science, aesthetics, and philosophy to explore the meanings and cultural limitations of improvisation. *Also ANTH 551a.*

[AFAM 687a, Race and Races in American Studies.]**AFAM 706a, Readings in Twentieth-Century United States History.**

Glenda Gilmore.

Th 1.30–3.20

Recent trends in American political history from the 1800s, with an emphasis on the social analysis of mass politics and reform. *Also AMST 714a, HIST 735a.*

AFAM 709b, Research in Twentieth-Century United States History.**Glenda Gilmore.**

T 10.30–12.20

Projects chosen from the post-Civil War period, with emphasis on twentieth-century social and political history, broadly defined. Research seminar. *Also AMST 709b, HIST 736b.*

[AFAM 710a, Readings in African American History since 1865.]

[AFAM 721b, Readings in Southern History since 1865.]

[AFAM 722b, Theorizing “Black” and “Asian” Intersectionalities in the United States.]

AFAM 723a, Black Intellectuals of the Caribbean Diaspora. Hazel Carby.

M 1.30–3.20

This course examines work by writers of Caribbean descent from different regions of the transatlantic world. In response to contemporary interest in issues of globalization, the premise of the course is that in the world maps of these black intellectuals we can see the intertwined and interdependent histories and relations of the Americas, Europe, and Africa. Thinking globally is not a new experience for black peoples and we need to understand the ways in which what we have come to understand and represent as “Caribbeanness” is a condition of movement. Literature is most frequently taught within the boundaries of a particular nation, but this course focuses on the work of writers who shape the Caribbean identities of their characters as traveling black subjects and refuse to restrain their fiction within the limits of any one national identity. We practice a new and global type of cognitive mapping as we read and explore the meanings of terms like black trans-nationalism, migrancy, globalization, and empire. Diasporic writing embraces and represents the geopolitical realities of the modern, modernizing, and postmodern worlds in which multiple racialized histories are inscribed on modern bodies. *Also AMST 645a, CPLT 949a.*

[AFAM 726a, Black Travel and Transnationality.]

[AFAM 728b^U, From West Africa to the Black Americas.][AFAM 729a^U, New York Mambo: Microcosm of Black Creativity.]**AFAM 731b^U, Black Women’s Film and Video. Terri Francis.**

T 7–8.50, screenings M 7 P.M.

Study of films and videos made by women of African descent during the twentieth and twenty-first centuries. Focus on filmmaking as a critical practice and an art form, particularly how it engages cinematic perceptions of black womanhood. Films placed in a matrix of African American film history, feminist film theory, and legacies of black feminist writing and image-making. Topics include film language, authorship, performance, and the question of audience. *Also FILM 717b^U.*

AFAM 732a^U, Film and the Harlem Renaissance. Terri Francis.

W 3.30–5.20, screenings M 7 P.M.

Consideration of the Harlem Renaissance’s cinematic expressions. Focusing on the period from the 1890s to the late 1940s, screenings include early images of African Americans, “race movies” of the silent and sound eras, and American and foreign films that feature black stars. This interdisciplinary seminar brings together early African American films with canonical writings of the Renaissance in an international context. *Also FILM 716a^U.*

AFAM 747b, Performativity. Diana Paulin.

Th 10.30–12.20

What does it mean to perform identity? The graduate seminar addresses this question through the study of theories of performance and performativity in order to come to a working definition of these terms and to apply this critical framework to multiple sites of cultural production (both historical and contemporary), including the stage, the page, the screen, the

street, and the courtroom. Racial performance, because of its inextricable link with the body, serves as a point of entry to this study, since performativity and performance highlight both bodily conditions and discursive systems that construct and produce racial identity, simultaneously. We consider how race is performed in and through its intersection with other categories of identity, such as sexuality, gender, and nation. Along these lines, we evaluate how the lens of performance and performativity might aid in the process of critiquing, reconfiguring, and resisting restrictive formulations of race and identity, as well as generate space for more productive possibilities. Authors include Judith Butler, Rachel Lee, Anna Deveare Smith, Harry Elam, Jose Munoz, Sadiya Hartman, Joseph Roach, and Karen Shimakawa. *Also AMST 675b.*

AFAM 748a^U, Rethinking the African American Literary Canon.

Elizabeth Alexander.

M 3.30–5.20

As we move into the twenty-first century, we now have behind us a serious body of literary criticism and theory on African American literature. This is a moment to consider, discuss, and perhaps revise some of the touchstones of the African American canon. We read works considered canonical along with the critical material surrounding them, studying these books in their historical contexts and finding new methods and contexts for reading them. This course assumes that students may have read many of these works but will reread with fresh eyes, moving toward original research and new propositions about these works as well as questions of tradition, doctrine, the idea of “genius” and “masterpiece,” and creative resistance. For a final project, students present a work not on the syllabus and argue for its necessity to African American literary study. Works include Frederick Douglass’s *Narrative, Incidents in the Life of a Slave Girl*, *The Collected Poems* of Paul Laurence Dunbar, *Cane*, *The Collected Poems* of Langston Hughes, *Their Eyes Were Watching God*, *The Collected Poems* of Gwendolyn Brooks, *Invisible Man*, *The Collected Poems* of Robert Hayden, *A Raisin in the Sun*, *Beloved*. Graduate seminar, also open to advanced undergraduates. *Also AMST 639a.*

AFAM 757a, Research Seminar in Nineteenth-Century United States History.

David Blight.

W 1.30–3.20

Some class sessions focus on matters of craft: research techniques, styles of writing narrative and analysis; judging scholarly work; and philosophical dimensions of doing history in the early twenty-first century. Primary focus of course is for each student to complete his/her own major research paper. Students in any field of American history are welcome. *Also AMST 722a, HIST 722a.*

[AFAM 758a, Readings in African American History to Emancipation.]

[AFAM 761b, Readings in Nineteenth-Century American History, 1820–1877.]

AFAM 763b, Methods and Practices in U.S. Cultural History. Matthew Jacobson.

M 1.30–3.20

This reading-intensive seminar examines the cultural turn in the discipline of history over the past several decades, and the rise of cultural history as a subfield in its own right. What precisely is meant by terms like “culture,” “subculture,” “dominant culture,” “cultures of resistance,” and “cultural hegemony”? And where do such concepts get us in our investigations of U.S. history? What is their explanatory power? Readings sample a wide range of methods and philosophical approaches within the field, arranged across a variety of periods and thematic topics: nationalism, consumption, empire, class formation and labor, radicalism, gender arrangements, cultural production, and genre. Students produce a significant historiographical essay by term’s end, either treating the literature on a given topic, or analyzing a particular cultural theorist (e.g., Gramsci, Hall, Spivak) and his/her influence on contemporary historiography. *Also AMST 731b, HIST 780b.*

AFAM 768b, Issues in Performance Art. Kellie Jones.

W 1.30–3.20

Wedged between the rudiments of theater and the gestures of visual art, performance art came to prominence at the end of the twentieth century. Our concentration in this course is on artists and practices after 1960. However, we also consider the roots of this form in the first part of the twentieth century as well as in earlier periods. Central to our investigations are discussions surrounding performance as catalytic process, as temporal art, and issues of the body as form. Feminist performance art is the focus for this term. *Also HSAR 696b.*

AFAM 783b, Colonizer and Colonized in Africa. Christopher L. Miller.

Th 10.30–12.20

The literature and film of the colonial encounter in French and British Africa, with attention to modes of interaction and representation. Early travel accounts and their impact on European philosophy and anthropology; the emergence of counterdiscourses. Theories of Lugard, Lyautey, Memmi, Fanon. Novels include *Heart of Darkness*, *Une Vie de boy*, *Things Fall Apart*, *L'Aventure ambiguë*, *La Noire de...*, *L'Etrange destin de Wangin*, *A Bend in the River*, *Nervous Conditions*. Films include *Zou-Zou*, *La Noire de...*, *Black and White in Color*, *Coup de Torchon*, *Chocolat*. Reading knowledge of French required. *Also AFST 859b, CPLT 948b, FREN 759b.*

[AFAM 792a^U, The Jazz Avant-Garde, 1955–1980.]

[AFAM 809a, Intersecting Identities: Nation, Race, and Gender.]

AFAM 812b, Women and Politics. Ange-Marie Hancock.

T 6–8

This course surveys the various approaches to studying gender in political science. It explicitly crosses the subfields of political theory, American politics, and comparative politics in course content and discussions of research design and methodology. Students intending to write dissertations involving gender analyses or preparing for the gender politics special field exam are encouraged to enroll in the class. *Also PLSC 843b.*

AFAM 814a, Race and Ethnicity. Khalilah Brown-Dean.

T 10.30–12.20

This course is an introduction to research on race and ethnicity in American politics. Topics include the social construction of race; intersections between race and gender; black, Latino, and Asian American public opinion and political participation; minority representation; the relationship among race, racism, and public policy; immigration and citizenship; state politics; the psychology of racial politics; and the role of race in campaigns. We discuss and debate the empirical contributions of this literature, as well as questions of theory, methodology, and research design. *Also PLSC 823a.*

AFAM 815b, American Legal History: The Law of Slavery and Anti-Slavery.

Kathleen Cleaver.

Th 2.30–4.20

This seminar focuses on the way legal institutions adapted to the institution of human slavery in North America during the eighteenth and nineteenth centuries, and prompted the evolution of legal support for resistance to slavery. Students investigate the tension slavery generated in a republican society by examining federal and state statutes, proclamations, constitutions, and judicial opinions, as well as historical scholarship and autobiographical writings by slaves. Topics examined include the African slave trade, the colonial rejection of slavery in Georgia, the catalyst of slavery in New England's economy, women in the abolitionist movement, fugitives and maroon communities, gradual emancipation, and the impact of territorial expansion on the law of slavery, with particular emphasis on the 1856 *Dred Scott* decision in the U.S. Supreme Court. Course requires a journal and a research paper. Classes begin on Thursday, January 19, 2006. *Also LAW 21483, WGSS 820b.*

AFAM 819a, Research in African American History and Culture to Emancipation.
Jennifer Baszile.

Th 1.30–3.20

This research seminar explores the full range of African American experience through the era of emancipation. The initial meetings examine central evidentiary and analytical challenges of research. The remainder of the course focuses on the conception, development, writing, and revision of article-length papers. *Also HIST 711a.*

AFAM 840a, African American Theater, Drama, and Performance. **David Krasner.**

W 10.30–12.20.

Studies in African American theater, drama, and performance of the nineteenth and through the twentieth century, including plays, performances, and theories during major periods of artistic development: the new Negro Movement, Harlem Renaissance, Federal Theater Projects, post-WWII Realism, Black Arts Movement, modernism, Postmodernism, and feminist/womanist theater. Among the playwrights examined are Hansberry, Baraka, Shange, Bullins, Kennedy, and August Wilson. *Also ENGL 862a.*

[AFAM 843a, Theory and Practice of Ethnomusicology.]

[AFAM 846a, Postcolonial Theory and Its Literature.]

AFAM 847a, African-Caribbean Connections in French. **Christopher L. Miller.**

Th 10.30–12.20

The intertwined literary and cultural relations between Africa and the Caribbean, as made possible by the slave trade and French colonialism. Focus on changing models of linkage and exile, beginning with nineteenth-century experiments, continuing with: early twentieth-century movements in Haiti and in France; two versions of Négritude; social realism; independence; “creoleness.” Authors include Maran, Senghor, Césaire, Roumain, Sembene, Glissant, Condé, Warner-Vieyra, Lopes. Reading knowledge of French required. *Also AFST 847a, CPLT 947a, FREN 947a.*

[AFAM 848b, African American Studies Graduate Research Seminar in Diasporic Cultural Studies.]

[AFAM 854b, The French Atlantic Triangle: Literature and Culture of the Slave Trade.]

AFAM 880a or b, Directed Reading.

By arrangement with faculty.

AFAM 895, Research Workshop. **Faculty.**

A noncredit, yearlong course required of all third-year students. Fall term consists of biweekly work-in-progress talks by Yale faculty, advanced graduate students, and outside speakers. Spring term has biweekly workshops that focus on the dissertation prospectus.

For course offerings in African languages, see African Studies.

AFRICAN STUDIES

Council on African Studies

Yale Center for International and Area Studies (YCIAS)

142 Luce Hall, 34 Hillhouse, 432.3436

www.yale.edu/ycias/african

M.A.

Graduate Certificate of Concentration in African Studies

Chair

Derek Yach (*Epidemiology & Public Health*)

Director of Graduate Studies

Ann Biersteker (*Linguistics*) (432.9902, ann.biersteker@yale.edu)

Director of Program in African Languages

Sandra Sanneh (432.1179, sandra.sanneh@yale.edu)

Professors

Lea Brilmayer (*Law*), Owen Fiss (*Law*), William Foltz (*Political Science*), Robert Harms (*History*), Andrew Hill (*Anthropology*), Christopher L. Miller (*French; African American Studies*), Curtis Patton (*Epidemiology*), Lamin Sanneh (*History; Divinity*), Ian Shapiro (*Political Science*), Robert Thompson (*History of Art*), Christopher Udry (*Economics*)

Associate Professors

Ann Biersteker (*Adjunct, Linguistics*), M. Kamari Clarke (*Anthropology*), David Watts (*Anthropology*), Eric Worby (*Anthropology*)

Assistant Professors

David Graeber (*Anthropology*), Lawrence King (*Sociology*), Michael Mahoney (*History*), Michael Veal (*Music*)

Senior Lectors

Sandra Sanneh (*African Languages*), Kiarie Wa’Njogu (*African Languages*)

Lecturers

Oluseye Adesola (*African Languages*), Kana Dower (*African Studies*), Anne-Marie Foltz (*Epidemiology & Public Health*), Peter Marris (*Sociology*), Nicoli Nattrass (*African Studies*), Gerald Thomas (*African American Studies; History*)

Fields of Study

African Studies considers the arts, history, cultures, languages, literatures, politics, religions, and societies of Africa as well as issues concerning development, health, and the environment. Considerable flexibility and choice of areas of concentration are offered because students entering the program may have differing academic backgrounds and career plans. Enrollment in the M.A. program in African Studies provides students with

the opportunity to register for the many African studies courses offered in the various departments of the Graduate School of Arts and Sciences and the professional schools.

The Program in African Studies also offers two interdisciplinary seminars to create dialogue and to integrate approaches across disciplines. In addition to the M.A. degree program, the Council on African Studies offers students in the University's doctoral and other professional degree programs the chance to obtain a Graduate Certificate of Concentration in African Studies by fulfilling a supplementary curriculum. Joint degrees are possible with the approval of the M.A. in African Studies and the relevant officials in the Schools of Forestry & Environmental Studies, Epidemiology and Public Health, Law, and Management.

The African collections of the Yale libraries together represent one of the largest holdings on Africa found in North America. The University now possesses over 220,000 volumes including, but not limited to, government documents, art catalogues, photographs, manuscripts, correspondence, and theses, many published in Africa.

Special Admissions Requirement

The GRE General Test is required.

Special Requirements for the M.A. Degree

The Yale University Master of Arts degree program in African Studies was instituted in 1986. The two-year interdisciplinary, graduate-level curriculum is intended for students who will later continue in a Ph.D. program or a professional school, or for those who will enter business, government service, or another career in which a sound knowledge of Africa is essential or valuable. A student may choose one of the following areas of concentration: history; anthropology; political science; economics; sociology; arts and literatures; languages and linguistics; religion; environmental and developmental studies.

The program requires sixteen courses: two compulsory introductory interdisciplinary seminars, Research Methods in African Studies (AFST 501a) and Africa and the Disciplines (AFST 764a), four courses of instruction in an African language, four courses in one of the above areas of concentration, four other approved courses offered in the Graduate School or professional schools, and two terms of directed reading and research (AFST 900a or b) during which students will complete the required thesis. A student who is able to demonstrate advanced proficiency in an African language may have the language requirement waived and substitute four other approved courses. The choice of courses must be approved by the director of graduate studies, Ann Biersteker, and students should consult with her as soon as possible in the first term.

The Master's Thesis

The master's thesis is based upon research on a topic approved by the director of graduate studies and advised by a faculty member with expertise or specialized competence in the chosen topic.

Special Requirements for the Graduate Certificate of Concentration in African Studies

The Certificate in African Studies enables graduate and professional school students in fields other than African Studies to demonstrate interdisciplinary area expertise, language proficiency, and research competence in African Studies. The certificate program is intended to complement existing fields of studies in other M.A. and Ph.D. programs and to provide the equivalent of such specialization for students in departments and schools without Africa-related fields of study. The certificate program is designed to be completed within the time span of a normal Ph.D. residence. Professional school students and M.A. students in the Graduate School may require an additional term of registration to complete the certificate requirements depending on the requirements of specific programs.

The certificate program includes interdisciplinary course work, language study, and research components. The specific requirements are:

1. Successful completion of at least six courses in African Studies from at least two departments or schools, one of which is a core course in African Studies (AFST 764a, Africa and the Disciplines, or AFST 501a, Research Methods in African Studies).
2. Demonstration of proficiency in an African language.
3. Evidence of research expertise in African Studies. Research expertise may be demonstrated by completion of an interdisciplinary thesis, dissertation prospectus, or dissertation or by completion of a substantive research seminar paper or the equivalent as approved by the faculty adviser.

The certificate courses and research work should be planned to demonstrate clearly fulfillment of the goals of the certificate. Certificate candidates should design their course schedules in consultation with the director of graduate studies for African Studies. Ideally, students should declare their intention to complete the certificate requirements early in their program at Yale. Graduate and professional school students who intend to complete the certificate program must declare their intention to do so no later than their penultimate term of enrollment. For general guidelines, see the YCIAS section (under Research Institutes) in this bulletin.

Program in African Languages

The language program offers instruction in three major languages from sub-Saharan Africa: Kiswahili (eastern and central Africa), Yorùbá (west Africa), and isiZulu (southern Africa). Language-related courses and language courses for professionals are also offered. African language courses emphasize communicative competence, and instructors use multimedia materials that focus on the contemporary African context. Course sequences are designed to enable students to achieve advanced competence in all skill areas by the end of the third year, and the African Language program encourages students to spend one summer or term in Africa during their language study.

Noncredited instruction in other African languages is available by application through the Directed Independent Language Study program at the Center for Language Study. Contact the director of the Program in African Languages.

Program materials are available upon request from the Director of Graduate Studies, Council on African Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail, african.studies@yale.edu.

Courses

AFST 501a, Research Methods in African Studies. Ann Biersteker.

W 1.30–3.20

This course considers disciplinary and interdisciplinary research methodologies in African studies. The focus of the course is on field methods and archival research in the social sciences and humanities. Topics include use of African studies and disciplinary sources (including bibliographical databases and African studies archives), research design, interviewing, survey methods, analysis of sources, and the development of databases and research collections.

AFST 541b^U, Comparative Perspectives on African Literatures. Ann Biersteker.

Th 1.30–3.20

Introduction to a wide range of topics in African literature through an examination of English translations of works composed both in African and in European languages. Readings include poetry, novels, plays, essays, nonliterary texts, and autobiographies. Consideration of the symbiotic relationship between printed text and oral performance, between composition and transmission.

AFST 598a^U, Introduction to an African Language. Sandra Sanneh.

MTWTh 9.30–10.20

Beginning instruction in an African language other than those regularly offered. Courses offered depend on availability of instructors. Methodology and materials vary with the language studied. Students may also study an African language through the noncredit Directed Independent Language Study program. Permission of instructor required.

AFST 599b^U, Introduction to an African Language. Sandra Sanneh.

5 HTBA

Continuing instruction in an African language other than those regularly offered. Courses offered depend on availability of instructors. Methodology and materials vary with the language studied. After AFST 598a. Students may also study an African language through the noncredit Directed Independent Language Study program. Permission of instructor required.

AFST 618b, Communication and Healing. Sandra Sanneh.

HTBA

This course deals with practical issues of communication about health and healing in South Africa. It focuses on the Nguni language environment (Zulu/Xhosa/Swati/Ndebele) but also addresses some issues relating to other South African languages. The course offers an introduction to Zulu language in the context of health, and to social and cultural issues surrounding the origins of suffering, the articulation of symptoms, and the role of the family, traditional healers, and western medical practitioners. Particular attention is given to HIV/AIDS in the community and to the status and attitudes of young people.

AFST 630b^U, Language Planning in Sub-Saharan Africa. Kiarie Wa’Njogu.

W 12.30–2.20

Examination of language policies in selected countries of sub-Saharan Africa. Analysis of language use in a variety of contexts. Assessment of the impact of globalization on African languages.

AFST 634a^U, Anthropology of the Postcolonial State. Eric Worby.

Th 1.30–3.20

Ethnographic and interpretive approaches to the postcolonial state and the forms of public culture to which it gives rise. Topics include the formation of state structures and citizen subjects; nationalism in relation to discourses of gender, race, marginality, and modernity; corruption and moral discourse in the public sphere; ritual and aesthetic dimensions of rule and resistance; tensions between popular, civic, and global culture. *Also ANTH 634a.*

AFST 650, Second Year in an African Language.

By arrangement with faculty. After AFST 599.

AFST 660, Third Year in an African Language.

By arrangement with faculty. After AFST 650.

AFST 670, Fourth Year in an African Language.

By arrangement with faculty.

AFST 759a, Issues in the Analysis of African Politics. William Foltz.

W 1.30–3.20

Subjects to be discussed include the influence of precolonial systems and colonial rule on contemporary politics; states and statelessness; the politics of economic performance; communal conflict; attempts at regional and subregional unity. *Also PLSC 759a.*

AFST 764a^U, Africa and the Disciplines. William Foltz.

T 1.30–3.20

An exploration of how the different academic disciplines reconceptualize the study of Africa and the ways in which the disciplines draw on each others’ techniques and results in the process. *Also PLSC 784a^U.*

AFST 783b, International Development in Historical Perspective.**Michael Mahoney.**

M 3.30–5.20

The history of economic development, mainly since 1945, with a focus on Latin America, Asia, and especially Africa. Survey of this history from the colonial civilizing mission to current state-market-civil society debates. Evaluation of conflicts over economic globalization. *Also HIST 983b.*

AFST 820b^U, Cultural Approaches to Education in Africa. Kana Dower.

W 2.30–4.20

Examination of schooling in Africa, using case studies of evangelical education, African education during the colonial era, and contemporary schools. Principal focus is historical and cultural, viewing schooling as a window on social change. Reading materials include ethnography, historical documents, fiction, and autobiography.

AFST 839a, Environmental History of Africa. Robert Harms.

W 1.30–3.20

An examination of the interaction between people and their environments in Africa, and the ways in which this interaction has affected or shaped the course of African history. *Also HIST 839a.*

AFST 845a, An Introduction to the Professional Study of Modern African History.**Michael Mahoney.**

M 1.30–3.20

A survey of key debates and readings in colonial and postcolonial African history, including South Africa. Themes include the state, gender, ideology, religion, peasantries, and urbanization. *Also HIST 845a.*

AFST 847a, African-Caribbean Connections in French. Christopher L. Miller.

Th 10.30–12.20

The intertwined literary and cultural relations between Africa and the Caribbean, as made possible by the slave trade and French colonialism. Focus on changing models of linkage and exile, beginning with nineteenth-century experiments, continuing with: early twentieth-century movements in Haiti and in France; two versions of Negritude; social realism; independence; “creoleness.” Authors include Maran, Senghor, Césaire, Roumain, Sembene, Glissant, Condé, Warner-Vieyra, Lopes. Reading knowledge of French required. *Also AFAM 847a, CPLT 947a, FREN 947a.*

AFST 859b, Colonizer and Colonized in Africa. Christopher L. Miller.

Th 10.30–12.20

The literature and film of the colonial encounter in French and British Africa, with attention to modes of interaction and representation. Early travel accounts and their impact on European philosophy and anthropology; the emergence of counterdiscourses. Theories of Lugard, Lyautey, Memmi, Fanon. Novels include *Heart of Darkness*, *Une Vie de boy*, *Things Fall Apart*, *L'Aventure ambiguë*, *La Noire de...*, *L'Etrange destin de Wangin*, *A Bend in the River*, *Nervous Conditions*. Films include *Zou-Zou*, *La Noire de...*, *Black and White in Color*, *Coup de Torchon*, *Chocolat*. Reading knowledge of French required. *Also AFAM 783b, CPLT 948b, FREN 759b.*

AFST 900a or b, Master's Thesis. Ann Biersteker and faculty.

Directed reading and research on a topic approved by the director of graduate studies and advised by a faculty member (by arrangement) with expertise or specialized competence in the chosen field. Readings and research are done in preparation for the required master's thesis.

AFST 951a or b, Directed Reading and Research. Ann Biersteker and faculty.

By arrangement with faculty.

SWAH 610a^U, Elementary Kiswahili I. Kiarie Wa'Njogu.

MTWThF 9.30–10.20

A beginning course with intensive training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken language and conversation. Credit only on completion of SWAH 620b.

SWAH 620b^U, Elementary Kiswahili II. Kiarie Wa'Njogu.

MTWThF 9.30–10.20

Continuation of SWAH 610a. Texts provide an introduction to the basic structure of Kiswahili and to the culture of the speakers of the language.

SWAH 630a^U, Intermediate Kiswahili I. Kiarie Wa'Njogu.

MTWThF 11.30–12.20

Further development of students' speaking, listening, reading, and writing skills. Prepares students for further work in literary, language, and cultural studies as well as for a functional use of Kiswahili. Study of structure and vocabulary is based on a variety of texts from traditional and popular culture. Emphasis on command of idiomatic usage and stylistic nuance. After SWAH 620b.

SWAH 640b^U, Intermediate Kiswahili II. Kiarie Wa’Njogu.

MTWThF 11.30–12.20

Continuation of SWAH 630a. After SWAH 630a.

SWAH 650a^U, Advanced Kiswahili I. Kiarie Wa’Njogu.

TTh 4–5.15

Development in fluency through readings and discussions on contemporary issues in Kiswahili. Introduction to literary criticism in Kiswahili. Materials include Kiswahili oral literature, prose, poetry, and plays, as well as texts drawn from popular and political culture. After SWAH 640b.

SWAH 660b^U, Advanced Kiswahili II. Kiarie Wa’Njogu.

TTh 4–5.15

Continuation of SWAH 650a. After SWAH 650a.

YORU 610a^U, Elementary Yorùbá I. Oluseye Adesola.

MTWThF 10.30–11.20

Training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken aspect, with special attention to unfamiliar consonantal sounds, nasal vowels, and tone, using isolated phrases, set conversational pieces, and simple dialogues. Multimedia materials provide audio practice and cultural information. Credit only on completion of YORU 620b.

YORU 620b^U, Elementary Yorùbá II. Oluseye Adesola.

MTWThF 10.30–11.20

Continuing practice in using and recognizing tone through dialogues. More emphasis is placed on simple cultural texts and role playing.

YORU 630a^U, Intermediate Yorùbá I. Oluseye Adesola.

MTWThF 12.30–1.20

Refinement of students’ speaking, listening, reading, and writing skills. More natural texts are provided to prepare students for work in literary, language, and cultural studies as well as for a functional use of Yorùbá. After YORU 620b.

YORU 640b^U, Intermediate Yorùbá II. Oluseye Adesola.

MTWThF 11.30–12.20

Students are exposed to more idiomatic use of the language in a variety of interactions, including occupational, social, religious, and educational. Cultural documents include literary and nonliterary texts. After YORU 630a.

YORU 650a^U, Advanced Yorùbá I. Oluseye Adesola.

3 HTBA

An advanced course intended to improve the students’ aural and reading comprehension as well as speaking and writing skills. Emphasis is on acquiring a command of idiomatic usage and stylistic nuance. Study materials include literary and nonliterary texts; social, political, and popular entertainment media such as video movies and recorded poems (*ewi*); and music. After YORU 640b.

YORU 660b^U, Advanced Yorùbá II. Oluseye Adesola.

3 HTBA

Continuing development of students’ aural and reading comprehension, and speaking and writing skills, with emphasis on idiomatic usage and stylistic nuance. Study materials are selected to reflect research interests of the students. After YORU 650a.

ZULU 610a^u, Elementary isiZulu I. Sandra Sanneh.

MTWTHF 11.30–12.20

A beginning course in conversational isiZulu, using Web-based materials filmed in South Africa. Emphasis on the sounds of the language, including clicks and tonal variation, and on the words and structures needed for initial social interaction. Brief dialogues concern everyday activities; aspects of contemporary Zulu culture are introduced through readings and documentaries in English. Credit only on completion of ZULU 620b.

ZULU 620b^u, Elementary isiZulu II. Sandra Sanneh.

MTWTHF 11.30–12.20

Introduction to the noun class and marker system of isiZulu; development of communication skills through dialogues and role play. Texts and songs are drawn from traditional and popular literature and songs. Students research daily life in selected areas of South Africa.

ZULU 630a^u, Intermediate isiZulu I. Sandra Sanneh.

MTWTHF 9.30–10.20

Development of basic fluency in speaking, listening, reading, and writing isiZulu, using Web-based materials filmed in South Africa. Students describe and narrate spoken and written paragraphs. Review of morphology; concentration on tense and aspect. Materials are drawn from contemporary popular culture, folklore, and mass media. After ZULU 620b.

ZULU 640b^u, Intermediate isiZulu II. Sandra Sanneh.

MTWTHF 9.30–10.20

Students read longer texts from popular media as well as myths and folktales. Prepares students for initial research involving interaction with speakers of isiZulu in South Africa, and for the study of oral and literary genres. After ZULU 630a.

ZULU 650a^u, Advanced isiZulu I. Sandra Sanneh.

3 HTBA

Development of fluency in using idioms, speaking about abstract concepts, and voicing preferences and opinions. Excerpts are drawn from oral genres, short stories, and dramas made for television. Introduction to other South African languages and to issues of standardization, dialect, and language attitude. After ZULU 640b.

ZULU 660b^u, Advanced isiZulu II. Sandra Sanneh.

3 HTBA

Readings may include short stories, a novel, praise poetry, historical texts, or contemporary political speeches, depending on student interests. Study of issues of language policy and use in contemporary South Africa; introduction to the Soweto dialect of isiZulu. Students are prepared for extended research in South Africa involving interviews with isiZulu speakers. After ZULU 650a.

AMERICAN STUDIES

230 Hall of Graduate Studies, 432.1186

M.A., M.Phil., Ph.D.

Chair

John Mack Faragher (230 HGS, 432.1186, john.faragher@yale.edu)

Director of Graduate Studies

Matthew Jacobson (230 HGS, 432.1186, matthew.jacobson@yale.edu)

Professors

Jean-Christophe Agnew, Jon Butler, Hazel Carby (*on leave* [Sp]), Edward Cooke, Jr., John Demos, Michael Denning (*on leave* [Sp]), Wai Chee Dimock (*on leave* [Sp]), Kathryn Dudley, John Mack Faragher, Glenda Gilmore, Dolores Hayden, Jonathan Holloway, Matthew Jacobson, Daniel Kevles, Joanne Meyerowitz, Charles Musser (*on leave*), Alexander Nemerov, Patricia Pessar (*Adjunct*), Stephen Pitti (*on leave* [F]), Michael Roemer (*Adjunct*), Stephen Skowronek, Robert Stepto, Harry Stout, John Szwed, John Harley Warner, Laura Wexler

Associate Professor

Amy Hungerford

Assistant Professors

Jennifer Baszile, Elizabeth Dillon, Seth Fein (*on leave*), Jill Lane (*on leave* [F]), Mary Lui, Sanda Lwin (*on leave*), Diana Paulin (*on leave* [F]), Alicia Schmidt Camacho, Steven Stoll, Kariann Yokota

Lecturers

Wes Davis, David Musto

Fields of Study

Fields include American literature, history, the arts and material culture, philosophy, cultural theory, and the social sciences.

Special Admissions Requirement

A writing sample of reasonable length is required with the application.

Special Requirements for the Ph.D. Degree

During the first two years of study students are required to take twelve term courses; at least two of these each year must be in American Studies. The student's program will be decided in consultation with the adviser and the director of graduate studies. In each of the two years, the student should take at least one seminar devoted to research or requiring a substantial original paper, and must achieve two grades of Honors, with an average overall of High Pass. Students will be required to show proficiency in a language other than English by conducting research in that language as a component of one of the courses taken during the first two years. Students should schedule the oral qualifying

examinations in four fields, in the fifth term of study. Preparation, submission, and approval of the dissertation prospectus should be completed by the end of the sixth term, with a final deadline at the end of the seventh term with permission. Students are admitted to candidacy for the Ph.D. at the end of the third year, upon completion of all predissertation requirements, including the prospectus. Students in American Studies teach in the third and fourth years of study.

Combined Ph.D. Programs

AMERICAN STUDIES AND AFRICAN AMERICAN STUDIES

The American Studies Program also offers, in conjunction with the Department of African American Studies, a combined Ph.D. in American Studies and African American Studies. This combined degree is most appropriate for students who intend to concentrate in and write a dissertation on any aspect of African American history, literature, or culture in the United States and other parts of the Americas. For further details, see African American Studies.

AMERICAN STUDIES AND FILM STUDIES

The Department of American Studies also offers, in conjunction with the Program in Film Studies, a joint Ph.D. in American Studies and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film Studies and to American Studies. All documentation within the application should include this information.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the Ph.D.). The M.A. is granted upon the completion of six term courses (two grades must be Honors and the other four grades must average High Pass), and the successful completion of the language requirement. It can be petitioned for in the term following completion of the requirements.

Master's Degree Program. The basic requirements for this terminal degree are six term courses, including a special writing project, and the successful completion of the language examination. The project involves the submission of substantial written work either in conjunction with one course or as a tutorial that substitutes for one course. Students must earn a grade of Honors in two of their courses and an average grade of High Pass in the others.

For further information, see the American Studies Web site: www.yale.edu/amstud.

Courses

AMST 600a, American Scholars. Michael Denning.

W 10.30–12.20

"What would we really know the meaning of? The meal in the firkin; the milk in the pan; the ballad in the street; the news of the boat; the glance of the eye; the form and the gait of the body... The literature of the poor, the feelings of the child, the philosophy of the street, the

meaning of household life, are the topics of the time.” — Ralph Waldo Emerson, “The American Scholar,” 1837

A half-century ago American studies was a movement; now it is an institution. But it remains an anomaly in the academy, with neither method nor discipline: a modest program — not a department — that immodestly claims the space between disciplines, beyond disciplines, and perhaps encompassing disciplines.

In the early days, American studies was imagined as a home for Emerson’s American scholar; these days Emerson’s scholar is apt to be eyed more skeptically. Nevertheless the “philosophy of the street” and the “meaning of household life” continue to be “the topics of the time,” and American studies remains an oddly Emersonian place for nurturing intellectuals.

To explore the various kinds of American scholars and American studies, the American Scholars colloquium meets weekly on Wednesday mornings. Each week, we ask a member of the American Studies faculty: What are the key works that shape your intellectual project? What works pose the crucial issues? What works engage “what [you] would . . . really know the meaning of”? Each speaks briefly and leads a discussion of the works chosen. First-year American Studies graduate students are expected to register for the colloquium and to attend regularly; other American Studies graduate students are welcome. There is no writing assignment, and students receive a credit for participating.

AMST 622a, Working Group on Globalization and Culture.

Michael Denning.

M 1.30–3.20

The Working Group on Globalization and Culture is a continuing collective research project, a cultural studies “laboratory,” that has been running since the fall of 2003. The group is made up of graduate students and faculty from several disciplines. The working group meets regularly to discuss common readings, to develop collective and individual research projects, and to present that research publicly. The general theme for the working group is globalization and culture, with three principal aspects: (1) the globalization of cultural industries and goods, and its consequences for patterns of everyday life as well as for forms of fiction, film, broadcasting, and music; (2) the trajectories of social movements and their relation to patterns of migration, the rise of global cities, the transformation of labor processes, and forms of ethnic, class, and gender conflict; (3) the emergence of and debates within transnational social and cultural theory. The specific focus, projects, and directions of the working group are determined by the interests, expertise, and ambitions of the members of the group, and change as its members change.

AMST 639a, Rethinking the African American Literary Canon. Elizabeth Alexander.

M 3.30–5.20

As we move into the twenty-first century, we now have behind us a serious body of literary criticism and theory on African American literature. This is a moment to consider, discuss, and perhaps revise some of the touchstones of the African American canon. We read works considered canonical along with the critical material surrounding them, studying these books in their historical contexts and finding new methods and contexts for reading them. This course assumes that students may have read many of these works but will reread with fresh eyes, moving toward original research and new propositions about these works as well as questions of tradition, doctrine, the idea of “genius” and “masterpiece,” and creative resistance. For a final project, students present a work not on the syllabus and argue for its necessity to African American literary study. Works include Frederick Douglass’s *Narrative, Incidents in the Life of a Slave Girl*, *The Collected Poems* of Paul Laurence Dunbar, *Cane*, *The Collected Poems* of Langston Hughes, *Their Eyes Were Watching God*, *The Collected Poems* of Gwendolyn Brooks, *Invisible Man*, *The Collected Poems* of Robert Hayden, *A Raisin in the Sun*, *Beloved*. Graduate seminar, also open to advanced undergraduates. *Also AFAM 748a^U*.

AMST 641a, African American Poets of the Modern Era. Robert Stepto.

T 1.30–3.20.

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic, and blues poems. Poets studied include Paul Laurence Dunbar, Langston Hughes, Sterling Brown, Gwendolyn Brooks, Margaret Walker, and Robert Hayden. The classes include sessions at Beinecke Library for the inspection and discussion of original editions, manuscripts, letters, and other archival materials. *Also AFAM 596a, ENGL 947a.*

AMST 643a, Theorizing the Racial Formation of the United States in the Early Twenty-First Century. Jonathan Holloway.

W 1.30–3.20

A designated core course for students in the joint Ph.D. program; also open to students in American Studies and History. The interdisciplinary seminar includes readings from the fields of critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AFAM 505a, HIST 772a.*

AMST 645a, Black Intellectuals of the Caribbean Diaspora. Hazel Carby.

M 1.30–3.20

This course examines work by writers of Caribbean descent from different regions of the transatlantic world. In response to contemporary interest in issues of globalization, the premise of the course is that in the world maps of these black intellectuals we can see the inter-twined and interdependent histories and relations of the Americas, Europe, and Africa. Thinking globally is not a new experience for black peoples and we need to understand the ways in which what we have come to understand and represent as “Caribbeanness” is a condition of movement. Literature is most frequently taught within the boundaries of a particular nation, but this course focuses on the work of writers who shape the Caribbean identities of their characters as traveling black subjects and refuse to restrain their fiction within the limits of any one national identity. We practice a new and global type of cognitive mapping as we read and explore the meanings of terms like black trans-nationalism, migrancy, globalization, and empire. Diasporic writing embraces and represents the geopolitical realities of the modern, modernizing, and postmodern worlds in which multiple racialized histories are inscribed on modern bodies. *Also AFAM 723a, CPLT 949a.*

AMST 651b, Intersections in American Literature. Robert Stepto.

T 1.30–3.20

This seminar studies key developments in American and African American prose literature when texts purported to be of different literary or cultural traditions intersect to form the full blossoming of that development. We discuss Indian captivity narratives, slave revolt narratives, female servant narratives, written folktales, passing novels, and modernist fiction. Careful attention is paid to texts that not only converse with each other but also bear a precursor-successor relationship. We are therefore more attentive than usual to how texts pair up for discussion. The course traverses from the nineteenth century to the twentieth through an extensive discussion of Twain’s *The Adventures of Huckleberry Finn* and Ellison’s *Invisible Man*. Prior to that, the authors studied include Mary Rowlandson, John Marrant, Herman Melville, Frederick Douglass, Charles Johnson, Harriett Jacobs, Hannah Cullwick, Joel Chandler Harris, and Charles Chesnutt. We also discuss Nella Larsen, F. Scott Fitzgerald, William Faulkner, and Toni Morrison. Admittedly, this could be (and is on some level) a “Race and American Literature” course; in this regard, influential studies such as Eric Sundquist’s *To Wake the Nations* have led to its design. But ideally we expect to push beyond that consideration in many discussions. Students are expected to complete a seminar-length essay (25 pages or so) and to participate in one or more presentation groups. Alternatives to the long paper (such as two shorter papers, etc.) can be considered, especially when they abet what students wish to get out of the course. *Also AFAM 595b.*

AMST 675b, Performativity. Diana Paulin.

Th 10.30–12.20

What does it mean to perform identity? The graduate seminar addresses this question through the study of theories of performance and performativity in order to come to a working definition of these terms and to apply this critical framework to multiple sites of cultural production (both historical and contemporary), including the stage, the page, the screen, the street, and the courtroom. Racial performance, because of its inextricable link with the body, serves as a point of entry to this study, since performativity and performance highlight both bodily conditions and discursive systems that construct and produce racial identity, simultaneously. We consider how race is performed in and through its intersection with other categories of identity, such as sexuality, gender, and nation. Along these lines, we evaluate how the lens of performance and performativity might aid in the process of critiquing, reconfiguring, and resisting restrictive formulations of race and identity, as well as generate space for more productive possibilities. Authors include Judith Butler, Rachel Lee, Anna Deveare Smith, Harry Elam, Jose Munoz, Sadiya Hartman, Joseph Roach, and Karen Shimakawa. *Also AFAM 747b.*

AMST 700a, Introduction to the Historiography of the United States.**John Mack Faragher.**

TTh 10.30–12.20

Readings and discussion of a scholarly work on U.S. history from the settlement era to the present. Members of the department faculty visit the class on a rotating basis. *Also HIST 700a.*

AMST 705b, Readings in Religion and American History, 1600–1990. Jon Butler.

M 9–11

This introductory graduate readings course assesses interrelations between religion and American society from 1600 to 1990. Concentration on religion's successes and failures in shaping American society from the Puritans to modern neoconservative fundamentalism. Readings in primary and secondary sources; development of bibliographical skills. *Also HIST 720b, RLST 705b.*

AMST 706a, Research in African American History to Emancipation.**Jennifer Baszile.**

Th 1.30–3.20

This research seminar explores the full range of African American experience through the era of Emancipation. The initial meetings examine central evidentiary and analytical challenges of research. The remainder of the course focuses on the conception, development, writing, and revision of article-length papers.

AMST 709b, Research in Twentieth-Century U.S. History. Glenda Gilmore.

T 10.30–12.20

Projects chosen from the post-Civil War period, with emphasis on twentieth-century social and political history, broadly defined. Research seminar. *Also AFAM 709b, HIST 736b.*

AMST 710b^U, Autobiography in America. Robert Stepto.

M 1.30–3.20

At least a dozen North American autobiographies are studied, mostly from the "American Renaissance" to the present. Discussion of various autobiographical forms and strategies as well as of various experiences of American selfhood and citizenship. Slave narratives, spiritual autobiographies, immigrant narratives, autobiographies of childhood or adolescence, relations between autobiography and class, region, or occupation. *Also AFAM 588b^U.*

AMST 714a, Readings in Twentieth-Century United States History.**Glenda Gilmore.**

Th 1.30–3.20

Recent trends in American political history from the 1800s, with an emphasis on the social analysis of mass politics and reform. *Also AFAM 706a, HIST 735a.*

AMST 722a, Research Seminar in Nineteenth-Century United States History.**David Blight.**

W 1.30–3.20

Students in any field of American history are welcome. Some class sessions focus on matters of craft: research techniques; styles of writing narrative and analysis; judging scholarly work; and philosophical dimensions of doing history in the early twenty-first century. Primary focus of the course is for each student to complete his or her own major research paper. *Also AFAM 757a, HIST 722a.*

AMST 731b, Methods and Practices in U.S. Cultural History. Matthew Jacobson.

M 1.30–3.20

This reading-intensive seminar examines the cultural turn in the discipline of history over the past several decades, and the rise of cultural history as a subfield in its own right. What precisely is meant by terms like “culture,” “subculture,” “dominant culture,” “cultures of resistance,” and “cultural hegemony”? And where do such concepts get us in our investigations of U.S. history? What is their explanatory power? Readings sample a wide range of methods and philosophical approaches within the field, arranged across a variety of periods and thematic topics: nationalism, consumption, empire, class formation and labor, radicalism, gender arrangements, cultural production, and genre. Students produce a significant historiographical essay by term’s end, either treating the literature on a given topic, or analyzing a particular cultural theorist (e.g., Gramsci, Hall, Spivak) and his/her influence on contemporary historiography. *Also AFAM 763b, HIST 780b.*

AMST 732b, Material Culture in Historical Research. Kariann Yokota.

W 10.30–12.20

The material objects people produce and consume provide rich texts for historical analysis. This seminar explores how the cultural meanings of objects have been analyzed and understood from various perspectives. Readings are interdisciplinary including works by historians, anthropologists, cultural theorists, sociologists, postcolonial scholars, writers, museum curators, and archaeologists. Topics of discussion include the role of material culture in the formation of national, ethnic, gender, and class identities. *Also HIST 783b.*

AMST 735a, An Introduction to American Material Culture. Edward Cooke, Jr.

W 1.30–3.20

The field of material culture has drawn from a number of different disciplines and scholarly traditions. Through readings and application of methodologies ranging from structuralism and semiotics to Marxist criticism and cultural studies, this seminar provides a solid foundation for the interpretation of artifacts. *Also ARCG 725a, HSAR 725a.*

AMST 746a, Ethnographic Writing and Representation. Kathryn Dudley.

W 1.30–3.20

This course examines the representational practices that inform the doing and making of ethnography, broadly construed as the depiction of social life in the past and present. We consider classic and contemporary approaches to ethnography as a literary form as well as explore precedents and possibilities in the visual and performing arts. *Also ANTH 593a.*

AMST 762b, Readings in Chicano/a History and the U.S.-Mexico Border Region.**Stephen Pitti.**

Th 1.30–3.20

Historical readings on Mexican Americans, on the U.S. Southwest, and on the Mexican North. Themes include gender, labor, migration, citizenship, community formation, transnationality, and politics. *Also HIST 762b.*

AMST 763b^u, The Anthropology of Sound. John Szwed.

T 1.30–3.20

The socially mediated nature of sound, and the cultural consequences of technologies of sound transmission, modification, and recording. Topics include the pre- and post-industrial soundscapes; audio ethnography; the art of noise; synesthesia; problems of originality and plagiarism (covers, sampling, mixing, machine music, etc.); world music; audio imperialism and terrorism; musical utopias; imaginary soundscapes. *Also ANTH 587b^u.*

AMST 770b, Research on Gender and Sexuality. Joanne Meyerowitz.

W 1.30–3.20

Students conduct research in primary sources and write original monographic essays on the history of gender and sexuality. Readings include key theoretical works as well as journal articles that might serve as models for student research projects. *Also HIST 770b, WGSS 750b.*

AMST 790a, Narrative and Other Histories. John Demos.

W 7–9 P.M.

An exploration through readings and discussion of the recent “literary turn” in historical scholarship. Reading include history, fiction, and some theory. *Also HIST 790a.*

AMST 795a, Market Cultures: Anthropological and Historical Approaches.**Jean-Christophe Agnew, Kathryn Dudley.**

W 1.30–3.20

What is the relationship between economic markets and cultural systems? How has this relationship changed over time? Drawing on a mix of theory and case studies, this seminar explores the answers to these and related questions as anthropologists, sociologists, and historians have ventured them in recent years. Students have the opportunity to compare approaches, but special attention is paid to the conversations that have developed across the disciplines. Readings focus on but are not confined to the United States. Subjects include exchange forms and commodity flows; labor regimes and their transformation; consumption, selfhood, and citizenship; race/ethnicity, gender, and economic inequality; ritual and community; risk and failure; the corporation and institutional logics. *Also ANTH 585a, HIST 795a.*

AMST 799b, The American Century, 1941–1961. Jean-Christophe Agnew.

Th 10.30–12.20

This seminar looks at recent work in the intellectual and cultural history of WWII and Cold War America — the years between the New Deal and the New Frontier. Secondary readings highlight current directions in historiography as well as the range of research opportunities available, while class assignments and discussions focus for the most part on the different ways one can teach the period and its documentary sources, including literature, film, music, and painting. The seminar aims to suggest the richness and coherence of this period as a subject for intellectual and cultural historians — especially for those wishing to pursue a research topic in this area — and as an occasion to explore the possibilities for interdisciplinary teaching. *Also HIST 799b.*

AMST 803b, Research in Early National America. Joanne Freeman.

T 1.30–3.20

A research seminar focused on the early national period of American history, broadly defined. Early weeks familiarize students with sources from the period and discuss research and writing strategies. Students produce a publishable article founded on primary materials. *Also HIST 703b.*

AMST 817b, From New American Cinema to Global Hollywood. Thomas Elsaesser.

T 11.30–1.20

This course looks at the various economic, cultural, and formalist arguments put forward in debate about American mainstream cinema between the late 1960s and the re-consolidation of Hollywood as the world's premier entertainment industry by the mid-1990s. Does this period, with slight modifications, prove the persistence of classical Hollywood, or do we have to posit a post-Fordist, post-classical Hollywood? What are the (multi-)cultural implications of Hollywood having become global? The course suggests several lines of argument and research-strategies, and also puts forward the idea of "parapractical" readings, as possibly more appropriate to an understanding of Hollywood genres and event movies than either close textual analysis or symptomatic readings. Films discussed range from *Five Easy Pieces*, *Chinatown*, *Apocalypse Now*, *Back to the Future* to *JFK*, *Forrest Gump*, *Schindler's List*, *Jurassic Park*, but may also include *Silence of the Lambs*, *Pulp Fiction*, *Memento*, *The Player*, *Fight Club*, *Mulholland Drive*, *Adaptation* and *Nurse Betty*. *Also FILM 861b.*

AMST 881b^U, The Cultural Grounding of Modern American Medicine.**John Harley Warner.**

M 1.30–3.20

An exploration of the shaping of American medical culture, especially during the late nineteenth and early twentieth centuries, focusing on the ways that healers' identities were constructed, perceived, and contested. Themes include the moral, social, political, technical, and epistemological grounding of orthodox and alternative professional authority; the fashioning of identities for the medical marketplace and more private constructions of self, with attention to gender, ethnicity, race, religion, and region; and medicine and modernity. *Also HIST 929b^U, HSHM 632b^U.*

AMST 882a^U, Biology and Society in the Twentieth Century. Daniel Kevles.

MW 11.30–12.20

A history of the interplay of modern biology, especially evolution, genetics, and molecular biology, and its social, economic, legal, and cultural context. Topics include eugenics and sterilization, the Scopes trial, contraception and abortion, the new reproductive technologies, medical genetics, the human genome project, and human cloning. *Also HIST 939a^U, HSHM 677a^U.*

AMST 914b, Built Environments and the Politics of Place. Dolores Hayden.

W 9.30–11.20

Call it the built environment, the vernacular, everyday architecture, everyday urbanism, or the cultural landscape — the material world of built and natural places is intricately bound up with social life. This is a seminar on American built environments of the nineteenth and twentieth centuries, emphasizing research methods in landscape history and urban history as well as narrative and visual strategies for interpreting spaces and places. In addition to publication, the role of scholarship as part of public history, preservation, urban design, and architectural design is discussed. A research paper of approximately 20–30 pages is required. Enrollment is limited to twelve. *Also ARCH 914b.*

AMST 918a^U, American Cultural Landscapes: An Introduction to the History of the Built Environment in the United States. Dolores Hayden.

MTW 10.30–11.20, section T 5–6

This lecture course deals with the cultural landscape from 1800 to the present, surveying the economic, political, social, and aesthetic choices behind the creation of built environments in the United States. This cultural landscape has evolved through decisions about the use of land and natural resources, the planning of towns, the development of transportation and infrastructure, and the promotion of various building types and architectural styles. After a brief review of Native American and colonial settlement patterns, the first part of the course deals with traditional towns and large cities between 1800 and 1920. The second part deals with the peripheral growth from 1920 to 2000 that has transformed downtowns and shaped diffuse metropolitan regions. Weekly writing assignments and one term paper. Two lectures and one discussion section per week; Professor Hayden teaches the graduate section. *Also ARCH 912a.*

AMST 921a^U, Ralph Ellison in Context. Robert Stepto.

W 1.30–3.20

This seminar pursues close readings of Ralph Ellison's essays, short fiction, and novels, *Invisible Man* and *Juneteenth*. The "in context" component of the seminar involves working from the Benston and Sundquist volumes on Ellison to discern a portrait of the modernist African America Ellison investigated, with at least Richard Wright, James Baldwin, and Romare Bearden also in view. The texts include Ellison, *The Collected Essays, Flying Home and Other Stories, Invisible Man*, and *Juneteenth*; K. Benston, *Speaking for You*; E. Sundquist, *Cultural Contexts for Ralph Ellison's Invisible Man*; A. Nadel, *Invisible Criticism: Ralph Ellison and the American Canon*. *Also AFAM 563a^U.*

AMST 922b, Gender, Territory, and Space. Dolores Hayden.

W 9.30–11.20

The seminar explores gender and territory as they affect women's and men's everyday experiences of built environments and the city. We consider how gender (along with race, class, age, and sexual orientation) affects the design and use of a range of spaces from the most private to the most public. The main focus is on the United States from the late nineteenth century to the present, but we also look at other countries for examples of built projects fostering full citizenship and integration into urban life, or for practices of spatial segregation that deny basic civil rights. Readings are drawn from architecture, history, gender studies, and geography, and include Ryan, *Women in Public*; Hayden, *Redesigning the American Dream*; Forsyth on Noho (lesbian and gay gentrification); Rothschild, ed., *Design and Feminism: Re-Visioning Spaces, Places, and Everyday Things*; and Rendell, ed., *Gender, Space, Architecture*. Participants develop papers. *Also ARCH 922b.*

AMST 923a, Suburbs and the Culture of Sprawl. Dolores Hayden.

T 1.30–3.20

In 2000, more Americans lived in suburbs than rural areas and central cities combined. The seminar explores the changing meanings of "city" and "suburb" in the American metropolitan landscape before considering definitions of sprawl. Examining architecture and land use, we survey seven suburban configurations: the "borderlands" of the 1820s, the picturesque enclaves of the 1840s, the dense streetcar suburbs of the late nineteenth century, the mail-order house boom of the 1920s, the mass-produced bedroom communities of the 1950s, the mall-centered "edge cities" along highways, and the rural fringes of the 1980s and 1990s. A research paper of approximately 20–30 pages is required. Enrollment is limited to twelve. *Also ARCH 925a.*

AMST 925a, American Literature and World Religions. Wai Chee Dimock.

TH 10.30–12.20

What is the relation between American literature and world culture? How important are cross-time translations, and what does it mean for Emerson, Thoreau, Margaret Fuller, Ezra Pound, Robert Lowell, and W.S. Merwin to be practitioners in this genre? How important are global roots to authors such as Maxine Hong Kingston, Toni Morrison, and Leslie Silko? This course explores “globalism” as the broadest possible frame for American literature, bringing together authors across centuries, across racial divisions, and across the customary division between poetry and prose. *Also CPLT 529a, ENGL 925a.*

ANTHROPOLOGY

51 Hillhouse, Rm 2A, 432.3665

M.A., M.Phil., Ph.D.

Chair

Andrew Hill

Director of Graduate Studies

Kathryn Dudley (Rm 3, 158 Whitney Avenue, 432.6083)

Professors

Richard Burger, Michael Dove (*Forestry & Environmental Studies*), Kathryn Dudley, J. Joseph Errington, Thomas Blom Hansen, Andrew Hill, Frank Hole, William Kelly, Enrique Mayer, Patricia Pessar (*Adjunct, American Studies*), Harold Scheffler, James Scott (*Political Science*), Helen Siu, John Szwed, David Watts, Harvey Weiss (*Near Eastern Languages & Civilizations*), Karl Zimmerer

Associate Professors

Richard Bribiescas, M. Kamari Clarke, David Graeber, Nora Groce (*Adjunct, Epidemiology & Public Health*), Linda-Anne Rebhun, Eric Worby

Assistant Professors

J. Bernard Bate, Marcello Canuto, Karen Nakamura, Eric Sargis, Thomas Tartaron

Lecturers

Stephanie Anestis, Elayaperumal Annamalai, Veronique Benei, Carol Carpenter (*Forestry & Environmental Studies*), Saroja Dorairajoo, Mazyar Lotfalian, Dhooleka Raj, Robert Rosenswig

Fields of Study

The department has four subfields. Archaeology focuses on ritual complexes and writing, ceramic analysis, warfare, ancient civilizations, origins of agriculture, and museum studies. Sociocultural anthropology provides a range of courses: classics in ethnography and social theory, religion, myth and ritual, kinship and descent, historical anthropology, culture and political economy, agrarian studies, ecology, environment and social change, medical anthropology, emotions, public health, sexual meanings and gender, postcolonial development, ethnicity, identity politics and diaspora, urban anthropology, global mass culture, and alternate modernity. Linguistic anthropology includes language, nationalism, and ideology, structuralism and semiotics, feminist discourse. Physical anthropology focuses on paleoanthropology, evolutionary theory, human functional anatomy, race and human biological diversity, primate ecology. There is strong geographical coverage in Africa, the Caribbean, East Asia (China and Japan), Latin America and South America, Southeast Asia (Indonesia), South Asia and the Indian Ocean, the Near East, Europe, and the United States.

Special Requirements for the Ph.D. Degree

Although there are a few required courses or seminars for each subfield, more than three-fourths of a student's program consists of electives, including course work in other departments. Admission to candidacy requires: (1) completion of two years of course work (sixteen term courses); (2) independent study and research; (3) satisfactory performance on qualifying examinations; and (4) a dissertation research proposal submitted and approved before the end of the third year. Qualifying examinations, normally taken at the end of the second year, consist of eight hours written (four hours on one of the subfields, four hours on the student's special interest), and two hours oral. Dissertations are normally based on field or laboratory research.

Combined Ph.D. Programs

The Anthropology department also offers a combined Ph.D. in Anthropology and Forestry & Environmental Studies in conjunction with the School of Forestry & Environmental Studies, and a combined Ph.D. in Anthropology and African American Studies in conjunction with the Department of African American Studies. These combined programs are ideal for students who intend to concentrate in, and to write dissertations on, thematic and theoretical issues centrally concerned with anthropology and one of these other areas of study. Students in the combined degree programs will be subject to the combined supervision of faculty members in the Anthropology department and in the respective department or school.

Admission into the combined degree program in Anthropology and African American Studies is based on mutual agreement between these two departments. Individual students will develop courses of study in consultation with their academic advisers and with the directors of graduate study for both departments. Students in the program must take core courses in Anthropology and in African American Studies, plus related courses in both departments approved by their advisory committees. In addition, they must successfully complete the African American Studies third-year Research Workshop. Oral and written qualifying examinations must include two topics in the field of African American Studies and two topics in Anthropology. The examination committee must include at least one faculty member from each department. The dissertation prospectus must be submitted to the directors of graduate study of both departments and approved by the faculty of both. The thesis readers committee must also include at least one faculty member from each department, and the faculties of both departments must approve its composition.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. Applications for a terminal master's degree are not accepted. This degree is granted to students not continuing in the Ph.D. program. The student must complete eight graduate-level term courses approved for credit in the Anthropology department and maintain an average grade of High Pass.

Program materials are available upon request to the Director of Graduate Studies, Department of Anthropology, Yale University, PO Box 208277, New Haven CT 06520-8277; 203.432.3665; e-mail, anthropology@yale.edu; Web site, www.yale.edu/anthropology.

Courses

ANTH 500a, Seminar in Social and Cultural Anthropology. Harold Scheffler.

W 10–12

The major theoretical orientations in social and cultural anthropology (especially in the United States and Europe), their historical development and importance, their relation to one another and to other disciplines.

ANTH 500b, Seminar in Sociocultural Anthropology. Thomas Blom Hansen.

T 9–12

This seminar continues the themes of ANTH 500, with special emphasis on the characteristics of anthropology as a discipline and as a profession and on the historical trajectory of sociocultural anthropology from the late nineteenth century to the 1970s. The seminar is reserved for first-year doctoral students in Anthropology, and students are presumed to have taken ANTH 500 in the fall.

ANTH 501b, Field Methods and Research Design. Karen Nakamura.

M 9.30–11.20

The course offers critical evaluation of the nature of ethnographic research. Research design includes the rethinking of site, voice, and ethnographic authority.

ANTH 505b, Kinship, Descent, and Alliance. Harold Scheffler.

F 1.30–3.20

The role of kinship in the organization of social life, with emphasis on tribal societies. Topics include regulation of sexual behavior and marriage, varieties of group organization, modes of kin classification and their social significance, and so on.

ANTH 513a, Language, Culture, and Ideology. J. Joseph Errington.

W 1.30–3.20

Influential anthropological theories of culture are reviewed with critical reference to theories of language that inspired or informed them. Topics include American and European structuralism, cognitivist and interpretivist approaches to cultural description, work of Bakhtin, Bourdieu, and various “critical theorists.”

ANTH 515a, Culture, History, Power, and Representation. Helen Siu.

T 1.30–3.20

This seminar is a critical introduction to anthropological formulations of the junctures of meaning, interest, and power. Readings include classical and contemporary ethnographies that are theoretically informed and historically situated.

ANTH 532b, Direct Action and Radical Social Theory. David Graeber.

W 10–11.15

This course is meant to explore some of the recent directions of radical social theory within, and around, the emergence of the globalization movement and the politics of direct action. The course begins with a famous example of direct action, the shut-down of Seattle meetings of the WTO in November 1999, and examines some of the history of the ideas (anarchism, direct action, direct democracy, primitivism) which inspired it. It then proceeds to trace the influences of Situationism and related branches of revolutionary theory on the present, and ends with a series of particular case studies from the current “global uprising” that provide revealing conjunctures of new theory and radical practice.

ANTH 533a, Bilingualism in Social Context. J. Joseph Errington.

T 1.30–3.20

The linguistic phenomenon of bilingualism is presented through broad issues in social description inseparably linked to it: growth and change in bilingual communities, bilingual usage, social identity, and allegiance; interactional significances of bilingual speech repertoire use.

ANTH 536a, Classics in Ethnography. William Kelly.

M 1.30–3.20

This seminar analyzes some eight or ten of the most important ethnographic monographs or series of monographs in social and cultural anthropology of the past fifty years, in order to understand some of the main problems in the historical development of the discipline and the methods used to resolve them.

ANTH 541a, Agrarian Societies: Culture, Society, History, and Development.

Michael Dove, Linda-Anne Rebhun, James Scott, Steven Stoll.

M 1.30–5.20

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from anthropology, economics, history, political science, and environmental studies are used to develop a meaning-centered and historically grounded account of the transformations of rural society. Team-taught. *Also F&ES 753a, HIST 965a, PLSC 779a.*

ANTH 548b, Gender and Media in India. J. Bernard Bate.

T 1.30–3.20

Examination of narratives of gender in India. Folkloristic and anthropological approaches to gendered performance in story, song, and theater. Recent feminist examinations of television, film, advertising, and literature. Topics include classical epic (*Ramayana, Shilapathigaram*).

ANTH 551a, Improvisation. John Szwed.

Th 1.30–3.20

Beginning with examples from music, dance, ritual, theater, film, literature, and the arts, this seminar draws on social theory, ethnography, linguistics, computer science, aesthetics, and philosophy to explore the meanings and cultural limitations of improvisation. *Also AFAM 637a.*

ANTH 562a, Topics in Chinese Anthropology and History. Helen Siu.

W 1.30–3.20

The seminar explores the Chinese identity as it has been reworked over the centuries. It familiarizes students with major works in Chinese anthropology and their intellectual connections with general anthropology and historical studies. Topics include kinship and marriage, marketing systems, rituals and popular religion, ethnicity and state making, and the cultural nexus of power.

ANTH 565b, The South Asian Diaspora. Dhooleka Raj.

T 1.30–3.20

Exploration of the South Asian diaspora, focusing on history, ethnography, and contemporary cultural change. Topics include definitions of South Asian diaspora, understandings of culture and cultural change, and the relationship between identity and diaspora.

ANTH 569a, Economic Anthropology. Enrique Mayer.

Th 1.30–3.20

An introduction to understanding economic systems in other cultures and societies. How work and leisure are organized, who gets what and how, and how economic concerns tie into other aspects of social life. Major debates and controversies are examined, and examples from different parts of the world are presented. No prior training in economics or anthropology necessary.

ANTH 570b, Language, Politics, and Society in Colonial India.**Elayaperumal Annamalai.**

Th 1.30–3.20

Study of British colonial politics and society in India and of the changes they effected within and between languages. Topics include the use and status of languages in society, the role of languages in politics, elite formation, creation of knowledge systems, rivalry between ethnic communities, and the reformulation of ethnic and political boundaries and of ethnic identities.

ANTH 575b, Urban Anthropology and Global History. Helen Siu.

W 1.30–3.20

Urbanization processes in different historical times and places. Using a combination of literary works, historical narratives, and ethnographies, this seminar analyzes how migrants and urbanites with their unique cultural histories confront changes in the macropolitical economies that encapsulate them. The seminar focuses on the nature of migration, adaptive strategies, ethnicity, and political symbolism, the myth of marginality, the language of class, and culture conflict.

ANTH 576b, Anthropology of the Object. Eric Worby.

TTh 2.30–3.35

An exploration of the culturally variable means through which value and significance are attributed to objects. Topics for discussion include gift-giving and commodity exchange; the classification collection, and display of art and artifacts; the gendered and racialized body as object for self and other; advertising, consumption, and commodity fetishism; concepts of property; the politics of value.

ANTH 581a, Society and Environment: Introduction to Theory and Method.**Michael Dove.**

Th 2.30–5.20

Critical issues in the analysis of relations between society and environment. Topics include: (1) the identification of environmental “problems” focusing on the rationale of development intervention and failure, and the study of environmental discourse; (2) conceptual boundaries in resource-use systems and in conceptions of nature and culture; (3) conceptual boundaries in environmental relations between center and periphery and between the local and the global; (4) the sociology of science of environmental relations, encompassing views of indigenous knowledge, objective distance, scientific “forgetfulness,” and relations between the natural and social sciences; and (5) the implications of the foregoing for current critiques of science. *Also F&ES 747a.*

ANTH 585a, Market Cultures: Anthropological and Historical Approaches.**Jean-Christophe Agnew, Kathryn Dudley.**

W 1.30–3.20

What is the relationship between economic markets and cultural systems? How has this relationship changed over time? Drawing on a mix of theory and case studies, this seminar explores the answers to these and related questions as anthropologists, sociologists, and historians have ventured them in recent years. Students have the opportunity to compare approaches, but special attention is paid to the conversations that have developed across the disciplines. Readings focus on but are not confined to the United States. Subjects include exchange forms and commodity flows; labor regimes and their transformation; consumption, selfhood, and citizenship; race/ethnicity, gender, and economic inequality; ritual and community; risk and failure; the corporation and institutional logics. *Also AMST 795a, HIST 795a.*

ANTH 587b^U, The Anthropology of Sound. John Szwed.

T 1.30–3.20

The socially mediated nature of sound, and the cultural consequences of technologies of sound transmission, modification, and recording. Topics include the pre- and postindustrial soundscapes; audio ethnography; the art of noise; synesthesia; problems of originality and plagiarism (covers, sampling, mixing, machine music, etc.); world music; audio imperialism and terrorism; musical utopias; imaginary soundscapes. *Also AMST 763b^U.*

ANTH 592a, Anthropology and Classical Social Theory. David Graeber.

W 3.30–5.20

The course is meant not only to introduce anthropology students to the founding works of Western social theory – the big names like Marx, Weber, and Durkheim – but also to place these authors in the context of the Western intellectual and cultural tradition from which they emerged and to discuss their ongoing relevance to anthropological thought. A central goal of the seminar is to identify ways of disarticulating the production of gender by examining how these roles are both naturalized and disrupted in local and global spheres.

ANTH 593a, Ethnographic Writing and Representation. Kathryn Dudley.

W 1.30–3.20

This course examines the representational practices that inform the doing and making of ethnography, broadly construed as the depiction of social life in the past and present. We consider classic and contemporary approaches to ethnography as a literary form as well as explore precedents and possibilities in the visual and performing arts. *Also AMST 746a.*

ANTH 626b, Anthropological Perspectives on Gender and Health.

Linda-Anne Rebhun.

W 1.30–3.20

Examines how issues of gender articulate with health as examined by anthropologists. Topics include women's health (reproductive issues, STDs, sexual violence, genital surgery, etc.), men's health (especially alcohol and drug use, STDs, violence, occupational issues), and issues of sexual identity, with a special emphasis on political, economic, and cultural aspects of gender and health. In addition, we look at moral/political issues like abortion and new reproductive technologies from an anthropological perspective.

ANTH 632b, Politics of Language. J. Joseph Errington.

M 1.30–3.20

This course centers on aspects of language difference and inequality as often neglected but crucial shapers of the political dynamics and social change in plural societies. The first part of the course involves broad comparative and theoretical approaches to the politics of sociolinguistic difference. The second part is devoted to case studies which foreground specific issues: "problems" of substandard languages, bilingual identities, globalization and language shift, language death, and others.

ANTH 634a, Anthropology of the Postcolonial State. Eric Worby.

Th 1.30–3.20

Ethnographic and interpretive approaches to the postcolonial state and the forms of public culture to which it gives rise. Topics include the formation of state structures and citizen subjects; nationalism in relation to discourse in the public sphere; ritual and aesthetic dimensions of rule and resistance; tensions among popular, civic, and global culture. *Also AFST 634a^U.*

ANTH 681a^U, Introduction to Jazz Studies. John Szwed.

T 1.30–3.20

An overview of the music and its cultural history, with consideration of the influences of jazz on the visual arts, dance, literature, and film; an introduction to the scholarship and methods of jazz studies. *Also AFAM 557a^U.*

ANTH 701a^U, Foundations of Modern Archaeology. Richard Burger.

TTH 1–2.15

Discusses how method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. This course assumes a background in the basics of archaeology equivalent to one of the introductory courses. *Also ARCG 701a^U.*

ANTH 705Lb^U, Archaeology Laboratory II. Thomas Tartaron.

W 1–4

Practical experience in preparation, analysis, and interpretation of artifacts and nonartificial archaeological data. Students undertake term projects. *Also ARCG 705Lb^U.*

ANTH 724a^U, Archaeology of the Minoan and Mycenaean Worlds.**Thomas Tartaron.**

MW 1–2.15

The Minoan and Mycenaean civilizations flourished in the Aegean Sea region (modern Greece) in the Bronze Age (3000–1000 B.C.). Archaeology is in a unique position to recover the lives and monuments of these prehistoric people. This course provides a comprehensive introduction to the archaeology of the Minoan and Mycenaean worlds. *Also ARCG 724a^U.*

ANTH 732a^U and 733La^U, Archaeological Field Techniques and Archaeology Lab I.**Thomas Tartaron.**

MW 9–10.15, Lab SA 9–5

An introduction to the practice and techniques of modern archaeology, including methods of excavation, recording, mapping, dating, and ecological analysis. The lab offers instruction in the field at an archaeological site in Connecticut in stratigraphy, mapping, artifact recovery, and excavation strategy. The courses must be taken concurrently and are counted together as 1 credit. *Also ARCG 732a^U and 733La^U.*

ANTH 748b^U, Contemporary Archaeological Theory. Richard Burger.

M 1.30–3.20

This seminar explores contemporary theory in all of its diversity. The course examines multiple critiques of New Archaeology and its remaining legacy; the diversity of competing approaches, sometimes called post-processualist, currently employed in the U.S. and the United Kingdom, including critical archaeology, the archaeology of gender, structuralist approaches, various Marxist and neo-Marxist formulations of archaeological theory, and applications of evolutionary theory; as well as the differing trajectory of approaches outside the English-speaking world. *Also ARCG 748b^U.*

ANTH 755b^U, Inca Culture and Society. Richard Burger.

MW 9–10.15

This course explores the history and organization of the Inca empire and its impact on the nations and cultures conquered by it. The role of archaeology in understanding the transformation of Andean lifeways is explored, as is the interplay between ethnohistoric and archaeological approaches to the subject. *Also ARCG 755b^U.*

ANTH 758a^U, Chavin and the Origins of Peruvian Civilization. Richard Burger.

T 9.30–11.20

The development of early complex society in Peru during the Early Horizon is examined along with its antecedents during the Preceramic and Initial periods. This seminar focuses on the problems of elucidating the sociopolitical organization of these societies and the factors responsible for their transformation. General theories of the origins of complex society are critically reviewed in light of the Peruvian case. *Also ARCG 758a^U.*

ANTH 761a^U, Analysis of Archaeological Ceramics. Robert Rosenswig.

TH 1.30–3.20

This course covers theoretical and practical approaches used to generate cultural information from ceramics recovered in archaeological contexts. Students are exposed to the ways in which ceramic data aid in establishing chronology, provide functional and stylistic information, as well as reconstruct production, distribution, and consumption patterns for prehistoric cultures. *Also ARCG 761a^U.*

ANTH 762b^U, Remote Sensing: Observing the Earth from Space. Ronald Smith and staff.

TRH 9–10.15

Topics include the spectrum of electromagnetic radiation; satellite-borne radiometers; data transmission and storage; computer image analysis; and GIS analysis of satellite imagery with applications to weather and climate, oceanography, surficial geology, snow and ice, forestry, agriculture, and watershed management. *ARCG 762b^U, F&ES 506b, G&G 562b^U.*

ANTH 763a^U, Archaeologies of Empire. Harvey Weiss.

TH 2.30–4.20

Comparative study of origins, structures, efficiencies, and limitations of imperialism, ancient and modern, in the Old and New World, from Akkad to “Indochine,” and from Wari to Aztec. The contrast between ancient and modern imperialisms examined from the perspectives of nineteenth- and twentieth-century archaeology and political economy. *Also ARCG 763a^U.*

ANTH 768a^U, The Rise of Civilization in Mesoamerica. Robert Rosenswig.

MW 9–10.15

This course provides a survey of the archaeological cultures of southern Mexico, Guatemala, Belize, and northern Honduras from the earliest inhabitants of the region through the emergence of the first states. Theoretical issues covered include the development of agriculture, the transition to sedentary villages as well as the origins of sociopolitical complexity and the first states in the region. *Also ARCG 768a^U.*

ANTH 773b^U, Civilizations and Collapse. Harvey Weiss.

TH 2.30–4.20

Collapse documented in the archaeological and early historical records of the Old and New Worlds, including Mesopotamia, Mesoamerica, the Andes, and Europe. Analysis of politico-economic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict. *Also ARCG 773b^U, NELC 588b^U.*

ANTH 806b, Research Methods in Biological Anthropology. Eric Sargis.

T 1.30–3.20

This seminar introduces students to methods and approaches for developing and carrying out research projects in biological anthropology. Each student develops a project, writes and presents a proposal of the project, and presents the results in both oral and written form. Discussion topics include the distinctions between inductive and predictive science, integrity in science, research design, data collection methods, communicating in science, and an introduction to biostatistical analysis. Focus is on how scientific research projects are successfully presented and communicated.

ANTH 851a, Topics and Issues in Evolutionary Theory. Eric Sargis, David Watts.

T 1.30–3.20

Focus on current literature in theoretical evolutionary biology, intended to give new graduate students intensive training in critical analysis of theoretical models and in scientific writing.

ANTH 856a, Reconstructing Human Evolution: An Ecological Approach.**Andrew Hill.**

TH 1.30–3.20

If human evolutionary change has been determined or affected by ecological factors, such as changes in climate, competition with other animals, and availability and kinds of food supply, then it is important to determine ecological and environmental information about the regions and time period in which human evolution has occurred. Examination of methods for obtaining data relevant to such information, and for evaluating the techniques and results of such other fields as geology, paleobotany, and paleozoology. Ethnographic, primatological, and other biological models of early human behavior.

ANTH 864b, Human Osteology. Eric Sargis.

MW 1–2.15

ANTH 941a and b, Research Seminar in Japan Anthropology. William Kelly.

HTBA

This seminar offers professional preparation for doctoral students in Japan anthropology through systematic readings and analysis of the anthropological literature, in English and in Japanese. Permission of the instructor required.

ANTH 942a and b, Research Seminar in South Asia Anthropology.**Thomas Blom Hansen.**

HTBA

This ongoing research seminar explores critical texts in the anthropology and anthropography of South Asia. The seminar is designed for doctoral students specializing in some aspect of South Asia. Others with appropriate backgrounds and interests may be admitted in consultation with the instructor.

ANTH 951a, Directed Research in Ethnology and Social Anthropology.

By arrangement with faculty.

ANTH 951b, Directed Research in Ethnology and Social Anthropology.

By arrangement with faculty.

ANTH 952a, Directed Research in Linguistics.

By arrangement with faculty.

ANTH 952b, Directed Research in Linguistics.

By arrangement with faculty.

ANTH 953a, Directed Research in Archaeology and Prehistory.

By arrangement with faculty.

ANTH 953b, Directed Research in Archaeology and Prehistory.

By arrangement with faculty.

ANTH 954a, Directed Research in Physical Anthropology.

By arrangement with faculty.

ANTH 954b, Directed Research in Physical Anthropology.

By arrangement with faculty.

APPLIED MATHEMATICS

A. K. Watson Hall, 432.1278

M.S., M.Phil., Ph.D.

Chair and Director of Graduate Studies

Steven Zucker (AKW 107A, 432.1278, zucker@cs.yale.edu)

Professors

Andrew Barron (*Statistics*), Donald Brown (*Economics*), Joseph Chang (*Statistics*), Ronald Coifman (*Mathematics; Computer Science*), Gustave Davis (*Pathology*), Eric Denardo (*Operations Research*), Stanley Eisenstat (*Computer Science*), Michael Fischer (*Computer Science*), John Hartigan (*Statistics*), Roger Howe (*Mathematics*), Peter Jones (*Mathematics*), Ravindran Kannan (*Computer Science; Applied Mathematics*), Steven Orszag (*Mathematics; Applied Mathematics*), David Pollard (*Statistics*), Vladimir Rokhlin (*Computer Science; Mathematics*), Herbert Scarf (*Economics*), Martin Schultz (*Computer Science*), Mitchell Smooke (*Mechanical Engineering; Applied Physics*), Katepalli Sreenivasan (*Adjunct, Mechanical Engineering; Applied Physics*), Steven Zucker (*Computer Science; Biomedical Engineering*)

Associate Professor

James Aspnes (*Computer Science*)

Assistant Professors

John Emerson (*Statistics*), Hannes Leeb (*Statistics*), Mauro Maggioni, Sekhir Tatikonda (*Electrical Engineering*)

Gibbs Assistant Professors

Yoel Shkolnisky, Amit Singer, Mark Tygert

Fields of Study

The graduate program in Applied Mathematics comprises mathematics and its applications to a range of areas, to the mathematical sciences (including computer science and statistics), and to the other sciences and engineering. Topics covered by the program include classical and modern applied harmonic analysis, linear and nonlinear partial differential equations, numerical analysis, scientific computing and applications, discrete algorithms, combinatorics and combinatorial optimization, graph algorithms, geometric algorithms, discrete mathematics and applications, statistical theory and applications, probability theory and applications, information theory, econometrics, financial mathematics, statistical computing, and applications of mathematical and computational techniques to computational biology, computational neuroscience, fluid mechanics, combustion, and other scientific and engineering problems.

Special Requirements for the Ph.D. Degree

All students are required to: (1) complete twelve term courses (including reading courses) at the graduate level, at least two with Honors grades; (2) pass a qualifying examination

on their general applied mathematical knowledge; (3) submit a dissertation prospectus; (4) participate in the instruction of undergraduates; (5) be in residence for at least three years; and (6) complete a dissertation that clearly advances understanding of the subject it considers. The normal time for completion of the Ph.D. program is four years. Requirement (1) normally includes four core courses in each of methods of applied analysis, numerical computation, algorithms, and probability; these should be taken during the first year. The qualifying examination is normally taken by the end of the second term and will test knowledge of the core courses as well as more specialized topics. The thesis is expected to be independent work, done under the guidance of an adviser. This adviser should be contacted not long after the student passes the qualifying examinations. A student is admitted to candidacy after completing requirements (1)–(5) and obtaining an adviser.

Master's Degrees

M. Phil. See Graduate School requirements, page 442.

M.S. (en route to the Ph.D.). The M.S. degree is a terminal degree and is not awarded en route to the Ph.D.

Master's Degree Program. Students may also be admitted to a terminal master's degree program directly. This program is normally completed in one year, but a part-time program may be spread over as many as four years. To qualify for the M.S., the student must pass eight graduate-level courses. Courses taken as part of the M.S. program must be pre-approved by the director of graduate studies to ensure that a suitable distribution of topics is covered.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see pages 438–39).

Program materials and additional information concerning degrees offered and admissions requirements are available upon request to the Graduate School of Arts and Sciences, Yale University, PO Box 208323, New Haven CT 06520-8323.

APPLIED PHYSICS

Dunham Laboratory, 432.4250
M.Eng., M.S., M.Phil., Ph.D.

Chair

Daniel Prober

Professors

Sean Barrett, William Bennett, Jr. (*Emeritus*), Richard Chang, Michel Devoret, Joseph Dillon, Jr. (*Adjunct*), Paul Fleury, Steven Girvin, Robert Grober, Victor Henrich, Arvid Herzenberg (*Emeritus*), Marshall Long, Tso-Ping Ma, Daniel Prober, Nicholas Read, Mark Reed, Robert Schoelkopf, Ramamurty Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*)

Associate Professor

Charles Ahn

Assistant Professors

Sohrab Ismail-Beigi, Janet Pan

FIELDS OF STUDY

Fields include areas of theoretical and experimental condensed-matter physics, optical and laser physics, and material physics. Specific programs include surface science, microlithography and quantum transport, optical properties of micro-cavities, spectroscopy at the nanoscale, near-field microscopy, atomic force microscopy and ferro-electronic materials, molecular beam epitaxy, mesoscopic physics, first principles electronic structure methods, and medical instrumentation.

For admissions and degree requirements, and for course listings, see Engineering and Applied Science.

ARCHAEOLOGICAL STUDIES

51 Hillhouse, 432.3772
M.A.

Chair and Director of Graduate Studies
Richard Burger (*Anthropology*)

Professors

Richard Burger (*Anthropology*), Edward Cooke, Jr. (*History of Art*), Robert Gordon (*Geology & Geophysics*), Andrew Hill (*Anthropology*), Diana Kleiner (*Classics*), Mary Miller (*History of Art*), Ronald Smith (*Geology & Geophysics*), Karl Turekian (*Geology & Geophysics*), Harvey Weiss (*Near Eastern Languages & Civilizations*)

Assistant Professors

Marcello Canuto (*Anthropology*), John Darnell (*Near Eastern Languages & Civilizations*), Björn Ewald (*Classics*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Thomas Tartaron (*Anthropology*)

Lecturers

Karen Foster (*Near Eastern Languages & Civilizations*), Robert Rosenswig

The aims of the program are to give students the academic background needed for careers in the conservation of archaeological resources, to prepare students to teach in community colleges and secondary schools, and to provide the opportunity for teachers, curators, and administrators to refresh themselves on recent developments in archaeology. The program is administered by Yale's Council on Archaeological Studies, with faculty from the departments of Anthropology, Classics, Geology & Geophysics, History of Art, and Near Eastern Languages & Civilizations.

Special Admissions Requirements

The GRE General Test; applicants need not have an archaeology background, but a strong grounding in the social sciences or history is recommended.

Special Requirements for the M.A. Degree

Courses are drawn from the graduate programs of the participating departments and from those undergraduate courses that are also open to graduate students. Eight courses are required. Unless previously taken for credit, these will include: Field Techniques; Great Discoveries in Archaeology, Genesis and Collapse of Old World Prehistory, Origins of Western Civilizations, or Foundations of Modern Archaeology; at least one laboratory course; a course related to archaeology in each of the following groups: Anthropology; Classics, History of Art, or Near Eastern Languages & Civilizations; Ecology & Evolutionary Biology, Forestry & Environmental Studies, or Geology & Geophysics; and two electives. In addition, each student will write a master's thesis. Degree candidates are required to pay a minimum of one year of full tuition. Full-time students can com-

plete the course requirements in one academic year, and all students are expected to complete the program within a maximum period of three academic years.

Program materials are available upon request to the Director of Graduate Studies, Archaeological Studies, Department of Anthropology, Yale University, PO Box 208277, New Haven CT 06520-8277; e-mail, anthropology@yale.edu; Web site, www.yale.edu/archaeology.

Courses

ARCG 701a^u, Foundations of Modern Archaeology. Richard Burger.

TRH 1–2.15

Discusses how method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. This course assumes a background in the basics of archaeology equivalent to one of the introductory courses. *Also ANTH 701a^u.*

ARCG 705Lb^u, Archaeology Laboratory II. Thomas Tartaron.

W 1–4

Practical experience in preparation, analysis, and interpretation of artifacts and nonartificial archaeological data. Students undertake term projects. *Also ANTH 705Lb^u.*

ARCG 724a^u, Archaeology of the Minoan and Mycenaean Worlds.

Thomas Tartaron.

MW 1–2.15

The Minoan and Mycenaean civilizations flourished in the Aegean Sea region (modern Greece) in the Bronze Age (3000–1000 B.C.). Archaeology is in a unique position to recover the lives and monuments of these prehistoric people. This course provides a comprehensive introduction to the archaeology of the Minoan and Mycenaean worlds. *Also ANTH 724a^u.*

ARCG 725a, An Introduction to American Material Culture. Edward Cooke, Jr.

W 1.30–3.20

The field of material culture has drawn from a number of different disciplines and scholarly traditions. Through readings and application of methodologies ranging from structuralism and semiotics to Marxist criticism and cultural studies, this seminar provides a solid foundation for the interpretation of artifacts. *Also AMST 735a, HSAR 725a.*

ARCG 732a^u and 733La^u, Archaeological Field Techniques and Archaeology Lab I.

Thomas Tartaron.

MW 4–5.15, Lab SA 9–5

An introduction to the practice and techniques of modern archaeology, including methods of excavation, recording, mapping, dating, and ecological analysis. The lab offers instruction in the field at an archaeological site in Connecticut in stratigraphy, mapping, artifact recovery, and excavation strategy. The courses must be taken concurrently and are counted together as one credit. *Also ANTH 732a^u and ANTH 733La^u.*

ARCG 748b^u, Contemporary Archaeological Theory. Richard Burger.

M 1.30–3.20

This seminar explores contemporary theory in all of its diversity. The course examines multiple critiques of New Archaeology and its remaining legacy; the diversity of competing approaches, sometimes called post-processualist, currently employed in the U.S. and the United Kingdom, including critical archaeology, the archaeology of gender, structuralist approaches, various Marxist and neo-Marxist formulations of archaeological theory, and

applications of evolutionary theory; as well as the differing trajectory of approaches outside the English-speaking world. *Also ANTH 748b^U*.

ARCG 755b^U, Inca Culture and Society. Richard Burger.

MW 9–10.15

This course explores the history and organization of the Inca empire and its impact on the nations and cultures conquered by it. The role of archaeology in understanding the transformation of Andean lifeways will be explored, as will the interplay between ethnohistoric and archaeological approaches to the subject. *Also ANTH 755b^U*.

ARCG 758a^U, Chavin and the Origins of Peruvian Civilization. Richard Burger.

T 9.30–11.20

The development of early complex society in Peru during the Early Horizon is examined along with its antecedents during the Preceramic and Initial periods. This seminar focuses on the problems of elucidating the sociopolitical organization of these societies and the factors responsible for their transformation. General theories of the origins of complex society are critically reviewed in light of the Peruvian case. *Also ANTH 758a^U*.

ARCG 761a^U, Analysis of Archaeological Ceramics. Robert Rosenswig.

Th 1.30–3.20

This course covers theoretical and practical approaches used to generate cultural information from ceramics recovered in archaeological contexts. Students are exposed to the ways in which ceramic data aid in establishing chronology, provide functional and stylistic information, as well as reconstruct production, distribution, and consumption patterns for prehistoric cultures. *Also ANTH 761a^U*.

ARCG 762b^U, Remote Sensing: Observing the Earth from Space. Ronald Smith and staff.

TTh 9–10.15

Topics include the spectrum of electromagnetic radiation; satellite-borne radiometers; data transmission and storage; computer image analysis; and GIS analysis of satellite imagery with applications to weather and climate, oceanography, surficial geology, snow and ice, forestry, agriculture, and watershed management. *Also ANTH 762b^U, F&ES 506b, G&G 562b^U*.

ARCG 763a^U, Archaeologies of Empire. Harvey Weiss.

Th 2.30–4.20

Comparative study of origins, structures, efficiencies, and limitations of imperialism, ancient and modern, in the Old and New Worlds, from Akkad to “Indochine,” from Wari to Aztec. The contrast between ancient and modern imperialisms examined from the perspectives of nineteenth- and twentieth-century archaeology and political economy. *Also ANTH 763a^U*.

ARCG 765a^U, Archaeometallurgy. Robert Gordon.

MWF 10.30–11.20

Evidence of the winning and use of metals by people in different cultures from earliest to modern times. The role of science; environmental consequences. Interpretation of artifacts and of smelting and metalworking sites. Laboratory demonstrations and field trips. *Also G&G 565a^U*.

ARCG 768a^U, The Rise of Civilization in Mesoamerica. Robert Rosenswig.

WF 9–10.15

This course provides a survey of the archaeological cultures of southern Mexico, Guatemala, Belize, and northern Honduras from the earliest inhabitants of the region through the emergence of the first states. Theoretical issues covered include the development of agriculture,

the transition to sedentary villages, as well as the origins of sociopolitical complexity and the first states in the region. *Also ANTH 768a^{II}.*

ARCG 773b^{II}, Civilizations and Collapse. Harvey Weiss.

th 2.30–4.20

Collapse documented in the archaeological and early historical records of the Old and New Worlds, including Mesopotamia, Mesoamerica, the Andes, and Europe. Analysis of politico-economic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict. *Also ANTH 773b^{II}, NELC 588b^{II}.*

ARCG 779b, Roman Imperial Art. Björn Ewald.

th 7–8.50

A course on Roman Imperial art, comprising the period from Augustus to Constantine (late first century B.C. to fourth century A.D.). The focus is on the so-called historical reliefs which once adorned or still adorn public buildings (e.g., triumphal arches) and monuments (e.g., the Ara Pacis). They are part of an elaborate visual system of official art which served to praise Imperial virtues and to imprint the Imperial accomplishments on the “collective memory” of Roman society. *Also CLSS 844b, HSAR 577b.*

ARCG 953a or b, Directed Research in Archaeology and Prehistory. Faculty.

By arrangement.

Related Courses

ARCG 100b, Genesis and Collapse of Old World Civilizations. Harvey Weiss.

Also HUMS 100b.

ARCG 171b, Great Discoveries in Archaeology. Thomas Tartaron.

[ARCG 172a, Great Hoaxes in Archaeology.]

ARCG 252b, Roman Architecture. Diana Kleiner.

Also HSAR 252b, CLCV 175b.

ARCG 281b, Human Creation and Destruction of Environments. Harvey Weiss.

Also ANTH 281b, EVST 225b.

CLSS 850b, Topics in Roman History and Culture. John Matthew, William Metcalf.

Also HIST 525b.

CLSS 873a, EClavdia: Women in Ancient Rome. Diana Kleiner.

Also HSAR 582a.

G&G 515b^{II}, Paleobotany. Leo Hickey.

HSAR 251b, Ancient Rome: Architecture, Topography, Civilization. Björn Ewald.

HSAR 408b, Aztec Art and Architecture. Mary Miller.

HSAR 425a, Pompeii and Herculaneum. Björn Ewald.

HSAR 746a, Mexican Art of the Sixteenth Century. Mary Miller, Jaime Lara.

Also REL 846a.

ASTRONOMY

J.W. Gibbs Laboratories, 432.3000

M.S., M.Phil., Ph.D.

Chair

Jeffrey Kenney

Director of Graduate Studies

Sarbani Basu (274 JWG, 432.3028, sarbani.basu@yale.edu)

Professors

Charles Bailyn, Charles Baltay (*Physics*), Sarbani Basu, Paolo Coppi, Pierre Demarque (*Emeritus*), Jeffrey Kenney, Richard Larson, Peter Parker (*Physics*), Sabatino Sofia, C. Megan Urry (*Physics*), William van Altena, Robert Zinn

Associate Professors

Priyamvada Natarajan

Assistant Professors

Richard Easther (*Physics*), Pieter van Dokkum

Lecturers

Michael Faison, Gordon Drukier

Fields of Study

Fields include observational and theoretical galactic astronomy, solar and stellar astrophysics, astrometry, extragalactic astronomy, radio astronomy, high-energy astrophysics, and cosmology.

Special Admissions Requirements

Applicants should have a strong undergraduate preparation in physics and mathematics. Although some formal training in astronomy is useful, it is by no means required for admission. Applicants should take the GRE Subject Test in Physics.

Special Requirements for the Ph.D. Degree

A typical program of study includes twelve courses during the first four terms, and must include the core courses listed below. At least two courses (and no more than four) must be research credits, each earned by working in close collaboration with a faculty member. Of the two research credits, one must be earned doing a theoretical project and one doing an observational research project. The choice of the remaining courses depends on the candidate's interest and background. Students are encouraged to take graduate courses in physics or related subjects. On an irregular basis, special-topic courses and seminars are offered, which provide the opportunity to study some fields in greater depth than is possible in the standard courses. To achieve both breadth and depth in their education, students are encouraged to take a few courses beyond their second year of study.

There is no foreign language requirement. An oral and written comprehensive examination, normally taken at the end of the fourth term of graduate work, tests the student's familiarity with the entire field of astronomy and related branches of physics and mathematics. Satisfactory performance in this examination, an acceptable record in course and research work, and an approved dissertation prospectus are required for admission to candidacy for the Ph.D. degree. The dissertation should present the results of an original and thorough investigation, worthy of publication. Most importantly, it should reflect the candidate's capacity for independent research. An oral dissertation defense is required.

Teaching experience is an integral part of graduate education in astronomy. All students will serve as teaching fellows and complete a total of 9 TF units. Both the levels of teaching assignments and the scheduling of teaching are flexible. By the end of the third term, however, most students will have completed 6 TF units. The additional 3 TF units will normally be carried out after the fourth term of study.

Core courses: The following have been designated as core courses that students must take: Stellar Populations (ASTR 510), Galaxies (ASTR 530), Stellar Astrophysics (ASTR 550), Interstellar Matter and Star Formation (ASTR 560), and either The Early Universe (ASTR 565) or Cosmology (ASTR 600). In addition two courses, Radiative Processes in Astrophysics (ASTR 540) and Computational Methods in Astrophysics and Geophysics (ASTR 520), have been designated as prerequisites. Students must have the permission of the director of graduate studies if they do not want to take any course that is designated as either a core course or a prerequisite.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see page 438–39).

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. (en route to the Ph.D.). Upon application, the department will recommend for the award of the M.S. degree any student who has satisfactorily completed the first year of the program leading to the Ph.D. degree. The department requires, in addition, that at least one of the courses taken during the year be a research course.

Program materials are available upon request to the Director of Graduate Studies, Department of Astronomy, Yale University, PO Box 208101, New Haven CT 06520-8101.

Courses

[ASTR 510bu, Stellar Populations.]

ASTR 518a, Stellar Dynamics. Gordon Drukier.

3 HTBA

The dynamics and evolution of star clusters; structure and dynamics of our galaxy; theories of spiral structure; dynamical evolution of galaxies.

ASTR 520b, Computational Methods in Astrophysics and Geophysics. Paolo Coppi.
The analytic and numerical/computational tools necessary for effective research in astronomy, geophysics, and related disciplines. Topics include numerical solutions to differential equations, spectral methods, and Monte Carlo simulations. Applications are made to common astrophysical and geophysical problems including fluids and N-body simulations. *Also G&G 538b.*

[ASTR 530a^U, Galaxies.]

ASTR 540b, Radiative Processes in Astrophysics and Geophysics. Sarbani Basu.
Applications to astrophysics and geophysics of the theory of radiation fields. Specific examples from stellar physics, stellar atmospheres, the interstellar medium, and high-energy astrophysics.

[ASTR 550bu, Stellar Astrophysics.]

ASTR 555a, Observational Techniques. William van Altena.

MW 1–2.15

The design and use of optical telescopes, cameras, spectrographs, and detectors to make astronomical observations. The reduction and analysis of photometric and spectroscopic observations.

ASTR 560b, Interstellar Matter and Star Formation. Richard Larson.

Observations of interstellar matter at optical, infrared, radio, and X-ray wavelengths. Dynamics and evolution of the interstellar medium including interactions between stars and interstellar matter. Molecular clouds and processes of star formation.

ASTR 565a, The Early Universe. Pieter van Dokkum.

3 HTBA

The emergence of structure in the universe: stars, galaxies, and clusters of galaxies. Theories of galaxy formation, and the properties of distant galaxies. Emphasis on the interplay of theory and observations in this rapidly evolving field.

ASTR 570a, High-Energy Astrophysics. Paolo Coppi.

A survey of current topics in high-energy astrophysics, including accreting black holes, black holes and neutron stars, relativistic jets, gamma-ray bursts, and ultra-high-energy cosmic rays. The basic physical processes underlying the observed high-energy mission are also covered. *Also PHYS 570a^U.*

[ASTR 575b, Topics in Astrometry.]

ASTR 580a or b, Research.

By arrangement with faculty.

ASTR 585b, Radio Astronomy. Michael Faison.

Introduction to radio astronomy, theory and techniques.

[ASTR 590b, Solar Physics.]

ASTR 600b, Cosmology. Priyamvada Natarajan.

The large-scale contents and structure of the universe and the origin of galaxies. *Also PHYS 600b.*

[ASTR 666b, Statistical Thermodynamics for Astrophysics and Geophysics.]

[ASTR 705, Research Seminar in Stellar Population.]

ASTR 710a or b, Professional Seminar. Faculty.

A seminar covering science and professional issues in astronomy.

[ASTR 715a, Research Seminar in High Energy Astrophysics.]

ASTR 720b, Research Seminar in Solar Physics. Sabatino Sofia.

ASTR 725b, Research Seminar in Astrometry. William van Altena.

ATMOSPHERIC SCIENCE

Advisory Committee

Donald Aylor (*Forestry & Environmental Studies*)

Alexey Fedorov (*Geology & Geophysics*)

Gary Haller (*Chemical Engineering; Chemistry*)

Xuhui Lee (*Forestry & Environmental Studies*)

Mark Pagani (*Geology & Geophysics*)

Daniel Rosner (*Chemical Engineering; Mechanical Engineering*)

Steven Sherwood (*Geology & Geophysics*)

Ronald Smith (*Geology & Geophysics*)

Sabatino Sofia (*Astronomy*)

Karl Turekian (*Geology & Geophysics*)

John Wettlaufer (*Geology & Geophysics; Physics*)

A number of departments of the Graduate School offer courses dealing with the physics, dynamics, and chemistry of the atmosphere, and the interactions of the atmosphere with the biosphere, oceans, and cryosphere, including all biogeochemical cycles. In order to permit students whose interests lie in the field of atmospheric science to develop an integrated program of studies, an interdisciplinary program is offered. Typical areas of interest included in the scope of the program are: theory of weather and climate, air pollution from industrial and natural sources, urban environmental health, global climatic change, paleoclimatology, hydrometeorology, and dynamics of atmospheric and oceanic motions. The program is individually planned for each student through a faculty adviser system.

Special Admissions Requirements

A student should, on the basis of scientific orientation, seek admission to one of the participating departments. The Department of Geology and Geophysics is the focus for studies of physical and dynamical meteorology, oceanography, and atmospheric chemistry, and the departments of Epidemiology & Public Health and Engineering & Applied Science (which includes the programs of Applied Physics, Chemical Engineering, Electrical Engineering, and Mechanical Engineering) provide additional courses in environmental health and atmospherically related processes. The Ph.D. and M.Phil. requirements are those of the admitting departments (see entries in this publication).

COMBINED PROGRAM IN THE BIOLOGICAL AND BIOMEDICAL SCIENCES (BBS)

L-200 Sterling Hall of Medicine, 785.3735

Director

Lynn Cooley (lynn.cooley@yale.edu)

Fields of Study

As the broad field of biological and biomedical sciences has become more exciting, it has also become more complex and demanding. The successful scientist today can no longer be an expert in only one area or one technique, but must be able to make use of information, technologies, and experimental strategies that ignore the boundaries defined by traditional university departments. In the coming decades, opportunities for research and scientific discovery will be greater, but also more challenging, than ever before. A student interested in pursuing a career in science should receive a breadth and depth of training in graduate school that will define his or her ultimate goal, whether he/she chooses to enter academia, industry, education, or any of the many other career opportunities that will be available to young scientists.

To help meet this challenge, Yale faculty have reorganized their approach to graduate education and formed the interdepartmental Combined Program in the Biological and Biomedical Sciences (BBS). Unique among graduate programs, BBS gives entering students access to more than 280 Yale biological science faculty in all departments, both at the School of Medicine and on the main university campus.

The primary purpose of BBS is to provide an environment for graduate education in modern biological and biomedical sciences that is both broad in scope and rigorous in depth. BBS serves as a focal point for research, education, and career development in the biological sciences and sponsors exciting initiatives, including new courses (like genomics and informatics; and laboratory practicals in confocal microscopy, immunocytochemistry, and molecular biology); informal scientific exchanges; career counseling and development; and numerous social activities.

BBS is composed of the faculty in the departments of Cell Biology; Cellular and Molecular Physiology; Experimental Pathology; Genetics; Immunobiology; the Interdepartmental Neuroscience Program; Microbial Pathogenesis; Molecular Biophysics and Biochemistry; Molecular, Cellular, and Developmental Biology; Neurobiology; and Pharmacology; and it draws relevant faculty from various clinical departments. The program is divided into several interest-based tracks whose identity may change with the changing interests of faculty. Currently, the tracks are: (1) Computational Biology and Bioinformatics; (2) Molecular Cell Biology, Genetics and Development; (3) Immunology; (4) Microbiology; (5) Molecular Biophysics and Biochemistry; (6) Neuroscience; (7) Pharmacological Sciences and Molecular Medicine; and (8) Physiology and Integrative Medical Biology. Each track draws its faculty from several departments and has a specific set of recommended courses and activities for first-year students. Entering students

apply to and then affiliate with a track, which places them with the group of students and faculty that most closely reflects their interests. Nevertheless, the courses, faculty, students, and, most important, laboratory research opportunities in all tracks remain completely available at all times, regardless of a student's primary track.

Entering students are admitted to Yale University as members of the BBS program and generally affiliate with the track to which they initially applied. The total number of students admitted each year is approximately seventy to eighty, with between five and twenty-five being admitted to any one track, depending on the interests and quality of the applicant pool. A student remains a member of the track for his or her first year and generally takes courses (with the advice of the track adviser or director) and performs at least three three-month rotations in a laboratory at Yale. At the end of the first year students generally select an adviser and also a department or academic program in which they take a qualifying examination in the second year and through which they eventually will earn a Ph.D. Advisers may be any full-time or affiliated Yale faculty member, regardless of their department or the student's track.

For the duration of their studies all students receive a stipend, which increases yearly, full tuition, health coverage, and a yearly allotment for travel to scientific meetings or courses. Financial support comes from university fellowships, National Institutes of Health (NIH) training grants, grants from foundations and companies, and from the Bristol-Myers Squibb Educational Alliance.

Special Admissions Requirements

Entrance requirements to BBS are track-specific but include the following: GRE General Test scores; relevant GRE Subject Test scores (strongly recommended but not a strict requirement); undergraduate major in a relevant biological, chemical, or physical science; three letters of recommendation addressing the student's academic performance and/or laboratory training; and TOEFL exam scores for students whose native language is not English. Track-specific requirements are listed below.

COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

A strong background in the basic sciences, along with computer science training, is expected.

MOLECULAR CELL BIOLOGY, GENETICS, AND DEVELOPMENT

No additional requirements or recommendations.

IMMUNOLOGY

It is preferred that students have taken courses in biology, organic chemistry, biochemistry, genetics, cell biology, physics, and mathematics. Actual course requirements, however, are not fixed, and students with outstanding records in any area of the biological sciences may qualify for admission. In special cases, Medical College Admission Test (MCAT) scores may be substituted for the GRE General Test scores.

MICROBIOLOGY

No additional requirements or recommendations.

MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

Actual course requirements in a student's background area are flexible. Desirable courses include biology; biochemistry; general, organic, and physical chemistry; physics; and math.

NEUROSCIENCE

Most applicants have had course work in neuroscience, psychobiology, physiological psychology, mathematics through calculus, general physics, general biology, general chemistry, organic chemistry, biochemistry, computer science, or engineering. Laboratory research experience is beneficial but is not a formal requirement. Medical College Admission Test (MCAT) scores may be substituted for the GRE General Test scores.

PHARMACOLOGICAL SCIENCES AND MOLECULAR MEDICINE

No additional requirements or recommendations.

PHYSIOLOGY AND INTEGRATIVE MEDICAL BIOLOGY

No additional requirements or recommendations.

Program materials are available by request to John Alvaro, Administrative Director, BBS Program, Yale University, PO Box 208084, New Haven CT 06520-8084; telephone 203.785.3735; fax 203.785.3734; e-mail, bbs@yale.edu; Web site, info.med.yale.edu/bbs.

BIOMEDICAL ENGINEERING

Dunham Laboratory, 432.4250

M.Eng., M.S., M.Phil., Ph.D.

Chair

Mark Saltzman

Professors

Richard Carson, James Duncan, Douglas Rothman, Mark Saltzman, Steven Segal, Fred Sigworth, Steven Zucker (*Computer Science*)

Associate Professors

Jacek Cholewicki, Todd Constable, Fahmeed Hyder, Lawrence Staib, Hemant Tagare

Assistant Professors

Francesco d'Errico, Robin de Graaf, Themis Kyriakides, Mark Laubach, Erin Lavik, Michael Levene, Xenios Papademetris

FIELDS OF STUDY

Fields include the physics of image formation (MRI, ultrasound, nuclear medicine, and X-ray), NMR spectroscopy, PET and modeling, digital image analysis and processing, computer vision, biological signals and sensors, biomechanics, physiology and human factors engineering, drug delivery, biotechnology, biomechanics of the spine, and tissue engineering.

For admissions and degree requirements, and for course listings, see Engineering and Applied Science.

CELL BIOLOGY

C-207 Sterling Hall of Medicine, 785.4320

www.cellbiology.yale.edu

M.S., M.Phil., Ph.D.

Chair

Ira Mellman

Director of Graduate Studies

Carl Hashimoto (C-223 SHM, 737.2746, carl.hashimoto@yale.edu)

www.cellbiology.yale.edu/cellbio/html/graduate/index.shtml

Professors

Norma Andrews (*Microbial Pathogenesis*), Roland Baron (*Orthopaedics*), Michael Caplan (*Physiology*), Lynn Cooley (*Genetics*), Peter Cresswell (*Immunobiology*), Pietro De Camilli, Susan Ferro-Novick, Jorge Galán (*Microbial Pathogenesis*), Fred Gorelick (*Internal Medicine/Digestive Diseases*), James Jamieson, Thomas Lentz, Vincent Marchesi (*Pathology*), Ira Mellman, Mark Mooseker (*Molecular, Cellular & Developmental Biology*), Michael Nathanson (*Internal Medicine/Digestive Diseases*), Peter Novick, Thomas Pollard (*Molecular, Cellular & Developmental Biology*), Elisabetta Ullu (*Internal Medicine/Infectious Diseases*), Graham Warren

Associate Professors

Carl Hashimoto, Gero Miesenböck, Sandra Wolin

Assistant Professors

Karin Reinisch, Elke Stein (*Molecular, Cellular & Developmental Biology*), Peter Takizawa, Derek Toomre

Fields of Study

Fields include membrane biology of eukaryotic cells (molecular mechanisms of membrane biogenesis, traffic, and fusion; organelle biogenesis), intracellular transport of membrane and secretory proteins, receptor-mediated endocytosis, generation of transmembrane signals, epithelial cell polarity and the extracellular matrix, protein folding, membrane function in the nervous system (synapse formation and function), neural networks, axon guidance, developmental genetics, virus-cell interactions, cell biology of protozoan parasites and of pathogen/host interactions, cell biology of the immune response, mRNA biogenesis and localization, RNA folding, the role of RNA-protein particles, structural biology, cell biology of bone remodeling and of the cytoskeleton. Approaches to these topics include biochemistry, molecular biology, and macromolecular crystallography; bacterial, yeast, *Drosophila*, and mouse genetics; immunocytochemistry and electron microscopy; cell fractionation; and live cell imaging.

Special Admissions Requirements

An undergraduate major in biology, biophysics, molecular biology, or biochemistry is recommended. MCAT scores may be substituted for the GRE General Test; GRE Subject Test recommended.

To enter the Ph.D. program, students apply to an interest-based track, usually the Molecular Cell Biology, Genetics, and Development track, in the combined program in Biological and Biomedical Sciences (BBS), <http://info.med.yale.edu/bbs>.

Special Requirements for the Ph.D. Degree

Students are required to take at least five graduate-level courses. No specific curriculum of courses is required, but CBIO 602a (Molecular Cell Biology) is recommended for all students to attain a solid foundation in molecular cell biology. Also recommended is a seminar course, such as CBIO 603a (Seminar in Molecular Cell Biology) or CBIO 606b (Advanced Seminar Course), in which students can develop the skill for critical analysis of research papers. Students design their own curriculum of courses to meet individual interests and needs, in consultation with the director of graduate studies. During the first year, students are also required to participate in three laboratory rotations. In the second year, a committee of faculty members determines whether each student is qualified to continue in the Ph.D. program. There is a written and oral qualifying examination at the end of the fourth term. In order to be admitted to candidacy, students must have met the Graduate School Honors requirement, maintained a High Pass average in course work, passed the qualifying examination, and submitted an approved prospectus. The remaining degree requirements include completion of the dissertation project and the writing of the dissertation and its oral defense, the formal submission of copies of the written dissertation to the Graduate School, and the deposit of an additional copy with the department. Laboratory rotations and thesis research may be conducted outside of the department.

An important aspect of graduate training in cell biology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school level. Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Students are not expected to teach during their first year.

Master's Degrees

M.Phil. Requirements for the M.Phil. degree are the same as for admission to candidacy (see above).

M.S. This degree is normally granted only to students who are withdrawing from the Ph.D. program. To be eligible for the degree, a student must pass at least five graduate-level term courses at Yale, including CBIO 602a, Molecular Cell Biology and a seminar course as recommended above, with at least one grade of Honors or three of High Pass.

Prospective applicants are encouraged to visit the BBS Web site (info.med.yale.edu/bbs), MCGD Track. Program materials are available upon request to the Director of Graduate Studies, Department of Cell Biology, Yale University, PO Box 208002, New Haven CT 06520-8002.

Courses

CBIO 502a/b, Molecules to Systems. James Jamieson, Thomas Lentz, Fred Gorelick, and staff.

This full-year course is designed to provide medical students with a current and comprehensive review of biologic structure and function at the cellular, tissue, and organ system levels. Areas covered include replication and transcription of the genome; regulation of the cell cycle and mitosis; protein biosynthesis and membrane targeting; cell motility and the cytoskeleton; signal transduction; nerve and muscle function; and endocrine and reproductive cell biology. Clinical correlation sessions, which illustrate the contributions of cell biology to specific medical problems, are interspersed in the lecture schedule. Histophysiology laboratories provide practical experience with the light microscope for exploring cell and tissue structure. This course is offered only to M.D. and M.D./Ph.D. students.

CBIO 503a/b, Histology Laboratory. Thomas Lentz and staff.

Histophysiology laboratory provides practical experience with the light microscope for exploring cell and tissue structure. This course is offered only to Ph.D. students.

CBIO 601a/b, Molecular and Cellular Basis of Human Disease. Fred Gorelick, James Jamieson, and staff.

M 4:30–6

This course emphasizes the connections between diseases and basic science using a lecture and seminar format. It is designed for students who are committed to a career in medical research, those who are considering such a career, or students who wish to explore scientific topics in depth. The course is organized in four- to five-week blocks that topically parallel CBIO 502a,b. Examples of blocks from past years include “Diseases of protein folding” and “Diseases of ion channels.” Each topic is introduced with a lecture given by the faculty. The lecture is followed by sessions in which students review relevant manuscripts under the supervision of a faculty mentor. Several special sessions are dedicated to technologic advances. In addition, three sessions are devoted to academic careers and cover subjects such as obtaining an academic position, promotions, and grant writing. The course is open to M.D. and M.D./Ph.D. students who are taking or have taken Cell Biology 502a,b. Student evaluations are based on attendance, participation in group discussions, formal presentations, and a written review of an NIH proposal. Graduate School credit is available. Our introductory meeting is on September 19, 2005.

CBIO 602a, Molecular Cell Biology. Sandra Wolin, Thomas Pollard, Graham Warren, and faculty.

MW 1:45–3

A comprehensive introduction to the molecular and mechanistic aspects of cell biology for graduate students in all programs. Emphasizes fundamental issues of cellular organization, regulation, biogenesis, and function at the molecular level. *Also MB&B 602a, MCDB 602a.*

CBIO 603a, Seminar in Molecular Cell Biology. Sandra Wolin, Thomas Pollard, Graham Warren, and faculty.

Th 9–11

A graduate-level seminar course in modern cell biology. The class is devoted to the reading and critical evaluation of classical and current papers. The topics are coordinated with the

CBIO 602a lecture schedule. Thus, concurrent or previous enrollment in CBIO 602a is required. *Also MCDB 603a.*

CBIO 604b, Systems Cell Biology. Carl Hashimoto and faculty.

Introduction to the organization and function of cells within complex multicellular systems as encountered in the human body. Covers major tissues and organs as well as the cardiovascular, immune, and nervous systems, with special emphasis on the molecular and cellular bases of developmental processes and human diseases. Lectures supplemented by electronic-based tutorials on the histology of tissues and organs.

CBIO 606b, Advanced Seminar Course. Susan Ferro-Novick, Peter Novick.

This seminar course, which meets once a week, covers several topics suggested by the second-year cell biology students. It should serve to introduce students to areas they might not have considered in prior courses. Each topic is spread over three to four sessions, starting with an introductory overview and followed by a detailed analysis of key papers. This course is run on alternate years with CBIO 727b.

CBIO 701b, Illuminating Cellular Function. Gero Miesenböck, Derek Toomre, and faculty.

Introduction to the principles and practical methods of live cell imaging. Covers principles of contrast generation (including genetically encoded probes and physiological indicators), image formation, image detection, and image analysis. Includes hands-on demonstrations of state-of-the-art instrumentation, such as video-rate confocal and multi-photon microscopes.

CBIO 900a and 901b, First-Year Introduction to Research. Carl Hashimoto, Frank Slack, Michael Stern, and faculty.

Lab rotations, grant writing, and ethics for Molecular Cell Biology, Genetics, and Development track students. *Also GENE 900a and 901b, MCDB 900a and 901b.*

CELLULAR AND MOLECULAR PHYSIOLOGY

B-147 Sterling Hall of Medicine, 737.2215

M.Phil., Ph.D.

Chair

Steven Hebert

Director of Graduate Studies

Emile Boulpaep (B-142 SHM, 785.4055, emile.boulpaep@yale.edu)

Professors

Peter Aronson (*Internal Medicine/Nephrology*), Henry Binder (*Internal Medicine/Digestive Disease*), Walter Boron, Emile Boulpaep, Thomas Brown (*Psychology*), Michael Caplan, W. Knox Chandler, Lawrence Cohen, Arthur DuBois (*Epidemiology*), Barbara Ehrlich (*Pharmacology*), Bliss Forbush III, John Geibel (*Surgery*), Steven Hebert, Leonard Kaczmarek (*Pharmacology*), Patricia Preisig (*Internal Medicine/Nephrology*), W. Mark Saltzman (*Biomedical Engineering*), Steven Segal, Gerald Shulman (*Internal Medicine/Endocrinology*), Fred Sigworth, Carolyn Slayman (*Genetics*), Clifford Slayman, Fred Wright (*Internal Medicine/Nephrology*)

Associate Professors

Cecilia Canessa, Lloyd Cantley (*Internal Medicine/Nephrology*), Marie Egan (*Pediatrics*), Reiko Maki Fitzsimonds, Giero Miesenböck (*Cell Biology*), P. Darrell Neuffer, Vincent Pieribone, George Richerson (*Neurology*)

Assistant Professors

Angelique Bordey (*Neurosurgery*), Michael Nitabach, Susumu Tomita, David Zenisek, Yufeng Zhou

Fields of Study

Fields of study range from cellular and molecular physiology to integrative medical biology. Areas of current interest include: ion channels, transporters and pumps, membrane biophysics, cellular and systems neurobiology, protein trafficking, epithelial transport, signal transduction pathways, vascular biology, organ physiology, genetic models of human disease, pathophysiology, structural biology of membrane proteins, and physiological genomics.

Special Admissions Requirements

We welcome applications from students with backgrounds in the biological, chemical, and/or physical sciences. These include majors in biology, biochemistry, physiology, genetics, chemistry, physics, mathematics, engineering, computer science, and psychology. Courses in biology, biochemistry, organic and physical chemistry, and mathematics through elementary calculus are recommended. The GRE General Test is required. To enter the Ph.D. program, students will apply to the Physiology and Integrative Medical Biology track within the interdepartmental graduate program in the Biological and Biomedical Sciences (see pages 71–73).

Special Requirements for the Ph.D. Degree

Formal requirements for the Ph.D. degree include two or three terms of course work, a qualifying examination taken by the end of the second year, submission of a thesis prospectus, and completion and satisfactory defense of the thesis.

Students are expected to design a suitable program of courses in consultation with a faculty adviser. The director of graduate studies will provide general oversight of the course selections. These courses will provide a coherent background for the expected area of thesis research and also satisfy the department's subject and proficiency requirements. Students must pass at least six graduate-level courses including C&MP 520a, C&MP 550a, and C&MP 560b. Also during the first two terms, each student should explore research projects by performing rotations in at least three laboratories to create an informed basis upon which to select a thesis project by the end of the first year. There is no foreign language requirement. The qualifying examination, which must be passed by the end of the student's second year, will cover areas of physiology that complement the student's major research interest.

An important dimension of graduate training in cellular and molecular physiology is the acquisition of teaching skills through participation in courses appropriate for the student's academic interests. Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Students are not expected to teach during their first year.

After satisfying the departmental pre-dissertation requirements, passing the qualifying examination, and submitting a satisfactory thesis prospectus, students are admitted to candidacy. The completed dissertation must describe original research making a significant contribution to knowledge.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see pages 438–39).

Master's Degrees

No students are admitted for master's degrees. A student leaving the Ph.D. program after one year of residence in good standing, and having completed a full two-term curriculum of courses with grades that satisfy departmental requirements, may elect to receive a terminal Master of Science (M.S.) degree. Any student who has fulfilled all the requirements for the Ph.D. except the prospectus and dissertation may elect to receive the Master of Philosophy (M.Phil.) degree, normally at the end of the second year. See Graduate School requirements, pages 436–47.

Program materials are available upon request to the Department Registrar, Department of Cellular and Molecular Physiology, Yale University, School of Medicine, 333 Cedar Street, PO Box 208026, New Haven CT 06520-8026.

Courses

C&MP 520a, Current Perspectives in Physiology. David Zenisek.

TTh 2.30–3.45

This seminar course explores a diverse range of current topics in physiology, emphasizing readings and discussions of recent primary literature. A variety of expert physiologists present topics such as structural biology, membrane transport, signal transduction, sensory systems, and exercise physiology. Instructors guide the discussion regarding the background, the experiments, the methods, and most importantly the impact of relevant research papers. The aim of the course is to understand how physiological approaches integrate the study of organismal function from genes, to systems, to behavior and disease.

C&MP 550a, Physiological Systems. W. Mark Saltzman, Emile Boulpaep.

MWF 9.30–10.20

We develop a foundation in human physiology, the regulation of homeostasis, and the biophysical properties of cells, tissues, and organs. Basic concepts in cell and membrane physiology are synthesized through exploring the function of skeletal, smooth, and cardiac muscle. Regulation of cardiac output, blood flow, and vascular exchange are integrated in light of exercise performance. Respiratory physiology explores the mechanics of ventilation, gas diffusion, and acid-base balance. Renal physiology explores the formation and composition of urine and the regulation of electrolyte, fluid, and acid-base balance. Organs of the digestive system are developed from the perspective of substrate metabolism and energy balance. Hormonal regulation is applied to metabolic control and to calcium, water, and electrolyte balance. The special senses are considered in light of signaling processes inherent to the nervous system. Weekly discussion sections provide a forum for in-depth exploration of topics. Graduate students evaluate research findings through literature review and weekly meetings with the instructor. *Also ENAS 550a^{II}, MCDB 550a^{II}.*

C&MP 560b, Cellular and Molecular Physiology: Molecular Machines in Human Disease. Emile Boulpaep, Michael Caplan, Mark Mooseker, Fred Sigworth.

MWF 9.30–10.20

This course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiologic levels. Students learn about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed upon the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiologic behaviors of cells and tissues are also stressed. Molecular motors are introduced and their mechanical relationship to cell function is explored. Students read papers from the scientific literature that establish the connections between mutations in genes encoding membrane proteins and a wide variety of human genetic diseases. *Also ENAS 570b^{II}, MCDB 560b^{II}.*

C&MP 710b, Electron Cryo-Microscopy for Protein Structure Determination. Vinzenz Unger, Fred Sigworth.

HTBA

Understanding cellular function requires structural and biochemical studies at an ever-increasing level of complexity. The course is an introduction into the concepts and applications of high-resolution electron cryo-microscopy. This rapidly emerging new technique is the only tool known to date that allows biological macromolecules to be studied at all levels of resolution ranging from their cellular organization to near-atomic detail. *Also MB&B 710b4.*

CHEMICAL ENGINEERING

Dunham Laboratory, 432.4250

M.Eng., M.S., M.Phil., Ph.D.

Chair

TBA

Professors

Eric Altman, Daniel Crothers, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Michael Loewenberg, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, L. Lee Wikstrom (*Adjunct*), Kurt Zilm

Associate Professors

Gaboury Benoit, Paul Van Tassel

Assistant Professors

Michelle Bell, Eric Dufresne, William Mitch, Jordan Peccia

FIELDS OF STUDY

Fields include combustion, separation processes, catalysis, statistical mechanics of adsorption, high-temperature chemical reaction engineering, convective heat and mass transfer, chromatography, biochemical and biomedical engineering, biotechnology, molecular beams, aerosol science and technology, materials processing, surface science, and environmental engineering.

For admissions and degree requirements, and for course listings, see Engineering and Applied Science.

CHEMISTRY

Sterling Chemistry Laboratory, 432.3913
M.S., Ph.D.

Chair

Gary Brudvig (Rm 1, SCL, 432.3912, chemistry.chair@yale.edu)

Director of Graduate Studies

Charles Schmuttenmaer (Rm 1, SCL, 432.3913, chemistry.dgs@yale.edu)

Professors

Sidney Altman (*Molecular, Cellular & Developmental Biology*), Jerome Berson (*Emeritus*), Gary Brudvig, William Chupka (*Emeritus*), Robert Crabtree, R. James Cross, Jr., Donald Crothers (*Emeritus*), John Faller, Gary Haller (*Engineering & Applied Science*), Andrew Hamilton, John Hartwig, Francesco Iachello (*Physics*), Mark Johnson, William Jorgensen, Philip Lyons (*Emeritus*), J. Michael McBride, Peter Moore, Lynne Regan (*Molecular Biophysics & Biochemistry*), Martin Saunders, Alanna Schepartz, Charles Schmuttenmaer, Robert Shulman (*Emeritus, Molecular Biophysics & Biochemistry*), Oktay Sinanoglu (*Emeritus*), Dieter Söll (*Molecular Biophysics & Biochemistry*), Thomas Steitz (*Molecular Biophysics & Biochemistry*), Scott Strobel (*Molecular Biophysics & Biochemistry*), Julian Sturtevant (*Emeritus*), John Tully, Patrick Vaccaro, Harry Wasserman (*Emeritus*), Kenneth Wiberg (*Emeritus*), John Wood, Frederick Ziegler, Kurt Zilm

Associate Professors

David Austin, Craig Crews (*Molecular, Cellular & Developmental Biology*), J. Patrick Loria

Assistant Professors

Victor Batista, Glenn Micalizio, Ann Valentine

Fields of Study

Fields include bio-inorganic chemistry, bio-organic chemistry, biophysical chemistry, chemical physics, inorganic chemistry, organic chemistry, physical chemistry, physical-organic chemistry, synthetic-organic chemistry, and theoretical chemistry.

Special Admissions Requirements

Applicants are expected to have completed or be completing a standard undergraduate chemistry major including a year of elementary organic chemistry, with laboratory, and a year of elementary physical chemistry. Other majors are acceptable if the above requirements are met. The GRE General Test and the Subject Test in Chemistry are required. Students whose native language is not English are required to take the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE).

Special Requirements for the Ph.D. Degree

A foreign language is not required. Three term courses are required in each of the first two terms of residence, and participation in additional courses is encouraged in subsequent terms. Courses are chosen according to the student's background and research area. To be admitted to candidacy a student must: (1) receive at least two term grades of Honors, exclusive of those for research; (2) pass either three cumulative examinations and one oral examination (organic students) or two oral examinations (nonorganic students) by the end of the second year of study; and (3) submit a thesis prospectus no later than the end of the third year of study. Remaining degree requirements include completing eight cumulative examinations (organic students), a written thesis describing the research, and an oral defense of the thesis. The ability to communicate scientific knowledge to others outside the specialized area is crucial to any career in chemistry. Therefore, all students are required to teach a minimum of two terms at the level of Teaching Fellow 3 or higher.

Master's Degree

M.S. (en route to the Ph.D.). A student must pass at least five graduate-level term courses in the Chemistry department exclusive of seminars and research. The student must obtain at least one term grade of Honors or three of High Pass in graduate-level courses. One full year of residence is required.

Program materials are available upon request to the Director of Graduate Studies, Department of Chemistry, Yale University, PO Box 208107, New Haven CT 06520-8107.

Courses

CHEM 520^U, Advanced Organic Chemistry. Martin Saunders.

MWF 9.30–10.20

A discussion of structure and mechanism in organic chemistry. Fall: bonding, structure and strain; carbanions, carbocations, and carbenes. Spring: The second term covers kinetics, basics of molecular orbital theory and its applications to organic reactivity, pericyclic reactions, non-covalent interactions, and molecular recognition.

CHEM 522a^U, Chemical Biology II. Alanna Schepartz.

TTh 9–10.15

A comprehensive introduction to the origins and emerging frontiers of chemical biology. This course develops the fundamental chemistry of molecules found in nature, a quantitative description of their interactions with themselves and each other, and subsequent effects on biological function. Topics include protein design, molecular evolution, chemical genetics, metabolic engineering, and methods in genomics and proteomics research.

CHEM 523^U, Synthetic Methods in Organic Chemistry. Glenn Micalizio [F], John Wood [Sp].

MWF 10.30–11.20

Modern methods of design in synthetic organic chemistry with an emphasis on natural products. Structural-type recognition, stereochemistry, mechanism and function group transformations in multifunctional group molecules are covered.

CHEM 525b^U, Spectroscopic Methods of Structure Determination.**Martin Saunders.**

TTH 10.30–11.30, 1 HTBA

The background and use of spectroscopic methods emphasizing NMR in organic chemistry are presented. The course includes the use of programs for simulating spin-spin coupling and rapid rearrangement reactions in NMR. All methods commonly used by organic chemists for determining molecular structures of species in solution, in the gas phase, and in solids are included.

CHEM 526a^U, Computational Chemistry and Biochemistry. William Jorgensen.

TTH 9–10.15

An introduction to modern computational methods employed for the study of chemistry and biochemistry, including molecular mechanics, quantum mechanics, statistical mechanics, and molecular dynamics. Special emphasis is placed on the hands-on use of computational packages for current applications ranging from organic reactions to protein-ligand binding and dynamics.

CHEM 530b^U, Statistical Methods and Thermodynamics. John Tully.

MWF 9.30–10.20

The fundamentals of statistical mechanics are developed and used to elucidate gas phase and condensed phase behavior, as well as to establish a microscopic derivation of the postulates of thermodynamics. Topics include ensembles; Fermi, Bose, and Boltzmann statistics; density matrices; mean field theories; phase transitions; chemical reaction dynamics; time-correlation functions; Monte Carlo and molecular dynamics simulations.

[CHEM 535a, Chemical Dynamics.]**CHEM 540a^U, Molecules and Radiation I. Kurt Zilm.**

MWF 8.30–9.20

An integrated treatment of quantum mechanics and modern spectroscopy. Covers basic wave and matrix mechanics, perturbation theory, angular momentum, group theory, time-dependent quantum mechanics, selection rules, coherent evolution in two-level systems, lineshapes, and NMR spectroscopy.

CHEM 542b^U, Molecules and Radiation II. Mark Johnson.

MWF 10.30–11.20

An extension of the material covered in CHEM 540a to atomic and molecular spectroscopy, including rotational, vibrational, and electronic spectroscopy, as well as an introduction to laser spectroscopy.

[CHEM 546b^U, Principles of Magnetic Resonance Spectroscopy.]**[CHEM 547b, Electron Paramagnetic Resonance.]****CHEM 548b, Nuclear Magnetic Resonance in Liquids. J. Patrick Loria.**

TTH 10.30–11.45

A theoretical treatment of solution NMR spectroscopy with emphasis on applications to proteins and biological macromolecules. This includes classical and quantum mechanical descriptions of NMR, product operator formalism, multidimensional NMR, phase cycling, gradient selection, relaxation phenomena, and protein resonance assignments.

CHEM 549b^U, Biophysical Chemistry. Peter Moore.

TTH 9–10.15

A detailed discussion of several important experimental techniques used to study the properties of biological macromolecules, emphasizing the application of Fourier methods and concepts to NMR spectroscopy, optical and electron microscopy, image reconstruction, X-ray

scattering/diffraction, and mass spectroscopy (also calorimetry and sedimentation, if time permits). Emphasis on the physical chemistry that underlies both the execution of such experiments and the interpretation of the resulting data.

CHEM 550a^U, Theoretical and Inorganic Chemistry. John Faller.

TTh 9–10.15

Covers the major physical methods used in the determination of molecular structure, bonding, and physical properties of metal complexes. Aimed at advanced undergraduate and first-year graduate students. Students should be familiar with both inorganic coordination chemistry and physical chemistry.

CHEM 552a^U, Organometallic Chemistry. John Hartwig.

TTh 9–10.15

A general introduction to organometallic chemistry, mostly of the transition metal elements. Topics include bonding, structure, and reactivity of transition metal organometallic compounds, ligand substitution reactions, oxidative addition/reductive elimination reactions, insertion reactions, reactions of coordinated ligands, applications to catalytic processes, and organic synthesis.

CHEM 554b, Bio-Inorganic Chemistry. Ann Valentine.

MWF 11.30–12.20

An advanced introduction to biological inorganic chemistry. Important topics in metallo-protein chemistry are illustrated. Objective is to define and understand function in terms of structure. Topics include catalysis with and without electron transfer, and carbon, oxygen, and nitrogen metabolism.

CHEM 555b, Inorganic Mechanisms. John Hartwig.

MW 9–10.15

Contemporary mechanistic problems in transition metal chemistry. The course presents the ability of fundamental physical organic principles to address problems in transition metal systems relevant to coordination chemistry, bioinorganic chemistry, organometallic chemistry, and catalysis. Prerequisites: CHEM 220a, 221b, or 125; CHEM 330 or 130; CHEM 457a and 450b.

CHEM 556a, Biochemical Kinetics and Dynamics. J. Patrick Loria.

MWF 9.30–10.20

An advanced treatment of enzymology. Topics include transition state theory and derivation of steady state and pre-steady state rate equations. The role of entropy and enthalpy in accelerating chemical reactions is considered, along with modern methods for the study of enzyme chemistry. These topics are supplemented with in-depth analysis of the primary literature.

CHEM 557a^U, Modern Coordination Chemistry. Ann Valentine.

TTh 11.30–12.45

The structure of the atom, molecular topologies, ionic bonding, covalent bonding, chemical forces, reaction pathways; fundamental concepts for transition metal complexes; coordination chemistry; structural aspects, isomerism, electron transfer reactions, substitution reactions, molecular rearrangements, and reactions of coordinated ligands; transition metal clusters, multiple bonding between transition metal atoms.

CHEM 560L, Advanced Physical Methods in Molecular Science. Patrick Vaccaro [F], Charles Schmuttenmaer [Sp].

F 3–4

A laboratory course introducing physical chemistry tools used in the experimental and theoretical investigation of large and small molecules. Modules include machining materials, elec-

tronics, vacuum technology, magnetic resonance, optical spectroscopy and lasers, computational aids, and molecular modeling.

CHEM 562L, Laboratory in Instrument Design and the Mechanical Arts. Kurt Zilm, David Johnson.

Familiarization with modern machine shop practices and techniques. Use of basic metal-working machinery and instruction in techniques of precision measurement and properties of commonly used metals, alloys, and plastics.

CHEM 564L, Advanced Mechanical Instrumentation. Kurt Zilm, David Johnson.

A course geared for both the arts and sciences that goes beyond the basic introductory shop courses, offering an in-depth foundation study utilizing "hands-on" instructional techniques that must be learned from experience. Prerequisite: CHEM 562L.

CHEM 570a^U, Introductory Quantum Chemistry. R. James Cross.

TTH 9–10.15

The elements of quantum mechanics developed and illustrated with applications to chemical problems. Suitable for first-year graduate students in chemistry who have had some exposure to quantum mechanics as part of an undergraduate chemistry course.

CHEM 600–670, Research Seminars. Faculty.

Presentation of a student's research results to his/her adviser and fellow research group members. Extensive discussion and literature review are normally a part of the series.

CHEM 700, Laboratory Rotation for First-Year Biophysical Graduate Students. Gary Brudvig.

CHEM 720, Current Topics in Organic Chemistry. Faculty.

A seminar series based on invited speakers in the general area of organic chemistry.

CHEM 730, Molecular Science Seminar. Faculty.

A seminar series based on invited speakers in the areas of physical, inorganic, and biological chemistry.

CHEM 990, Research. Faculty.

Individual research for Ph.D. degree candidates in the Department of Chemistry, under the direct supervision of one or more faculty members.

CLASSICS

402 Phelps Hall, 432.0977

M.A., M.Phil., Ph.D.

Chair

Christina Kraus

Director of Graduate Studies

Egbert Bakker (404 Phelps, 432.0980, egbert.bakker@yale.edu)

Professors

Egbert Bakker, Victor Bers (*on leave*), Donald Kagan, Diana Kleiner (*on leave* [Sp]), Christina Kraus, John Matthews (*on leave* [F]), William Metcalf (*Adjunct; Curator Coins & Metals, Art Gallery*)

Associate Professor

Michael Anderson (*on leave*)

Assistant Professors

Björn Ewald, Corinne Pache, Celia Schultz

Lecturers

Serena Connolly, Veronika Grimm, Joseph Solodow

Senior Research Scholar/Lecturer

Ann Ellis Hanson

Affiliated Faculty

Robert Babcock (*Curator Early Books, Beinecke Library*), Susanne Bobzien (*Philosophy*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Bentley Layton (*Religious Studies*), Dale Martin (*Religious Studies*), David Quint (*Comparative Literature*), Barbara Shailor (*Deputy Provost for the Arts*)

Fields of Study

The degree program in Classics seeks to provide an overall knowledge of Greek and Roman civilization, combined with specialized work in a number of fields or disciplines within the total area.

Special Admissions Requirements

A minimum of three years of college training in one of the classical languages and two years in the other.

Special Requirements for the Ph.D. Degree in Classics

(1) Passing sight translation examinations in Greek and Latin by the end of the first year in residence; (2) passing departmental reading examinations in French and German by the beginning of the second year in residence; (3) completing fourteen term graduate-level courses including: four courses in the history of Greek and Latin literature (or a rea-

sonable equivalent), one course in historical or comparative linguistics, three seminars (two in one language and one in the other), one course in ancient history or classical art and archaeology, one further course not involving the study of Greek or Latin language or literature; (4) satisfying the departmental composition requirement in Greek and Latin (which may but need not be satisfied by courses taken under (3) above); (5) passing translation examinations in Greek and Latin, based on the Ph.D. reading list, by the end of the fifth term in residence; (6) passing oral examinations in Greek and Latin literature, based on the Ph.D. reading list, by the end of the fifth term in residence; (7) passing the special fields oral examinations by the end of the sixth term, consisting of two areas of special concentration in each language selected by the candidate in consultation with the DGS; (8) presentation of a dissertation prospectus by the end of the seventh term in residence to the approval of the Graduate Committee; (9) a dissertation.

In addition to the Graduate School's requirement of Honors grades in at least one year course or two term courses, students must have a High Pass average in the remaining courses. Admission to candidacy for the Ph.D. is granted upon completion of all pre-dissertation requirements not later than the end of the seventh term of study.

The faculty considers experience in the teaching of language and literature to be an important part of this program. Students in Classics typically teach in their third and fourth years of study.

Combined Programs

ANCIENT HISTORY

The Ph.D. program in Ancient History is offered in collaboration with the Department of History and may be pursued in either department. In the Classics department, the Ancient History program of study comprises: (A) language and literature, to include: (1) passing sight translation examinations in Greek and Latin by the end of the first year in residence; (2) passing departmental reading examinations in French and German by the beginning of the second year in residence; (3) completing at least six term courses including two courses in the history of Greek or Latin literature; (4) passing translation examinations in Greek or Latin, based on the Ph.D. reading list, by the end of the fifth term in residence; (5) passing oral examinations in Greek or Latin literature, based on the Ph.D. reading list, by the end of the fifth term in residence; (6) passing a translation examination in the other ancient language based on a 1,000-page reading list approved by the DGS, by the end of the fifth term in residence; and (B) Greek and Roman history, to include: (1) six term courses in Greek and Roman history and, normally, two in another period of history, of which three must be graduate seminars; (2) passing oral examinations in Greek and Roman history on topics approved by the DGS; (C) presentation of a dissertation prospectus by the end of the seventh term in residence to the approval of the Graduate Committee; (D) a dissertation.

Prerequisites for admission: a year's course in Greek or Roman history, or a B.A. in history; a minimum of one year of college-level Greek and one of college-level Latin (more preferred). Students may apply to either the Department of Classics or the Department of History (see below).

CLASSICAL ART AND ARCHAEOLOGY

The program is offered in collaboration with the Department of the History of Art and is designed to give a general knowledge of the development of art in Greece and Italy from the Bronze Age to late antiquity, combining this with a detailed study of one particular period and area; and an acquaintance with the contribution made by field archaeology to our understanding of the classical world. It is expected that each student will be given the opportunity to visit the major sites and monuments. Students are required to pass fourteen term courses, to include three seminars, divided between the two departments; distribution may be adjusted to suit the interests of individual students. Students must demonstrate a competence in Greek and Latin, usually by passing at least one 400/700-level course in each language. They must also pass departmental examinations in German and one other modern language, usually Italian or French, by the beginning of the second year in residence. They will be admitted to candidacy for the Ph.D. after passing a written and oral comprehensive examination in classical art and archaeology and by securing approval of their dissertation prospectus. Further details should be obtained from the director of graduate studies.

Prerequisites for admission: a year's course in Greek and Roman art or archaeology; a minimum of two years of college training in one classical language and one in the other (more preferred).

CLASSICS AND COMPARATIVE LITERATURE

Students may be admitted to this joint program after consultation with the director of graduate studies of each department, normally during the first term. The requirements are as follows: (1) passing sight translation examinations in Greek and Latin by the end of the first year in residence; (2) completing fourteen term courses including at least seven in Classics, including: two courses in the history of Greek or Latin literature and two seminars; and at least six courses in Comparative Literature, including: at least four courses on post-classical European literature and two courses on literary theory or methodology; (3) demonstrating literary proficiency in English, Greek, Latin, German, and one other modern language during the first two years; (4) passing an oral examination in the Comparative Literature department on six topics appropriate to both disciplines, selected in consultation with the two DGSS, by the end of the sixth term; (5) passing translation examinations in Greek and Latin, based on the Ph.D. reading list, by the end of the fifth term in residence; (6) passing oral examinations in Greek and Latin literature, based on the Ph.D. reading list, by the end of the fifth term in residence; (7) presentation of a dissertation prospectus by the end of the sixth term in residence to the approval of the two DGSS; (8) a dissertation.

Prerequisites for admission through the Department of Classics: same as for Classics. (For admission requirements in the Department of Comparative Literature, consult the director of graduate studies of that department.) After admission to the Department of Classics, qualified students may apply to be admitted to this joint program, normally during the first term of residence; the directors of graduate studies of both departments should be consulted before application to the joint program is made.

CLASSICS AND PHILOSOPHY

Students who have had at least three years of college-level Greek and two of philosophy may be admitted to a joint program offered in collaboration with the Department of Philosophy. Further details should be obtained from the director of graduate studies of either department.

Prerequisites for admission: For students seeking admission in the Department of Classics, the same as for Classical Philology. For admission requirements in the Department of Philosophy, consult the director of graduate studies of that department. After admission to either department, qualified students may apply to the interdepartmental committee for admission to the program in Ancient Philosophy.

CLASSICS AND RENAISSANCE STUDIES

The Department of Classics also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in Classics and Renaissance Studies. For further details, see Renaissance Studies.

For information about the Ph.D. program in Graeco-Arabic Studies, please contact Professor Gutas, Department of Near Eastern Languages and Civilizations.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program qualify for the M.A. degree upon completion of seven courses, ordinarily with a High Pass average in two successive terms.

Program materials are available upon request to the Director of Graduate Studies, Department of Classics, Yale University, PO Box 208266, New Haven CT 06520-8266.

Courses

GREK 714b, Hesiod and Homeric Hymns. Corinne Pache.

MW 11.30–12.45

Translation and study of selections from Hesiod's *Theogony*, *Works and Days*, and the Homeric hymns, with attention to poetics, myths, and connections with Homeric epic.

GREK 771b, Plutarch. John Matthews.

TRH 2.30–3.45

An introduction to a Greek historian and essayist writing under the Roman Empire, whose voluminous and versatile writings have ever since his own day been widely influential. The course consists of representative selections from his works to be read in Greek, with the addition of modern translations to set Plutarch in his literary and historical context and to relate him more broadly to other writers of the period. Particular themes of interest concern the social experience of Plutarch as a Greek living and writing under Roman rule, the interplay of past and present in his persuasive style, and the nature of his moral judgments. A central purpose of the course is to reach a critical appreciation of the variety of Plutarch's writings, and of his importance as a interpreter of the world in which he lived.

GREK 790b, Syntax and Stylistics. Ann Hanson.

TTH 1–2.15, 1 HTBA

A review of accidence and syntax, stylistic analysis of Greek prose of the fifth and fourth centuries B.C., including a comparison of “prosaic” and “poetic” syntax, and prose composition in various styles.

GREK 798a, 799b, History of Greek Literature. Corinne Pache [F], Egbert Bakker [Sp].

TTH 11.30–12.45, HTBA [F]; TTH 9–10.15, HTBA [Sp]

A comprehensive treatment of Greek literature from Homer to the Imperial period. The student is expected to read extensively in the original language, working toward familiarity with the range and variety of the literature.

LATN 736b, Cicero’s Letters. William Metcalf.

MW 2.30–3.45

An introduction to Cicero’s correspondence, with particular attention to its social and historical context. Readings focus on his changing relationships with major political figures of the day, his proconsulship, and his reaction to the fall of the Roman Republic.

LATN 738b, Plautus. Ann Hanson.

TTH 1–2.15

The purpose of this course is to gain an appreciation of and familiarity with the comedies of T. Maccius Plautus, comic playwright of *fabulae palliatae* between ca. 205 and 184 B.C.E., and the earliest Latin author whose works survive to our time complete. Greatest attention is focused on two of his so-called darker comedies (*Bacchides*, *Casina*), as well as the mythological *Amphitruo*, and this, in turn, enables us to contrast and compare these plays with what critics consider more normative Plautus.

LATN 747b, Roman Social History in Latin Texts. John Matthews.

MW 1–2.15

The course, which is intended for graduate students and senior undergraduates, studies issues in the social and economic life of the Roman Empire of the first to fifth century through readings in the legal, documentary, and epigraphic as well as in the literary sources of the period. A strong knowledge of Latin is required, and emphasis is given to the variety of literary and nonliterary styles of the documents.

LATN 762a, Tacitus. William Metcalf.

TTH 11.30–12.45

Close reading of Tacitus’ *Histories* and parallel passages from his other works, with attention to his syntax and style. The influence of Tacitus’ background and experience on his narrative is focal throughout.

LATN 780b, Lucretius. Celia Schultz.

TTH 11.30–12.45

Close reading of selected books of Lucretius’ *De Rerum Natura* from both a poetic and a philosophical perspective.

LATN 790b, Syntax and Stylistics. Ann Hanson.

TTH 1–2.15

A systematic review of syntax and an introduction to Latin style. Selections from Latin prose authors are read and analyzed, and students compose short pieces of Latin prose. For students with some experience reading Latin literature who desire a better foundation in forms, syntax, idiom, and style.

LATN 798a, 799b, History of Latin Literature. Christina Kraus.

MW 9–10.15

A wide-ranging, yearlong treatment of Latin literature from its beginnings through the late Imperial period. Students are expected to read extensively in the original language in order to gain familiarity with literature of various genres from different periods.

CLSS 605b, Greek Papyrology. Ann Hanson.

W 2.30–4.20

Literary and documentary papyri of Greek and Roman Egypt, concentrating on documents housed in the Beinecke Library from the late Ptolemaic and Roman periods. Topics include using papyri as sources for social and other histories; gaining familiarity with the language of the papyri; and the reading of literary and documentary hands. Prerequisites: proficiency in Greek; reading knowledge of German and French.

CLSS 821a, *Odyssey*. Egbert Bakker.

M 2.30–4.20

A reading of the Homeric *Odyssey* with special attention to the nature and function of the narrative of Odysseus' wanderings and the unity of the poem.

CLSS 835b, Early Roman Religion. Celia Schultz.

T 2.30–4.20

A detailed examination of major issues and problems in the study of Roman religion in the Archaic period through the early and middle Republic. What is the nature of our sources? How do we reconcile conflicting sources (e.g., literary texts and archaeological material)? What is really Roman, versus what is Greek, Italic, or Etruscan? What are the major trends in the history of the field? It is expected that students will have strong command of both Latin and ancient Greek. Course readings of ancient materials include epigraphic texts as well as extensive selections from the first decade of Livy's *AUC*, relevant works of Cicero, Festus, Plutarch, and others. Students must also possess reading knowledge of at least one modern language sufficient to handle select items of recent scholarship.

CLSS 844b, Roman Imperial Art. Björn Ewald.

Th 7–8.50 P.M.

A course on Roman Imperial art, comprising the period from Augustus to Constantine (late first century B.C. to fourth century A.D.). The focus is on the so-called historical reliefs which once adorned or still adorn public buildings (e.g., triumphal arches) and monuments (e.g., the Ara Pacis). They are part of an elaborate visual system of official art which served to praise Imperial virtues and to imprint the Imperial accomplishments on the "collective memory" of Roman society. *Also ARCG 779b, HSAR 577b.*

CLSS 850b, Topics in Roman History and Culture. John Matthews,**William Metcalf.**

F 4–6

A weekly program of research papers on various topics, given by faculty members, graduate students, and visitors to Yale, followed by formal and informal discussion. Graduate students may acquire a course credit by presenting a paper to the seminar or by writing a term paper on one of the topics chosen, together with regular participation and contributions to discussion. Suggestions for and offers of papers are welcome. *Also HIST 525b.*

CLSS 873a, EClavdia: Women in Ancient Rome. Diana Kleiner.

T 1.30–3.20

The contributions of Roman women to one of the greatest cities — and one of the greatest empires — in world history. Lost stories of real-life Roman women recovered from public and residential buildings, portraits, paintings, and other works of Roman art and architecture. *Also HSAR 582a.*

CLSS 875a, Eclogues. Christina Kraus.

Th 2.30–4.20

Close reading of the *Eclogues* of Vergil and Calpurnius Siculus. Topics for discussion include the pastoral genre; Alexandrian poetics at Rome; the poetic book; intertextuality and readers; *amor* and the countryside; Triumviral literature; Neronian literature.

CLSS 885b, Aristotle's *Athenaion Politeia*. Donald Kagan.

Th 1.30–3.20

A study of the historical portion of Aristotle's *Constitution of the Athenians*. Also HIST 512b.

CLSS 900a or b, Directed Reading.

By arrangement with faculty.

CLSS 910a or b, Directed Research.

By arrangement with faculty.

COMPARATIVE LITERATURE

451 College, Rm 202, 432.2760
M.A., M.Phil., Ph.D.

Chair

David Quint

Director of Graduate Studies

Katie Trumpener (katie.trumpener@yale.edu)

Professors

Dudley Andrew, Katerina Clark, Roberto González Echevarría, Cyrus Hamlin, Benjamin Harshav, Carol Jacobs, David Quint, Haun Saussy, Katie Trumpener

Associate Professors

Catherine Labio, Pericles Lewis

Assistant Professors

Ala Alryyes, Alexander Beecroft, Moira Fradinger, Barry McCrea

Fields of Study

The Department of Comparative Literature introduces students to the study and understanding of literature beyond linguistic or national boundaries; the theory, interpretation, and criticism of literature; and its interactions with adjacent fields like visual and material culture, linguistics, film, psychology, law, and philosophy. The comparative perspective invites the exploration of such transnational phenomena as literary or cultural periods and trends (Renaissance, Romanticism, Modernism, postcolonialism) or genres and modes of discourse. Students may specialize in any cultures or languages, to the extent that they are sufficiently covered at Yale. The Ph.D. degree qualifies the candidate to teach Comparative Literature as well as the national literature(s) of her or his specialization.

Special Admissions Requirements

Applicants must hold a B.A. or equivalent degree and should normally have majored in comparative literature, English, a classical or foreign literature, or in an interdepartmental major that includes literature. They must be ready to take advanced courses in two foreign literatures in addition to English upon admission. The GRE General Test is required. A ten- to twenty-page writing sample, written in English, should be submitted with the application.

Special Requirements for the Ph.D. Degree

Students must successfully complete fourteen term courses, including at least seven listed under the departmental heading. The student's overall schedule must fulfill the following requirements: (1) at least one course in medieval or classical European literature,

philology, or linguistics (or their equivalents in other cultures); one course in the Renaissance or Baroque (or equivalents); and one course in the modern period; (2) three courses in literary theory or methodology; (3) course work dealing with texts from three literatures, one of which may be English or American. Any course may be counted for several requirements simultaneously.

Languages: Literary proficiency in four languages (including English, at least one other modern language, and one classical or ancient language, such as Latin, Greek, Biblical Hebrew, Classical Arabic, Classical Chinese, Provençal). The fulfillment of this requirement will be demonstrated by a written exam consisting of a translation of a literary or critical text, to be held by the end of the sixth term; or by an equivalent level in the student's course work.

Orals: An oral examination to be taken in the third year of studies, demonstrating both the breadth and specialization as well as the comparative scope of the student's acquired knowledge. The examination consists of seven topics that include texts from at least three national literatures and several historical periods (at least one modern and one before the Renaissance). The topics should also include representatives of the three traditional literary genres (poetry, drama, narrative fiction).

The Ph.D. dissertation, supervised by a dissertation director (or directors) and approved by the departmental faculty, completes the degree. Its initial step is a dissertation prospectus, to be submitted and approved by the dissertation director and the faculty no later than half way through the seventh term of study. Admission to candidacy for the Ph.D. is granted after six terms of residence and the completion of all requirements (courses, languages, orals, prospectus) except the dissertation.

Teaching: Training in teaching, through teaching fellowships, is an important part of every student's program. Normally students will teach in their third and fourth years.

Combined Ph.D. Programs

COMPARATIVE LITERATURE AND CLASSICS

The Department of Comparative Literature also offers, in conjunction with the Department of Classical Languages and Literatures, a combined Ph.D. in Comparative Literature and Classics. For further details, see Classics.

COMPARATIVE LITERATURE AND FILM STUDIES

The Department of Comparative Literature also offers, in conjunction with the Program in Film Studies, a joint Ph.D. in Comparative Literature and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film Studies and to Comparative Literature. All documentation within the application should include this information.

COMPARATIVE LITERATURE AND RENAISSANCE STUDIES

The Department of Comparative Literature also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in Comparative Literature and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in Comparative Literature are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program may receive the M.A. upon completion of ten courses with at least two grades of Honors and a maximum of three grades of Pass, and the demonstration of proficiency in *two* of the languages, ancient or modern, through course work or departmental examinations.

No student is admitted to a terminal M.A.

Program materials are available upon request to the Director of Graduate Studies, Department of Comparative Literature, Yale University, PO Box 208299, New Haven CT 06520-8299.

Courses

CPLT 501a,b, Introduction to Renaissance Studies. David Quint [F],
Lawrence Manley [Sp].

T 10.30–12.20 [F], W 3.30–5.20 [Sp]

An introduction to the major texts, issues, bibliography, and methods in the interdisciplinary study of the Renaissance. Emphasis in the first term on Italy and in the second on northern Europe. *Also ENGL 565a/b, RNST 500a,b.*

CPLT 511b^U, Introduction to Theory of Literature. Haun Saussy.

TTh 11.30–12.20

An examination of concepts and assumptions active in contemporary views of literature, with their history. Shifting definitions of “literary theory”; accounts of meaning, interpretation, and representation; examinations of historicist, formalist, psychoanalytic, Marxist, structuralist, post-structuralist, feminist, and media-centered approaches to theory and literature.

CPLT 515a, Proseminar in Comparative Literature. Haun Saussy.

T 1.30–3.20

Introductory proseminar for all first-year graduate students in Comparative Literature (and other interested persons). Critical readings of formative texts in the theory and practice of the discipline, from the late eighteenth century to the present. Topics to be covered include the nature of literature; translation; national identities and identities beyond the nation; interpretation and evaluation; the humanities and the human; media. The course is taken for a grade of Satisfactory/Unsatisfactory.

CPLT 524a, World Literatures: Questions and Issues. Haun Saussy,
Katie Trumpener.

W 7–9 P.M.

Discussion of current issues in the canon, theory, and pedagogy of world literature. Readings in selected primary and secondary texts, presentations, and discussion with a faculty group from across literature departments. The course is taken for a grade of Satisfactory/Unsatisfactory.

CPLT 526a, The Contest between Poetry and Divinity. Geoffrey Hartman.

W 2–4.50

The honorific that the poet is like a god, or that art can conceive heterocosms, should not obscure the strange fact that writers, especially poets, keep falling back on a language “*plena Jovis*,” as the materialist Proudhon admitted. Or that many of them wish to reappropriate and

reshape visionary conceptions they consider alienated by an established priesthood. “Who owns the gods?” Texts chosen from the following poets: Addison, Blake, Coleridge, Wordsworth, Shelley, Emily Dickinson, Christopher Smart, Hölderlin, and Nerval. *Also ENGL 775a.*

CPLT 529a, American Literature and World Religions. Wai Chee Dimock.

TH 10.30–12.20

Beginning with Cabeza de Vaca and Olaudah Equiano as instances of Christianity in the Atlantic world, this course studies the extension, migration, and transformation of world religions — Islam, Hinduism, Buddhism, and their folk variants — within the context of American literature, challenging the standard account of an exclusively Puritan heritage. Readings range from Emerson and Thoreau to Henry Adams, Willa Cather, Malcolm X, Allen Ginsberg, Gary Snyder, Amy Tan, and Bharati Mukherjee. *Also AMST 925a, ENGL 925a.*

CPLT 532b, Language and Reason. Carol Jacobs.

W 1.30–3.20

An exploration of the relationship between language and reason in literary and philosophical texts. Concentration on the periods of the Enlightenment, Romanticism, and contemporary literature, in the context of the Platonic tradition. Through close readings of a wide range of theoretical and literary texts, we work through the complex interdependence of language and representation in relation to conceptualizations of reason. There are no prerequisites for this course. Students are expected to write papers that develop their own powers of interpretation and theorization rather than essays dependent for their ideas on research of secondary works. Our principal texts include works of Plato (one dialogue), Kant, Hamann, Herder, English Romantic poetry (Shelley and Wordsworth), Kleist, and Sebald. *Also GMAN 634b.*

CPLT 533a, Literature, Politics, Opinion. Kirk Wetters.

M 3.30–5.20

This course focuses on political, philosophical, and literary determinations of the concept of opinion, focusing on (but not limited to) the last half of the eighteenth century. This period is crucial, however, insofar as modernity's two most decisive applications of the concept of opinion — “freedom of opinion” and “public opinion” — fall within the general time frame. Authors include Hobbes, Locke, Sterne, Hamann, Mendelssohn, Lessing, Lichtenberg, Wieland, Kant, Fichte, Goethe, Hölderlin, Arendt, Koselleck, Sennett, Habermas, and Derida. *Also GMAN 626a.*

CPLT 538b^u, The Galaxy of Modernism: Ideologies and Poetics. Benjamin Harshav.

M 1.30–3.20

An interdisciplinary seminar on the ideologies and principles of poetics of the major trends in twentieth-century literature and the arts. Italian and Russian Futurism, Expressionism, Acmeism, Imagism, Dada, Surrealism, Postmodernism — in German, Italian, Russian, French, English, Hebrew, and other cultures. The discourse of Modernist trends, their similarities and divergences. Readings of manifestos and recent scholarly books. Emphasis on art and literature, with several trends in film theory (Eisenstein) and architecture (Bauhaus vs. Postmodernism).

CPLT 541a^u, Poetics I: Theory of the Work of Literature. Benjamin Harshav.

M 1.30–3.20

The course presents a comprehensive theory of works of literature as the highest sign-complexes in human culture. From rhythm and sound patterns through metaphor and fictional worlds to genre and representation, a work of literature combines elements of structure with a network of necessary and possible or contradictory constructs. The seminar develops a conceptual network for the descriptive analysis of individual works of poetry and fiction. The theory focuses on questions of fictionality and art in language, yet goes beyond linguistics.

tics and philosophy of language, on the one hand, and narratology, on the other. It is grounded in close readings of poems and narrative texts by Kafka, Joyce, Eliot, Dostoevsky, and others. *Also PHIL 706a.*

CPLT 580a, Topics in Literary Theory. Paul Fry.

Th 1.30–3.20

Readings in twentieth-century literary theory that set the terms for its recurrent structures of argument, the premise being that the theoretical moment in thinking about literature can be reconsidered as a coherent tradition from Saussure to Butler. Some attention also to critics of this tradition like Searle, Knapp and Michaels, and Guillory. *Also ENGL 978a.*

CPLT 587b, Comparative Study of Lyric. John MacKay.

T 7–8.50 P.M.

Detailed consideration of a variety of models for interpreting lyric poetry across languages, cultures, and periods. The issue of the “translatability” of lyric is also addressed. The choice of poets discussed depends in large part on the linguistic abilities and interests of the seminar participants. We also read methodological and theoretical works by such authors as Auerbach, Curtius, Benjamin, Frye, Jakobson, Riffaterre, Lentricchia, and Jameson. *Also RUSS 747b.*

CPLT 592a, Urban Phantasmagoria: Berlin, Vienna, and Paris. Henry Sussman.

T 1.30–3.20

Grounding itself in Walter Benjamin’s *The Arcades* project, a print-medium Web site of the rise of modernity, malls, advertising, gambling, amusement park, and urban-cruising in nineteenth-century Paris, this course pursues these developments as they revolutionize the environment in the major German-speaking cities and as they are documented in literary and cultural criticism. *Also GMAN 644a.*

CPLT 620a, The Medieval Canon, According to Borges. María Rosa Menocal.

T 1.30–3.20

This course tackles the question of how we conceive of the medieval canon and its relationship to the rest of literary history if we make Jorge Luis Borges our guide. Readings of Borges include selected works of both fiction and nonfiction. The course also functions as a meditation on the nature of literary history, and an introduction to a series of the varied medieval works from that literary universe assumed and constructed by Borges; e.g., everything from the Cordoban poetry he read in the histories of Asín Palacios to the Conde Lucanor (parts of which he “rewrote”), and much between and beyond, including the *Divine Comedy* and the *Thousand and One Nights*. *Also ITAL 553a, SPAN 550a.*

CPLT 684b, The Epic: Politics and Literary Form. David Quint.

T 10.30–12.20

A study of European epic poetry from its Roman traditions (Virgil, Lucan) to the Renaissance (Tasso, Camoes, Ercilla, d’Aubigne, and Milton). Areas of focus are the relationship between ideas of narrative and conflicting political ideologies and the problem of the representation of violence. *Also ENGL 574b.*

CPLT 688b, Race, History, and Memory after 1649. Elliott Visconsi.

M 1.30–3.20

A study of the braided histories of political belonging, sovereignty, and racial identity through a range of literary and philosophical texts written in the years between the killing of Charles I and the emergence of the United States. Topics include world history and the clash of civilizations; national literatures and poetic traditions; rights, citizenship, and political obligation; cultural memory and racial destiny. Authors include Shakespeare, Dryden, Milton, Locke, Behn, Defoe, Voltaire, Equiano, Paine, and Kant. *Also ENGL 688b.*

CPLT 699b, Heidegger's *Being and Time*. Karsten Harries.

T 10.30–12.20

*Also PHIL 705b.***CPLT 702a, Schopenhauer's *The World as Will and Representation*.****Karsten Harries.**

T 10.30–12.20

A careful reading, with special emphasis on the reception of Schopenhauer's ideas. *Also PHIL 704a.*

CPLT 706b, The New Map of the World: Vico's Poetic Philosophy.**Giuseppe Mazzotta.**

T 3.30–5.20

Examination of Vico's thought globally and in the historical context of the late Renaissance and the Baroque. Starting with Vico's *Autobiography*, working to his University Inaugural Orations, *On the Study of Methods of Our Time*, the seminar delves into his juridical-political texts and submits the second *New Science* (1744) to a detailed analysis. Some attention is given to Vico's poetic production and the encomia he wrote. The overarching idea of the seminar is the definition of Vico's new discourse for the modern age. To this end, discussion deals prominently with issues such as Baroque encyclopedic representations, the heroic imagination, the senses of "discovery," the redefinition of "science," the reversal of neo-Aristotelian and neo-Platonic poetics, the crisis of the Renaissance, and the role of the myth. *Also ITAL 700b.*

CPLT 709b, Desiring Women: Greek Heroines in the German Intellectual Tradition.**Elke Siegel.**

M 1.30–3.20

Since the foundational myths of Western civilization, desire and death have been closely related in the depiction of women in aesthetic and theoretical discourse (e.g., the Sirens or Pandora). This seminar focuses on the reinterpretations of the three central tragic female figures—Antigone, Electra, and Medea—in the German intellectual tradition. Topics include Antigone's place in Hegel's discussion of the ethical, Electra as hysteric in turn-of-the-century Vienna, and the feminist and postcolonial rewriting of *Medea* by Christa Wolf. Readings and discussion in English. *Also GMAN 642b.*

CPLT 732b, The Bayeux Tapestry and the Anglo-Norman World. Howard Bloch.

W 3.30–5.20

A study of the Bayeux Tapestry in the context of the Conquest and the Anglo-Norman world. Topics include origin, formal description, fabrication, Nordic and continental homologies; relation of inscription to image, of borders to central panels, of decoration to narration; representations of the protagonists, of the events, of the everyday, of military, nautical, architectural, social, political, religious, and natural worlds; mixing of Viking, Celtic, Saxon, and Gallic cultures; literary and chronicle accounts. Basic text, the Bayeux Tapestry Digital Edition CD, 2003. In English. *Also FREN 741b, HSAR 593b.*

CPLT 761b, Literature and Economics in the Eighteenth Century. Catherine Labio.

W 3.30–5.20

The role played by literature in the formation of a new economic and moral subject as well as the key role played by modern economic thought and new economic realities in the emergence of modern literary forms and of literature as an academic discipline. Works by such authors as Defoe, Mandeville, Montesquieu, Rousseau, Hume, and Adam Smith. *Also ENGL 739b.*

CPLT 858a, Readings in Critical Theory. Catherine Labio.

M 1.30–3.20

An introduction to twentieth-century French/francophone thought. Emphasis on the post-World War II era and on the concepts of structure, *récit*, *altérité*, difference, judgment, and economy. Taught in French. *Also FREN 763a.*

CPLT 862b, Theatrical Bodies: Brecht, Artaud, Müller, and the Modern Theater. Rainer Nägele.

W 1.30–3.20

An investigation of three major playwrights and theoreticians of the twentieth century. *Also GMAN 663b.*

CPLT 900a, Directed Reading. Faculty.**CPLT 900b, Directed Reading. Faculty.****CPLT 901a, Individual Research. Faculty.****CPLT 901b, Individual Research. Faculty.****CPLT 914b, Drama, Performance, and Mass Culture. Joseph Roach.**

W 10.30–12.20

Taking account of the genealogy of modern drama in eighteenth-century performance, this seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events from *The Beggar's Opera* (1728) to *The Threepenny Opera* (1928). Topics include the transformation of classical genres into the *drame*, the commercialization of leisure through the mass-marketing of vicarious experience, and the emerging culture of celebrity. Critical readings include selections from the Frankfurt School, Walter Benjamin, Bertolt Brecht, Raymond Williams, Roland Barthes, and Jean Baudrillard. Plays are drawn from popular comedies, Sheridan to Shaw (*Pygmalion* and *My Fair Lady*), and long-running bourgeois dramas, beginning with Lillo's *The London Merchant*. *Also ENGL 962b.*

CPLT 916b, Literature into Cinema in Italy. Millicent Marcus.

W 3.30–5.20

This course undertakes a series of twelve case studies of films adapted from literary works, identifying the challenges that specific texts present to filmmakers in their attempts to transform verbal fictions into mass media spectacles. Taught in English. *Also FILM 830b, ITAL 590b.*

CPLT 917a, Films and Their Study. Dudley Andrew.

W 10.30–12.20, screenings M 7 P.M.

"Films and Their Study" sets in place some undergirding for graduate students who want to anchor their film interest to something like the "professional discourse" of this field. A coordinated set of topics in film theory is interrupted first by the often discordant voice of history and second by the obtuseness of the films examined each week. As the title of this seminar is meant to convey, films themselves take the lead in our discussions. *Also FILM 601a.*

CPLT 922b, Spatial Dimensions in Cinema. Dudley Andrew.

W 1.30–3.20, screenings M 7 P.M.

Investigation of how cinema orients its spectators, how nations orient their citizens through cinema, and how businessmen and bureaucrats map the territories that images reach and affect. Methods used by scholars to parse the films of the world to account for their variable power. Examination of both films and the distribution patterns of cinema. *Also FILM 721b^W.*

CPLT 923b, Modernist Fiction: The Seen and the Unseen. Pericles Lewis.

Th 1.30–3.20

This seminar surveys a range of modernist stories and novels that describe the interaction between the visible world — of objects, bodies, and the natural and social environment — and the invisible world — of mental states, unconscious desires, unseen social forces, and the occult. Authors considered include Henry James, Marcel Proust, Franz Kafka, James Joyce, Virginia Woolf, and Samuel Beckett. Also readings from early twentieth-century social scientists such as Durkheim, Freud, and Weber. *Also ENGL 964b.*

CPLT 928a, Alternative Cultures in Communist Central and Eastern Europe.**Katerina Clark, Katie Trumpener.**

M 7–9 P.M.

Exploring a range of texts — from film and media culture, literary and visual culture, to youth culture and popular music — from across Communist (and post-Communist) Europe, this course examines a range of dissident cultures, subcultures, and countercultures. Topics to include the relationship between official and experimental modes of culture, transnational circuits of influence, the construction of subcultural worlds, and the range of dissident ideologies (nationalist, liberal, religious, and reform-Marxist). *Also FILM 824a, GMAN 611a, RUSS 746a.*

CPLT 929b, The Aesthetics of Occupation: Arts and Politics of Everyday Life in Fascist-Occupied Europe. Katie Trumpener.

W 3.30–5.20, screenings W 7 P.M.

Examining a wide range of texts, literary (fiction, poetry, diaries) and visual (films, photographs, painting), this course examines the commonplace that, in countries that came under fascist domination, everyday life became resistance. How did artists' and diarists' sense of the quotidian under duress ground aesthetic strategies, ethical positions, and political visions? The course looks at critical responses to fascism in Germany and Italy, texts from countries under military occupation (Holland, France, Czechoslovakia, Poland, Hungary), and British counterfactual fictions imaging occupation. Special attention to children's experiences and memories, as to how postwar aesthetic developments (from neorealism to the New Waves) built on wartime experience. All readings and films in English. Seminar discussion augmented by speakers and film screenings. Readings by Anna Seghers, Wilhelm Reich, Christopher Isherwood, Victor Klemperer, Anne Frank, Miklos Radnoti, Elio Vittorini, Jiri Weil, Imre Kertesz, Charlotte Salomon, Jorge Semprun, Rex Warner, Miron Bialoszweski, Harry Mulish, Josef Brodsky. Films by Veit Harlan, Rossellini, Humphrey Jennings, Bresson, Melville, Wajda, Resnais, Konrad Wolf, Huillet/Straub. Enrollment limited to fifteen. *Also FILM 765b^u, GMAN 666b.*

CPLT 946b, The Arabic Novel in Translation. Ala Alryyes.

Th 3.30–5.20

This seminar aims to introduce students to a select set of modern Arabic novels in translation. We read works by Haykal, Mahfouz, Jabra, Salih, Munif, al-Shaykh, and al-Ghitani because they are exceptionally good and because their themes and forms emulate and diverge from those of the Western novel, raising alternative approaches to narrative and literary theory and the poetics of translation. These novels fictionalize distinctive Arab modern themes such as the persistence of orality and the vexed relation between dialect and formal language; the clash between desert and city; the chasm between ordinary lives and official history; political defeat and exile; patriarchy and the woman question. Yet the seminar's guiding principle is that literature includes culture and politics, and not vice versa. We also read two important plays by al-Hakim and Wannus that raise similar issues in relation to Western drama.

CPLT 947a, African-Caribbean Connections in French. Christopher L. Miller.

Th 10.30–12.20

The intertwined literary and cultural relations between Africa and the Caribbean, as made possible by the slave trade and French colonialism. Focus on changing models of linkage and exile, beginning with nineteenth-century experiments, continuing with: early twentieth-century movements in Haiti and in France; two versions of Negritude; social realism; independence; “creoleness.” Authors include Maran, Senghor, Césaire, Roumain, Sembene, Glissant, Condé, Warner-Vieyra, Lopes. Reading knowledge of French required. *Also AFAM 847a, AFST 847a, FREN 947a.*

CPLT 948b, Colonizer and Colonized in Africa. Christopher L. Miller.

Th 10.30–12.20

The literature and film of the colonial encounter in French and British Africa, with attention to modes of interaction and representation. Early travel accounts and their impact on European philosophy and anthropology; the emergence of counterdiscourses. Theories of Lugard, Lyautey, Memmi, Fanon. Novels include *Heart of Darkness*, *Une Vie de boy*, *Things Fall Apart*, *L'Aventure ambiguë*, *La Noire de...*, *L'Etrange destin de Wangin*, *A Bend in the River*, *Nervous Conditions*. Films include *Zou-Zou*, *La Noire de...*, *Black and White in Color*, *Coup de Torchon*, *Chocolat*. Reading knowledge of French required. *Also AFAM 783b, AFST 859b, FREN 759b.*

CLPT 949a, Black Intellectuals of the Caribbean Diaspora. Hazel Carby.

M 1.30–3.20

This course examines work by writers of Caribbean descent from different regions of the transatlantic world. In response to contemporary interest in issues of globalization, the premise of the course is that in the world maps of these black intellectuals we can see the intertwined and interdependent histories and relations of the Americas, Europe, and Africa. Thinking globally is not a new experience for black peoples and we need to understand the ways in which what we have come to understand and represent as “Caribbeanness” is a condition of movement. Literature is most frequently taught within the boundaries of a particular nation, but this course focuses on the work of writers who shape the Caribbean identities of their characters as traveling black subjects and refuse to restrain their fiction within the limits of any one national identity. We practice a new and global type of cognitive mapping as we read and explore the meanings of terms like black trans-nationalism, migrancy, globalization, and empire. Diasporic writing embraces and represents the geopolitical realities of the modern, modernizing, and postmodern worlds in which multiple racialized histories are inscribed on modern bodies. Taught in English. *Also AFAM 723a, AMST 645a.*

CPLT 961b, The Latin American Dictator Novel. Moira Fradinger.

W 4–6

A reading of six major dictator novels in light of questions pertaining to literary theory, political philosophy, and the Latin American literary canon of the nineteenth and twentieth centuries. We analyze the figure of the “dictator” as a literary theme, dictators and dictatorship in Latin American novels with reference to their historical context, and the tradition of dictator novels in Latin America. We also consider broader questions posed by literary figurations of political power, including issues of sovereignty and the formation of the political sphere so central to the Western discipline of political philosophy. Conducted in Spanish. *Also SPAN 910b.*

COMPUTATIONAL BIOLOGY AND BIOINFORMATICS

Bass 432A, 432.8189

M.S., Ph.D.

Directors of Graduate Studies

Mark Gerstein (Bass 432A, 432.6105, mark.gerstein@yale.edu)

Perry Miller (300 George St, Suite 501, 737.2903, perry.miller@yale.edu)

Professors

Joseph Chang (*Statistics*), Ronald Coifman (*Mathematics*), Lynn Cooley (*Genetics; Cell Biology*), Donald Engelman (*Molecular Biophysics & Biochemistry*), William Jorgensen (*Chemistry*), Douglas Kankel (*Molecular, Cellular & Developmental Biology*), Kenneth Kidd (*Genetics*), Perry Miller (*Anesthesiology; Molecular, Cellular & Developmental Biology*), Willard Miranker (*Computer Science*), Anna Pyle (*Molecular Biophysics & Biochemistry*), Martin Schultz (*Computer Science*), Gordon Shepherd (*Neurobiology*), Abraham Silberschatz (*Computer Science*), Michael Snyder (*Molecular, Cellular & Developmental Biology*), Dieter Söll (*Molecular Biophysics & Biochemistry; Chemistry*), Günter Wagner (*Ecology & Evolutionary Biology*), Sherman Weissman (*Genetics; Medicine*), Steven Zucker (*Computer Science; Biomedical Engineering*)

Associate Professors

James Aspnes (*Computer Science*), Mark Gerstein (*Molecular Biophysics & Biochemistry; Computer Science*), Elias Lolis (*Pharmacology*), Michael Stern (*Genetics*), Kevin White (*Genetics*), Heping Zhang (*Epidemiology & Public Health; Statistics*), Hongyu Zhao (*Epidemiology & Public Health; Genetics*)

Assistant Professors

Kei-Hoi Cheung (*Anesthesiology; Genetics*), Michael Krauthammer (*Pathology*), Andrew Miranker (*Molecular Biophysics & Biochemistry*), Valerie Reinke (*Genetics*), David Tuck (*Pathology*)

Fields of Study

Computational biology and bioinformatics (CB&B) is a rapidly developing multidisciplinary field. The systematic acquisition of data made possible by genomics and proteomics technologies has created a tremendous gap between available data and their biological interpretation. Given the rate of data generation, it is well recognized that this gap will not be closed with direct individual experimentation. Computational and theoretical approaches to understanding biological systems provide an essential vehicle to help close this gap. These activities include computational modeling of biological processes, computational management of large-scale projects, database development and data-mining, algorithm development and high-performance computing, as well as statistical and mathematical analyses.

To enter the Ph.D. program, students apply to an interest-based track within the interdepartmental program in the Biological and Biomedical Sciences.

Special Admissions Requirements

Applicants are expected (1) to have a strong foundation in the basic sciences, such as biology, chemistry, and mathematics, and (2) to have training in computing/informatics, including significant computer programming experience. The Graduate Record Examination (GRE) General Test is required, and the GRE Subject Test in cell and molecular biology, biology, biochemistry, chemistry, computer science, or other relevant discipline is recommended. Applicants for whom English is not their native language are required to submit results from the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

With the help of a faculty advisory committee, each student plans a program that includes courses, seminars, laboratory rotations, and independent reading. Students are expected to gain competence in three core areas: (1) computational biology and bioinformatics, (2) biological sciences, and (3) informatics (including computer science, statistics, and applied mathematics). The courses taken to satisfy the core areas of competency may vary considerably. A typical program will include nine courses. Completion of the core curriculum will typically take three to four terms, depending in part on the prior training of the student. Students will typically take two to three courses each term and three research rotations during the first year. After the first year, students will start working in the laboratory of their Ph.D. thesis supervisor. Students must pass a qualifying examination normally given at the end of the second year or the beginning of the third year. There is no language requirement. Students will serve as teaching assistants in two term courses.

Master's Degree

M.S. (en route to the Ph.D.). To qualify for the awarding of the M.S. degree a student must (1) complete two years (four terms) of study in the Ph.D. program, with nine required courses taken at Yale, (2) complete the required course work for the Ph.D. program with an average grade of High Pass, (3) successfully complete three research rotations, and (4) meet the Graduate School's Honors requirement (see pages 438–39).

Courses

Students normally take at least three of the following four core courses.

CB&B 752a, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein, Michael Snyder.

MW 1–2.15.

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, comparative genomics, geometric analysis of protein structure, and macromolecular simulation. Prerequisite: EEB 122 and MATH 115, or permission of the instructor. Also CPSC 752a^{II}, MB&B 752a^{II}, MCDB 752a^{II}.

CB&B 750b, Core Topics in Biomedical Informatics. Perry Miller and faculty.

HTBA

Introduction to common unifying themes that serve as the foundation for different areas of biomedical informatics, including clinical, neuro-, and genome informatics. The course is designed for students with significant computer experience and course work who plan to build computational tools for use in bioscience research. Emphasis is on understanding basic principles underlying informatics approaches to biomedical data modeling, interoperability among biomedical databases and software tools, standardized biomedical vocabularies and ontologies, modeling of biological systems, and other topics of interest. The course involves lectures, class discussions, student presentations, and computer programming assignments. *Also MCDB 750b.*

CB&B 645b, Statistical Methods in Genetics and Bioinformatics. Joseph Chang.

HTBA

Stochastic modeling and statistical methods applied to problems such as mapping quantitative trait loci, analyzing gene expression data, sequence alignment, and reconstructing evolutionary trees. Statistical methods include maximum likelihood, Bayesian inference, Monte Carlo Markov chains, and some methods of classification and clustering. Models introduced include variance components, hidden Markov models, Bayesian networks, and coalescent. Recommended background: STAT 541a, STAT 542b. Prior knowledge of biology is not required. Times to be arranged at organizational meeting. *Also STAT 645b.*

CHEM 526a^U, Computational Chemistry and Biochemistry. William Jorgensen.

TTh 9–10.15.

An introduction to modern computational methods employed for the study of chemistry and biochemistry, including molecular mechanics, quantum mechanics, statistical mechanics, and molecular dynamics. Special emphasis is placed on the hands-on use of computational packages for current applications ranging from organic reactions to protein-ligand binding and dynamics.

Additional courses focused on the biological sciences and on areas of informatics are selected by the student in consultation with CB&B faculty.

COMPUTER SCIENCE

A. K. Watson Hall, 432.1246
M.S., M.Phil., Ph.D.

Chair

Abraham Silberschatz

Director of Graduate Studies

Drew McDermott (508 AKW, 432.1283, drew.mcdermott@yale.edu)

Professors

Dana Angluin, Ronald Coifman (*Mathematics*), Julie Dorsey, Stanley Eisenstat, Joan Feigenbaum, Michael Fischer, David Gelernter, Paul Hudak, Ravindran Kannan (*on leave* [Sp]), Drew McDermott, A. Stephen Morse (*Electrical Engineering*), Vladimir Rokhlin, Holly Rushmeier, Martin Schultz (*on leave* [F]), Zhong Shao, Abraham Silberschatz (*on leave* [Sp]), Daniel Spielman, Steven Zucker

Associate Professor

James Aspnes, Yorgis Makris (*Electrical Engineering*), Edmund Yeh (*Electrical Engineering*)

Assistant Professors

Mark Gerstein (*Molecular Biophysics & Biochemistry*), Michael Mahoney (*Applied Mathematics*), Brian Scassellati, Yang Richard Yang (*on leave* [F])

Adjunct Professors

Gil Kalai, Willard Miranker

Lecturer

Robert Dunne

Fields of Study

Artificial intelligence (vision, robotics, planning, computational neuroscience, neural networks); programming languages and systems (functional programming, parallel languages and architectures, programming environments, formal semantics, software engineering, compilation techniques, modern computer architecture, theorem proving and proof assistants, type theory/systems, logical frameworks, and meta-programming); scientific computing (numerical linear and nonlinear algebra, numerical solution of partial differential equations, mathematical software, parallel algorithms); theory of computation (algorithms and data structures, complexity, distributive systems, learning, online algorithms, graph algorithms, geometric algorithms, fault tolerance, reliable communication, cryptography, security, and electronic commerce); and topics of discrete mathematics with application to computer science (combinatorics, graph theory, combinatorial optimization).

Research Facilities

The department operates a high-bandwidth, local-area computer network based mainly on distributed workstations and servers, with connections to worldwide networks. Workstations include Sun SPARCstations and Workstation PCs (NT and/or Linux). A vision laboratory contains specialized equipment for vision and robotics research. Various printers, including color printers, as well as image scanners, are also available. The primary educational facility consists of thirty-seven PC workstations supported by a large Intel PC server. This facility is used for courses and unsponsored research by computer science majors and first-year graduate students. Access to computing, through both the workstations and remote login facilities, is available to everyone in the department.

Special Admissions Requirements

Applicants for admission should have strong preparation in mathematics, engineering, or science. They should be competent in programming but need no computer science beyond that basic level. The GRE General Test and a pertinent Subject Test are required.

Special Requirements for the Ph.D. Degree

There is no foreign language requirement. To be admitted to candidacy, a student must: (1) pass twelve courses (including CPSC 690 and CPSC 691) with at least two grades of Honors, the remainder at least High Pass, including three advanced courses in an area of specialization; (2) take six advanced courses in areas of general computer science; (3) successfully complete a research project in CPSC 690, 691, and submit a written report on it to the faculty; (4) pass a qualifying examination in an area of specialization; (5) be accepted as a thesis student by a regular department faculty member; (6) serve as a teaching assistant for two terms; and (7) submit a written dissertation prospectus, with a tentative title for the dissertation. To satisfy the distribution requirement (clause 2 above), the student must take one course in programming languages or systems, one programming-intensive course, two theory courses, and two in application areas. In order to gain teaching experience, all graduate students are required to serve as teaching assistants for two terms during their first three years of study. All requirements for admission to candidacy must be completed prior to the end of the third year.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. (en route to the Ph.D.). To qualify for the M.S., the student must pass eight courses at the 500 level or above from an approved list. An average grade of at least High Pass is required, with at least one grade of Honors.

Master's Degree Program. Students may also be admitted to a terminal master's degree program directly. The requirements are the same as for the M.S. en route to the Ph.D. This program is normally completed in one year, but a part-time program may be spread over as many as four years.

A brochure providing additional information about the department, faculty, courses, and facilities is available from the Graduate Coordinator, Department of Computer Science, Yale University, PO Box 208285, New Haven CT 06520-8285; e-mail, cs-admissions@cs.yale.edu.

Courses

CPSC 521a^u, Compilers and Interpreters. Zhong Shao.

MWF 11.30–12.20

Compiler organization and implementation: lexical analysis, formal syntax specification, parsing techniques, execution environment, storage management, code generation and optimization, procedure linkage, and address binding. The effect of language-design decisions on compiler construction.

CPSC 522b^u, Operating Systems. Zhong Shao.

MW 1–2.15

The design and implementation of operating systems. Topics include synchronization, deadlocks, process management, storage management, file systems, security, protection, and networking.

[CPSC 524a^u, Parallel Programming Techniques.]

CPSC 525a^u, Theory of Distributed Systems. James Aspnes.

MWF 1.30–2.20

Models of asynchronous distributed computing systems. Fundamental concepts of concurrency and synchronization, communication, reliability, topological and geometric constraints, time and space complexity, and distributed algorithms. After CPSC 323a and 365b.

[CPSC 528b^u, Language-Based Security.]

[CPSC 529a^u, Functional Programming.]

CPSC 530a^u, Formal Semantics. Paul Hudak.

TTh 1–2.15

Introduction to formal approaches to programming language design and implementation. Topics include the lambda-calculus, type theory, denotational semantics, type-directed compilation, higher-order modules, and application of formal methods to systems software and Internet programming. After CPSC 202a and 323a.

CPSC 533b, Computer Networks. Yang Richard Yang.

MW 2.30–3.45

An introduction to the design, implementation, analysis, and evaluation of computer networks and their protocols. Topics include layered network architectures, applications transport, congestion, routing, data link protocols, local area networks, performance analysis, multimedia networking, network security, and network management. Emphasis on protocols used in the Internet. After CPSC 323a.

[CPSC 534b^u, Mobile Computing and Wireless Networking.]

CPSC 536a, Networked Embedded Systems and Sensor Networks.

Andreas Savvides.

TTh 2.30–3.45

Introduction to the fundamental concepts of networked embedded systems and wireless sensor networks, presenting a cross-disciplinary approach to the design and implementation of smart wireless embedded systems. Topics include embedded systems programming concepts, low-power and power-aware design, radio technologies, communication protocols for

ubiquitous computing systems, and mathematical foundations of sensor behavior. Laboratory work includes programming assignments on low-power wireless devices. *Also ENAS 960a.*

CPSC 537a^U, Introduction to Databases. Abraham Silberschatz.

TRH 2.30–3.45

An introduction to database systems. Data modeling. The relational model and the SQL query language. Relational database design, integrity constraints, functional dependencies, and natural forms. Object-oriented databases. Implementation of databases: file structures, indexing, query processing, transactions, concurrency control, recovery systems, and security.

CPSC 539b^U, Computer Systems. Andreas Savvides.

TRH 2.30–3.45

The organization of computer systems as hardware and software systems. Instruction-set architecture, assembly programming, computer arithmetic, data-path architecture and control, pipelining, memory hierarchy. Concepts illustrated by exploration of an instructional RISC microprocessor. *Also ENAS 907b^U.*

CPSC 540b^U, Numerical Computation I. Vladimir Rokhlin.

MW 2.30–3.45

Algorithms for numerical problems in the physical, biological, and social sciences: solution of linear and nonlinear systems of equations, interpolation and approximation of functions, numerical differentiation and integration, optimization.

CPSC 545b, Introduction to Data Mining. Martin Schultz.

TRH 2.30–3.45

A study of algorithms and systems that allow computers to find patterns and regularities in databases, to perform prediction and forecasting, and to improve their performance generally through interaction with data.

[CPSC 555b^U, Economics and Computation.]

CPSC 557a^U, Sensitive Information in a Wired World. Joan Feigenbaum.

TRH 2.30–3.45

An examination of issues of ownership, control, privacy, and accuracy of the huge amount of sensitive information about people and organizations that is collected, stored, and used by today's ubiquitous information systems. Readings consist of research papers that explore both the power and the limitations of existing privacy-enhancing technologies such as encryption and "trusted platforms."

CPSC 560b^U, Theoretical Methods in Computer Science. Joan Feigenbaum.

TRH 1–2.15

Basic topics in theoretical computer science: machine models; fundamental algorithms and their design, implementation, and analysis; data structures; the complexity of computation, communication, and data storage.

CPSC 563a, Introduction to Machine Learning. Dana Angluin.

TRH 2.30–3.45

Paradigms and algorithms for learning classification rules and more complex behaviors. Topics may include version spaces, decision trees, artificial neural networks, Bayesian networks, instance-based learning, genetic algorithms, reinforcement learning, inductive logic programming, the MDL principle, the PAC model, VC dimension, sample bounds, boosting, support vector machines, queries, grammatical inference, and inductive inference.

[CPSC 564b^U, Quantum Computing.]

CPSC 565a^u, Topics in Algorithms. Ravindran Kannan.

TTh 1–2.15

Introduction to the fundamental tools used in approximation algorithms: linear, convex, and semi-definite programming; dynamic programming; and geometric tools. Recent progress in the design of approximation algorithms for graph problems, combinatorial problems, and other NP-hard optimization problems. Results on the hardness of approximation based on probabilistically checkable proofs.

CPSC 567a^u, Cryptography and Computer Security. Michael Fischer.

TTh 4–5.15

A survey of such private and public key cryptographic techniques as DES, RSA, and zero-knowledge proofs, and their application to problems of maintaining privacy and security in computer networks. The main focus is on technology, but the course also considers such societal issues as balancing individual privacy concerns against the needs of law enforcement, vulnerability of societal institutions to electronic attack, export regulations and international competitiveness, and development of secure information systems.

[CPSC 569a^u, Randomized Algorithms.]**CPSC 570a^u, Artificial Intelligence. Drew McDermott.**

MWF 2.30–3.20

An introduction to artificial intelligence research, focusing on reasoning and perception. Topics include knowledge representation, predicate calculus, temporal reasoning, vision, robotics, planning, and learning.

[CPSC 572a, AI Programming Techniques.]

CPSC 573b, Intelligent Robotics. Brian Scassellati.

MWF 10.30–11.20

An introduction to the construction of intelligent, autonomous systems. Sensory-motor coordination and task-based perception. Implementation techniques for behavior selection and arbitration, including behavior-based design, evolutionary design, dynamical systems, and hybrid deliberative-reactive systems. Situated learning and adaptive behavior.

[CPSC 574b, Autonomous Systems.]

CPSC 575b, Computational Vision and Biological Perception. Steven Zucker.

MW 1–2.15

An overview of computational vision with a biological emphasis. Suitable as an introduction to biological perception for computer science and engineering students, as well as an introduction to computational vision for mathematics, psychology, and physiology students. *Also ENAS 575b^u.*

CPSC 577a^u, Neural Networks for Computing. Willard Miranker.

TTh 11.30–12.45

Artificial neural networks as a computational paradigm studied with application to problems in associative memory, learning, pattern recognition, perception, robotics, and other areas. Models for the dynamics of neurons and methods such as learning for designing neural networks are developed. Concepts, designs, and methods compared and tested in software simulation. Brain and consciousness studies are optional topics.

CPSC 578b^u, Computer Graphics. Holly Rushmeier.

MW 11.30–12.45

An introduction to the basic concepts of two- and three-dimensional computer graphics. Topics include affine and projective transformations, clipping and windowing, visual perception, scene modeling and animation, algorithms for visible surface determination, reflection

models, illumination algorithms, and color theory. Assumes solid C or C++ programming skills and a basic knowledge of calculus and linear algebra.

CPSC 579b^U, Advanced Computer Graphics: Rendering Techniques. Julie Dorsey.

M 3:30–5:20

A broad overview of the theory and practice of rendering. Topics include appearance capture and models; local and global illumination; surface reflection; lighting simulation algorithms; efficient rendering; image-based rendering; procedural approaches; and texture generation and rendering. Prerequisite: CPSC 478b.

CPSC 690a or b, Independent Project I.

By arrangement with faculty.

CPSC 691a or b, Independent Project II.

By arrangement with faculty.

CPSC 692a or b, Independent Project.

Individual research for students in the M.S. program. Requires a faculty supervisor and the permission of the director of graduate studies.

CPSC 752a^U, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein, Michael Snyder.

MW 1–2:15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, geometric analysis of protein structure, and macromolecular simulation. *Also CB&B 752a, MB&B 752a^U, MCDB 752a^U.*

CPSC 820a or b, Directed Readings in Programming Languages and Systems.

By arrangement with faculty.

CPSC 840a or b, Directed Readings in Numerical Analysis.

By arrangement with faculty.

CPSC 860a or b, Directed Readings in Theory.

By arrangement with faculty.

CPSC 870a or b, Directed Readings in Artificial Intelligence.

By arrangement with faculty.

EAST ASIAN LANGUAGES AND LITERATURES

308 Hall of Graduate Studies, 432.2860

M.A., M.Phil., Ph.D.

Chair

John Whittier Treat

Director of Graduate Studies

Edward Kamens (310 HGS, 432.2862, edward.kamens@yale.edu)

Professors

Kang-i Sun Chang, Edward Kamens, Haun Saussy (*Comparative Literature*), Hugh Stimson, John Whittier Treat

Associate Professor

Charles Laughlin

Assistant Professors

Aaron Gerow, Christopher Hill

Senior Lecturer

Koichi Shinohara

Senior Lectors

Seungja Choi, Koichi Hiroe, Zhengguo Kang, Yoshiko Maruyama, John Montanaro, Ling Mu, Michiaki Murata, Hiroyo Nishimura, Masahiko Seto, Mari Stever, Wei Su, William Zhou

Lectors

Angela Lee-Smith, Rongzhen Li, Ninghui Liang, Jianhua Shen, Li-li Teng, Peisong Xu

Fields of Study

Fields for doctoral study are Chinese literature and Japanese literature. (See also the Combined Ph.D. Program in Film Studies.) Although the primary emphasis is on these East Asian subjects, the department welcomes applicants who are seeking to integrate their interests in Chinese or Japanese literature with interdisciplinary studies in such fields as history, history of art, linguistics, religious studies, comparative literature, film studies, literary theory and criticism, and the social sciences.

Special Admissions Requirements

The department requires entering students in Chinese or Japanese (and the Combined Program in Film Studies) to have completed at least three years of study, or the equivalent, of either Chinese or Japanese. Students applying in Chinese are expected to have completed at least one year of literary Chinese. Students applying in premodern Japanese are expected to have completed at least one year of literary Japanese. This is a doctoral program; no students are admitted for master's degrees.

Special Requirements for the Ph.D. Degree

During the first three years of study, students are required to take at least fourteen term courses. Usually students complete twelve term courses in years one and two, and then take two tutorials or two seminars in year three. Students concentrating in Chinese or Japanese literature are encouraged to take at least one term course in Western literature or literary theory. All students must prove their proficiency in French, German, Russian, or another European language that the director of graduate studies deems appropriate, by the beginning of the second year. In some cases, with the approval of the director of graduate studies, students in Chinese literature may substitute modern Japanese and students in Japanese literature may substitute modern Chinese for a European language. By the end of the third year, students specializing in premodern Japanese literature must pass a reading test in literary Chinese. At the end of the second full academic year, the student must take a written examination in the language of his or her specialization, including both its modern and premodern forms.

At the end of each academic year, until a student is admitted to candidacy, a faculty committee will review the student's progress. For the second year review, the student must submit a revised seminar research paper, on a topic selected in consultation with the adviser, no later than April 1 of the fourth term. No later than the end of the sixth term the student will take the qualifying oral examination. The exam will cover three fields distinguished by period and/or genre in one or more East Asian national literatures or in other fields closely related to the student's developing specialization. These fields and accompanying reading lists will be selected in consultation with the examiners and the director of graduate studies in order to allow the student to demonstrate knowledge and command of a range of topics. After having successfully passed the qualifying oral examination, students will be required to submit a dissertation prospectus to the department for approval by the end of the seventh term in order to complete the process of admission to candidacy for the Ph.D.

Opportunities to obtain experience in teaching language and literature form an important part of this program. Students in East Asian Languages and Literatures normally teach in their third and fourth years in the Graduate School.

Combined Ph.D. Program

The Department of East Asian Languages and Literatures also offers, in conjunction with the Program in Film Studies, a combined Ph.D. in East Asian Languages and Literatures and Film Studies. For further details, see Film Studies. Applicants to the combined program must indicate on their application that they are applying both to Film Studies and to East Asian Languages and Literatures. All documentation within the application should include this information.

Master's Degrees

M.Phil. The successful completion of all predissertation requirements, including the qualifying examination, will make a student eligible for an M.Phil. degree.

M.A. (en route to the Ph.D.). The successful completion of twelve term courses and languages required in the first two years of study will make a student eligible for an M.A. degree.

Additional program materials are available at the department Web site, www.yale.edu/eall.

Courses

CHNS 500a^U, Man and Nature in Chinese Literature. Kang-i Sun Chang.

TRH 1–2.15

An exploration of concepts of man and nature in traditional Chinese literature and criticism, with special attention to historical contexts and cultural meanings. Topics include the centrality of lyricism and Taoism; depictions of nature and self-cultivation; travel in literature; the relation of poetry to painting; images of utopian communities as compared to the Western notion of Utopia; poets' strategies of self-canonization and identity. All readings in translation; no knowledge of Chinese is assumed. Optional discussion section conducted in Chinese for qualified students.

CHNS 501b^U, Women and Literature in Traditional China. Kang-i Sun Chang.

TRH 1–2.15

A study of women poets in traditional China, with some attention to representation of women in male poetry as well. Issues include literary canon and traditions, feminine voice and allegory, the abandoned woman, women in exile, the dichotomy of yin and yang, gender and genre, body and sexuality, notions of love, aesthetics of illness, and the function of memory. All readings in translation; no knowledge of Chinese required. Optional discussion section conducted in Chinese for qualified students. *Also WGSS 770b.*

CHNS 515^U, Elementary Modern Chinese. John Montanaro, William Zhou, Jianhua Shen.

MTWThF 9.30–10.20 *or*

MTWThF 10.30–11.20 *or*

MTWThF 11.30–12.20

Intended for students with no background in Chinese. An intensive course with emphasis on spoken language and drills. Pronunciation, grammatical analysis, conversation practice, and introduction to the reading and writing of Chinese characters. To be followed by CHNS 530.

CHNS 518^U, Elementary Modern Chinese for Advanced Learners. Ninghui Liang.

MTWThF 9.30–10.20

First level of the advanced learner sequence. Intended for students with some background in Chinese. An intensive course with emphasis on spoken languages and drills. Pronunciation, grammatical analysis, conversation practice, and introduction to reading and writing Chinese characters. To be followed by CHNS 533. Placement confirmed by placement test on first day of class and by instructors.

CHNS 530^U, Intermediate Modern Chinese. Ling Mu, Rongzhen Li.

MTWThF 10.30–11.20 *or*

MTWThF 11.30–12.20

An intermediate course that continues intensive training in listening, speaking, reading, and writing, and consolidates what students have achieved in the first year of study, allowing students to improve oral fluency, study more complex grammatical structures, and enlarge both reading and writing vocabulary. To be followed by CHNS 550. Prerequisite: CHNS 515 or equivalent.

CHNS 533^U, Intermediate Modern Chinese for Advanced Learners. Peisong Xu.MTWThF 9.30–10.20 *or*

MTWThF 10.30–11.20

The second level of the advanced learner sequence. Intended for students with intermediate to advanced oral proficiency and high elementary reading and writing proficiency. Students receive intensive training in listening, speaking, reading, and writing, supplemented by audio and video materials. The objective of the course is to balance these four skills and attain an advanced level in all of them. To be followed by CHNS 553. Prerequisite: CHNS 518 or equivalent.

CHNS 550^U, Advanced Modern Chinese. Li-li Teng.MTWThF 10.30–11.20 *or*MTWThF 11.30–12.20 *or*

MTWThF 12.30–1.20

Third level of the standard foundational sequence of modern Chinese language study in the areas of speech, listening, reading, and writing. Use of audiovisual materials, oral presentations, skits, and longer and more frequent writing assignments to assimilate more sophisticated grammatical structures. Introduction to a wide variety of written forms and styles. Use of both traditional and simplified forms of Chinese characters. After CHNS 530.

CHNS 552^U, Chinese through Film. Zhengguo Kang.

TTh 9–10.15

A survey of Chinese films of the past twenty years, optimized for language teaching. Texts include plot summaries, critical essays, and some scripts. Discussions, screenings, presentations, and writing workshops consolidate the four language skills. After CHNS 550 or equivalent.

CHNS 553^U, Advanced Modern Chinese for Advanced Learners. Zhengguo Kang.MWF 9.30–10.20 *or*

MWF 10.30–11.20

Third level of the advanced learner sequence in Chinese. Intended for students with advanced speaking and listening skills (able to conduct conversations fluently on broad topics) but with high intermediate reading and writing skills (able to write 1,000 to 1,200 characters). Readings on contemporary life in China and Taiwan, supplemented with authentic video and other selected reading materials. Class discussion, presentations, and regular written assignments. Texts in simplified characters with vocabulary in both simplified and traditional characters. After CHNS 533 or equivalent.

CHNS 556^U, Readings in Contemporary Chinese Texts. Wei Su.MW 11.30–12.45 *or*

TTh 11.30–12.45

Completes the standard sequence in Chinese. Selected readings in Chinese fiction, essays, and articles of the past twenty years. Lectures, discussion, and written work in Chinese aim at integrated mastery of the modern language. Prerequisite: CHNS 550 or equivalent.

CHNS 557^U, Readings in Modern Chinese Short Stories. Wei Su.

MWF 9.30–10.20

An advanced language course designed to further develop students' overall language skills through reading and discussion of modern short stories. Conducted in Chinese. After CHNS 550 or equivalent.

CHNS 560^U, Introduction to Literary Chinese. Faculty.

MWF 10.30–11.20

Reading and interpretation of texts in various styles of literary Chinese (*wenyan*), with attention to basic problems of syntax and literary style. After CHNS 533 or 550.

CHNS 562^U, Intermediate Literary Chinese: Old Chinese Prose and Poetry.**Hugh Stimson.**

Close reading of texts of the first millennium B.C.E. with attention to syntax and style. Prerequisite: CHNS 560 or equivalent.

CHNS 574a^U, The Revolutionary Tradition in Modern Chinese Literature.**Charles Laughlin.**

MW 1–2.15

An introduction to modern Chinese literary culture from the perspective of its central, revolutionary tradition. Exploration of ways that Chinese writers have attempted to change society through writing; the relationships among realism, romanticism, and revolution; and the consequences of the Chinese Communist Party's institutionalization of revolutionary literature. No knowledge of Chinese required.

CHNS 585b^U, Chinese Modernism. Charles Laughlin.

MW 1–2.15

Exploration of modernist and avant-garde literature in China. Discussion of issues of translation and modernity in a global context in fiction, poetry, drama, and film from the 1920s to the 1990s. Authors from China, Taiwan, and Hong Kong include Ding Ling, Shi Zhecun, Eileen Chang, Xi Xi, Yu Hua, Can Xue, Liu Suola, Zhang Dacun, Zhu Tianwen, and Gao Xingjian. Films by Huang Jianxin, Chen Kaige, and Wong Kar-wai. Prerequisite: CHNS 574a or permission of instructor. All readings in translation; no knowledge of Chinese assumed.

CHNS 635a, Seminar in the *Ci* Lyric. Kang-i Sun Chang.

T 2.30–4.20

A close reading of *ci* lyric and criticism from late Tang to the Ming. The course explores the evolution of the *ci* genre in various literary and cultural contexts—including its production and reception, its relationship with popular literature and print culture, aesthetic concerns, rhetorical devices, gender considerations, and political forces that shaped the generic development. Readings include selected texts of modern *ci* criticism, such as *Renjian cibua* by Wang Guowei.

CHNS 636b, Seminar in Chinese Prose from Tang to Ming. Kang-i Sun Chang.

T 2.30–4.20

A survey of essays by the “eight masters of the Tang and Song” as well as major prose writers of the Ming. The course explores the Chinese notion of literary models, of tradition and individuality, of cross-generic influences, and of the formation of canons. Some attention to the relationship between examination system and prose writing, including readings of the *baguwen* (the eight-part essay).

CHNS 685a, The Literature of Leisure and Chinese Modernity. Charles Laughlin.

T 9.30–11.20

Readings in the informal Chinese essay from late imperial times to the present. The course examines how, using the essay, writers have resisted the growing demand that literature serve society, creating a compelling vision of cultural modernity at odds with that of the mainstream. Discussion and secondary readings focus on changing Chinese conceptions of literature and its relationship to social life, the discourse on “tradition” and Chinese modernity, and issues of genre classification and literary groupings.

CHNS 802a, *Dream of the Red Chamber: The Novel and Its Readers.* Haun Saussy.

Th 2.30–4.20

A reading of the great eighteenth-century novel *Dream of the Red Chamber* (*Honglou meng*), in Chinese, with attention to selected commentaries from 1790 to 1920. Reading knowledge of literary Chinese expected.

CHNS 835b, Readings in the *Mencius*, the *Xunzi*, and the *Zhuangzi*. Ann-Ping Chin.

Th 3.30–5.20

Reading (in Chinese) of three Warring States texts as intellectual and political history, and as literature. *Also HIST 857b.*

CHNS 900, Directed Readings. Faculty.

Offered by permission of instructor and DGS to meet special needs not met by regular courses.

CHNS 990, Directed Research. Faculty.

Offered as needed with permission of instructor and DGS for student preparation of dissertation prospectus.

[JAPN 501b^U, *The Tale of Genji* and *The Pillow Book*.]**JAPN 515^U, Elementary Japanese. Michiaki Murata, Hiroyo Nishimura, Mari Stever.**MTWThF 9.30–10.20 *or*

MTWThF 10.30–11.20

An introductory course in spoken Japanese. Drills in pronunciation and conversation; lectures on grammar; and an introduction to reading and writing, including *hiragana*, *katakana*, and 200 *kanji*.

JAPN 540^U, Intermediate Japanese. Yoshiko Maruyama, Masahiko Seto,**Hiroyo Nishimura.**MTWThF 10.30–11.20 *or*

MTWThF 11.30–12.20

Emphasis on continued development in both written and spoken Japanese with reinforcement of previously learned patterns and structures. Besides the text, teaching materials include audio- and videotapes for listening comprehension and speaking practice, as well as multimedia materials. Prerequisite: JAPN 515 or equivalent.

JAPN 550^U, Advanced Japanese I. Koichi Hiroe, Mari Stever.MWF 1–2.15 *or*

MWF 2.30–3.45

An advanced Japanese language course designed to continue the development of students' proficiency in aural and reading comprehension, as well as speaking and writing skills. Reading and discussion of short stories, essays, and journal articles. Listening to and discussion of television and radio broadcasts. Writing practice includes diary, letters, essays, and criticism. Prerequisite: JAPN 540 or equivalent.

JAPN 552a^U, The Atomic Bombings of Japan in World Culture. John Treat.

TTh 1–2.15

A survey of the literary and artistic responses from around the world, but principally from Japan, to the nuclear destruction of Hiroshima and Nagasaki in 1945. Genres include fiction, poetry, theater, and film. No knowledge of Japanese required.

[JAPN 553a^U, Modern Japanese Fiction and Its Margins.]**JAPN 557^U, Advanced Japanese II. Masahiko Seto.**

MWF 1–2.15

Close reading in modern Japanese writings in current affairs, social science, cultural history, and modern literature. Students develop their speaking, listening, and writing skills through discussion and written exercises. Conducted in Japanese. After JAPN 550 or equivalent.

JAPN 558^u, Advanced Japanese III. Koichi Hiroe.

TTH 2.30–3.45

Further development of skills used in academic settings, including public speaking, formal presentations, and expository writing based on research. Materials include lectures, scholarly papers, criticism, fiction, and films. After JAPN 557 or equivalent.

JAPN 560a^u, Introduction to Literary Japanese. Edward Kamens.

MW 2.30–3.45

Introduction to the grammar and style of the premodern literary language (*bungotai*) through a variety of texts. Prerequisite: JAPN 550 or equivalent.

JAPN 561b^u, Readings in Literary Japanese. Edward Kamens.

M 1.30–3.20

Close analytical reading of a sequence of selections from texts of the Nara through Tokugawa periods: prose, poetry, and various genres. After JAPN 160a or equivalent.

[JAPN 565a, Literary Chinese (*Kambun*) for Students of Japanese.]**JAPN 578a^u, Modern Japanese Fiction. Christopher Hill.**

TTH 2.30–3.45

An introduction to Japanese fiction from the 1890s to the 1980s. Novels and stories by such writers as Natsume Soseki, Tanizaki Jun'ichiro, and Oe Kenzaburo; discussion of major trends such as modernism and writing by women. No knowledge of Japanese required.

JAPN 581b^u, Japanese Literature after 1970. John Treat.

TTH 11.30–12.45

A continuation of JAPN 578a. Study of Japanese literature published between 1970 and the present. Writers may include Murakami Ryu, Maruya Saiichi, Shimada Masahiko, Nakagami Kenji, Yoshimoto Banana, Yamada Eimi, Murakami Haruki, and Medoruma Shun. No knowledge of Japanese required.

JAPN 585b^u, Naturalist Literature in the Global Frame. Christopher Hill.

T 2.30–4.20

The dissemination of naturalist literature worldwide, from France in the 1850s to Asia and the Americas in the 1900s. Focus on France, the United States, and Japan. Local and global socioeconomic conditions supporting naturalist schools. Writers include Zola, Maupassant, Dreiser, Norris, Katai, and Toson.

[JAPN 586a^u, Japanese Cinema before 1960.]**JAPN 587a^u, Japanese Cinema after 1960. Aaron Gerow.**

TTH 11.30–12.45

The development of Japanese cinema after the breakdown of the studio system, through the revival of the late 1990s, and to the present.

JAPN 702b, Readings in Heian Period Prose and Poetry. Edward Kamens.

F 10–12

Close reading of works in various genres and styles from the eighth through twelfth century; research in traditional commentaries and contemporary criticism. In spring 2006 the seminar focuses on readings in *monogatari* and *setsuwa*.

JAPN 704a, Readings in Early Modern Japanese Literature. Edward Kamens.

F 10–12

Close reading of prose and poetry from the late sixteenth through nineteenth century; research in traditional and contemporary sources. In fall 2005 the seminar focuses on the works of Yosa Buson.

JAPN 830b, Literature, Culture, and Thought in Modern Japan. Christopher Hill.

Th 2.30–4.20

The transformations of literature and thought in the Meiji period. Topics include vernacularization, urban growth, and the representation of space, gender, and nationalism.

[JAPN 871b, Readings in Japanese Film Theory.]**JAPN 872b, Theorizing Popular Cultures and Subcultures of Modern Japan.**

Aaron Gerow.

T 1.30–3.20

An intense survey of postwar Japanese theories of subculture and popular image culture, focusing on the intellectual debates and the texts they discussed. *Also FILM 880b.*

JAPN 885a, Modern Japanese Novel. John Treat.

W 10–12

A seminar primarily designed as a three-year course in which graduate students specializing in Japanese literature are required to read major works of modern Japanese fiction in the original.

JAPN 900, Directed Readings. Faculty.

Offered by permission of instructor and DGS to meet special needs not met by regular courses.

JAPN 990, Directed Research. Faculty.

Offered as needed with permission of instructor and DGS for student preparation of dissertation prospectus.

KREN 515^U, Elementary Korean. Angela Lee-Smith and staff.MTWThF 9.30–10.20 *or*

MTWThF 10.30–11.20

A beginning course in modern Korean. Pronunciation, lectures on grammar, conversation practice, and introduction to the writing system (*Hankul*). The 10.30–11.20 meeting time is for students with elementary aural proficiency but little training in written Korean.

KREN 535^U, Intermediate Korean. Seungja Choi and staff.

MTWThF 10.30–11.20

Continued development of skills in modern Korean, spoken and written, leading to intermediate-level proficiency. After KREN 515 or equivalent.

KREN 550^U, Advanced Modern Korean. Seungja Choi and staff.

TTh 11.30–12.45

An advanced Korean language course designed to further develop students' aural and reading comprehension, as well as speaking and writing skills. Reading and discussion of short stories, essays, and journal articles. Writing practice includes letters and essays. After KREN 535 or equivalent.

EAST ASIAN STUDIES

320 Luce Hall, 34 Hillhouse, 432.3426
M.A.

Chair

Mimi Hall Yiengpruksawan (*History of Art*) (206 OAG, 56 High, 432.2682,
mimi.yiengpruksawan@yale.edu)

Director of Graduate Studies

Frances Rosenbluth (124 Prospect, 432.5256, frances.rosenbluth@yale.edu)

Professors

Richard Barnhart (*Emeritus, History of Art*), Beatrice Bartlett (*Emeritus, History*), Kang-i Sun Chang (*East Asian Languages & Literatures*), James Crowley (*Emeritus, History*), Deborah Davis (*Sociology*), Koichi Hamada (*Economics*), Valerie Hansen (*History*), Edward Kamens (*East Asian Languages & Literatures*), William Kelly (*Anthropology*), Edwin McClellan (*Emeritus, East Asian Languages & Literatures*), Frances Rosenbluth (*Political Science*), Haun Saussy (*Comparative Literature; East Asian Languages & Literatures*), Helen Siu (*Anthropology*), Jonathan Spence (*History*), Hugh Stimson (*East Asian Languages & Literatures*), Conrad Totman (*Emeritus, History*), John Whittier Treat (*East Asian Languages & Literatures*), Stanley Weinstein (*Emeritus, East Asian Languages & Literatures; Religious Studies*), Mimi Hall Yiengpruksawan (*History of Art*)

Associate Professor

Charles Laughlin (*East Asian Languages & Literatures*)

Assistant Professors

Michael Auslin (*History*), Aaron Gerow (*East Asian Languages & Literatures; Film Studies*), Christopher Hill (*East Asian Languages & Literatures*), Pierre-François Landry (*Political Science*), Lillian Lanying Tseng (*History of Art*)

Fields of Study

The Master of Arts program in East Asian Studies offers a concentrated course of study designed to provide a broad understanding of Chinese or Japanese history, culture, contemporary society, politics, and economy. This program is designed for students wishing to go on to the doctorate in one of the disciplines listed above, as well as for those students seeking a terminal M.A. degree before entering the business world, the media, government service, or a professional school.

Course of Study for the M.A. Degree

The program is designed to be completed by successfully taking eight courses approved for graduate credit by the director of graduate studies over the course of one academic year. Normally, students entering the program are expected to have already completed the equivalent of at least two years of Chinese or Japanese language, so that the three-year language requirement can be completed in the two terms spent at Yale. A program

of study for completion of the degree in one year consists of at least eight term courses that normally include two terms of language study at Yale's third-year level (unless the language requirement has already been met through previous study) and six other term courses selected from the current year's offerings of advanced language courses and lecture courses or seminars in any relevant subject area, with the approval of the director of graduate studies.

Special Requirements for the M.A. Degree

Students must earn two Honors grades ("H") over the course of their two terms at Yale. Honors grades earned in any Chinese or Japanese language class cannot be counted toward satisfying this requirement, except with the permission of the director of graduate studies.

Course of Study for the Joint Degree in East Asian Studies and Management

The joint master's degree program in East Asian Studies and Management is designed for students considering careers in public or private organizations that deal with East Asia. Normally a three-year program, it awards a master's degree in business administration and a Master of Arts degree in East Asian studies.

Special Requirements for the Joint Degree

The East Asian component of this degree is the same as that of the regular M.A. program except that the time period for the completion of the degree is extended to accommodate work at the School of Management. The Management component of this degree requires joint-degree candidates to complete thirteen courses at the School of Management. These include nine in the disciplines essential to management and three in integrative management courses.

Program materials are available upon request to the Council on East Asian Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail, eastasian.studies@yale.edu; Web site, www.yale.edu/ycias/ceas. Applications are available from the Admissions Office, Graduate School, Yale University, PO Box 208236, New Haven CT 06520-8236; e-mail, graduate.admissions@yale.edu.

Courses

EAST 510b, Seminar in Korean History. Kyung Moon Hwang.

W 1.30–3.20

An intensive readings course covering recent major studies in Korean history. Students are required to submit regular papers offering a critical analysis of these works in the context of the ongoing historiographical debates and historical themes. Some advanced undergraduates may enroll with permission of the instructor. *Also HIST 874b.*

Please consult the course information available online at www.yale.edu/ycias/ceas and <http://students.yale.edu/oci/> for a complete listing of East Asian-related courses offered at Yale University.

ECOLOGY AND EVOLUTIONARY BIOLOGY

Osborn Memorial Laboratories, Rm 101, 165 Prospect Street, 432.3837

www.eeb.yale.edu

M.S. (en route to the Ph.D.), Ph.D.

Chair

Günter Wagner

Director of Graduate Studies

Richard Prum

Professors

Leo Buss, Michael Donoghue, Jacques Gauthier (*Geology & Geophysics*), Willard Hartman (*Emeritus*), Gene Likens (*Cary Arboretum*), Jeffrey Powell, Richard Prum, Charles Remington (*Emeritus*), Oswald Schmitz (*Forestry & Environmental Studies*), David Skelly (*Forestry & Environmental Studies*), Stephen Stearns (*on leave*), J. Rimas Vaisnys (*Electrical Engineering*), Günter Wagner

Associate Professor

Vivian Irish (*Molecular, Cellular & Developmental Biology*)

Assistant Professors

Suzanne Alonzo, David Post (*on leave*), Melinda Smith, Paul Turner, Kevin White

Lecturers

Adalgisa Caccone, Kealoha Freidenburg, Dianella Howarth, Nancy Rosenbaum, Marta Martinez Wells

Fields of Study

The Department of Ecology and Evolutionary Biology (E&EB) offers training programs in organismal biology, ecology, and evolutionary biology including molecular evolution, phylogeny, molecular population genetics, developmental evolution, and evolutionary theory.

Special Admissions Requirements

Applicants should have had training in one of the following fields: biology, mathematics, chemistry, physics, statistics, and/or geology. Candidates are selected, regardless of their major, based on overall preparation for a career in research in ecology and evolutionary biology. Some, planning for careers in applied fields, may have prepared with courses in public policy, economics, and agriculture.

Special Requirements for the Ph.D. Degree

Each entering student, in consultation with the director of graduate studies, develops a specific program of courses, seminars, laboratory research, and independent reading tailored to the student's interests, background, and goals. There are normally no foreign language requirements. All first-year students carry out two research rotations. Students

have the option of a rotation over their first summer. Students must also attend the advanced research topics course and participate in (1) a program of ethics of research and authorship; (2) weekly E&EB seminars; and (3) symposia of faculty and graduate student research. In addition, during their first two years of study, graduate students must enroll in a minimum of three additional graduate-level courses (numbered 500 and above). Teaching experience is regarded as an integral part of the graduate training program. All students are required to teach two courses, normally at the TF 2 level, during their first two years of study.

In the third term of study each student takes a general examination in ecology. By the end of the third term, each student organizes a formal preprospectus consultative meeting with his/her advisory committee to discuss the planned dissertation research. By the end of the fourth term, students present and defend their planned dissertation research at a prospectus meeting, where the department determines the viability and appropriateness of the student's Ph.D. proposal. A successful prospectus meeting and completion of course requirements result in admission to candidacy for the Ph.D. The remaining requirements include completion, presentation, and successful defense of the dissertation, and submission of copies of the dissertation to the Graduate School and to the Kline Science Library.

In cases where the dissertation committee decides that preliminary field work during the summer after the fourth term is necessary prior to the prospectus, the prospectus meeting can be delayed by one term. A request for a delay has to come from the dissertation committee and needs to be approved by the DGS. In these exceptional cases admission to candidacy may not be required for registration for the third year of graduate study.

Honors Requirement

Students must meet the Graduate School's requirement of Honors in two courses by the end of the fourth term of study. The E&EB department also requires an average grade of at least High Pass in course work during the first two years of study.

Master's Degree

M.S. (en route to the Ph.D.). Satisfactory completion of the first two years of study leading to the Ph.D. up to, but not necessarily including, the prospectus.

Additional material providing information on the department, faculty, courses, and facilities is available from Maureen Cunningham, Office of the Director of Graduate Studies, Department of Ecology and Evolutionary Biology, Yale University, PO Box 208106, New Haven CT 06520-8106; e-mail: maureen.cunningham@yale.edu; phone: 203.432.3837; fax: 203.432.2374; Web site: www.eeb.yale.edu.

Courses

E&EB 503a, Advanced Research Topics in Ecology and Evolutionary Biology: Module One: Topic to be announced. Richard Prum.

TTh 10–12

This course is an introduction to cutting-edge research topics in ecology and evolutionary biology. Each topic is taught by a different faculty member who leads the course for six weeks. At the end of each term the students are expected to write a paper on a topic of their choice.

E&EB 504a, Advanced Research Topics in Ecology and Evolutionary Biology: Module Two: Experimental Evolution. Paul Turner.

TTh 10–12

This course is an introduction to cutting-edge research topics in ecology and evolutionary biology. Each topic is taught by a different faculty member who leads the course for six weeks. At the end of each term the students are expected to write a paper on a topic of their choice. This course examines how experiments are designed, executed, and analyzed to test evolutionary hypotheses. Emphasis is placed on evolutionary ecology, genetics, and genomics studies using model organisms, such as *Drosophila*, yeast, *E. coli*, and viruses. Topics include tests of the advantage of sex, the evolution of interactions (parasitism, mutualism, predator/prey), adaptation in constant versus changing environments, and evolution of genetic architecture. The course combines short lectures with discussion of classic and recent papers drawn from the primary literature. At the end of the course, students orally present a paper of their choosing, as if delivering a talk at a scientific conference.

E&EB 510a^U, Introduction to Statistics: Life Sciences. Günter Wagner.

TTh 1–2.15

Statistical and probabilistic analysis of biological problems is presented with a unified foundation in basic statistical theory. A general lecture covering statistical theory and a discipline-based lecture covering statistical modeling of biological problems drawn from genetics, ecology, epidemiology, and bioinformatics. Graduate students are expected to finish a course project in addition to regular homework and exams. *Also STAT 501a^U.*

E&EB 520a^U, General Ecology. Melinda Smith.

MWF 10.30–11.20

A broad consideration of the theory and practice of ecology, including the ecology of individuals, population dynamics and regulation, community structure, ecosystem function, and ecological interactions on broad spatial and temporal scales. Topics such as climate change, fisheries management, and infectious disease are placed in an ecological context.

E&EB 525b^U, Evolutionary Biology. Jeffrey Powell.

TTh 11.30–12.45

An introduction to the study of evolution from both a macro- and microevolutionary perspective. Principles of population genetics, systematics, paleontology, and molecular evolution are addressed as well as application of evolutionary thinking to issues in animal behavior, ecology, and molecular biology.

E&EB 526Lb^U, Laboratory for Evolutionary Biology. Marta Martinez Wells.

W 1.30

The companion laboratory to E&EB 525b. Study of patterns and processes of evolution, including collection and interpretation of molecular and morphological data in a phylogenetic context. Focus on methods of analysis of species-level and population-level variation in natural populations.

E&EB 530a^u, Field Ecology. Melinda Smith, Peter Raymond, Thomas Siccama.

Th 1–5

A field-based introduction to ecological research. Experimental and descriptive approaches, comparative analysis, and modeling are explored using field and small-group projects relevant to major topics in ecology. Concurrently with or after E&EB 220a or by permission of the instructor. Limited enrollment.

[E&EB 540a^u, AIDS and Society.]**E&EB 541a^u, Animal Behavior. Suzanne Alonzo.**

MW 11.30–12.45, I HTBA

An introduction to the study of animal behavior from an evolutionary and ecological perspective. This course covers the history and methods used to study animal behavior as well as discussion of many of the important topics in animal behavior such as foraging, predation, communication, reproduction, cooperation, and the role of behavior in conservation.

E&EB 550a^u, Biology of Terrestrial Arthropods. Marta Martinez Wells.

TTh 11.30–12.45

Evolutionary history and diversity of terrestrial arthropods (body plan, phylogenetic relations, fossil record); physiology and functional morphology (water relations, thermoregulation, energetics of flying and singing); reproduction (biology of reproduction, life cycles, metamorphosis, parental care); behavior (migration, communication, mating systems, evolution of sociality); ecology (parasitism, mutualism, predator-prey interactions, competition, plant-insect interactions).

E&EB 551La^u, Laboratory for Biology of Terrestrial Arthropods.

Marta Martinez Wells.

W 1.30

Comparative anatomy, dissections, identification, and classifications of terrestrial arthropods; specimen collection; field trips.

E&EB 555b, The Invertebrates. Leo Buss.

MW 11.30–12.45

A systematic treatment of the invertebrate phyla, with emphasis on anatomy, functional organization, and evolutionary history.

E&EB 556Lb, Laboratory for the Invertebrates. Leo Buss.

Th 1.30

Study of the anatomy of representative living invertebrates accompanied by examination of museum specimens of living and fossil invertebrates. Concurrently with E&EB 555b.

E&EB 572b^u, Ornithology. Richard Prum.

MWF 9.30–10.15

Structure, function, behavior, evolution, and diversity of birds. A general overview of avian biology and evolution. Topics include the evolutionary origin of birds, avian phylogeny, anatomy, physiology, neurobiology, behavior, breeding systems, and biogeography.

E&EB 573Lb^u, Laboratory for Ornithology. Richard Prum.

T 2.30

Laboratory and field studies of avian morphology, diversity, phylogeny, classification, identification, and behavior. Must be taken concurrently with E&EB 572b^u.

[E&EB 575b^u, Evolution of the Mammals.][E&EB 576Lb^u, Laboratory for Evolution of the Mammals.]

E&EB 615La^u, Laboratory in Molecular Systematics. Adalgisa Caccone.

M 1.30–5.30

A practical introduction to molecular techniques used in systematics (DNA extraction, PCR, sequencing) and their application to field studies in natural history, population genetics, mating systems, paternity, and the historical analysis of lineages. Research projects apply the methodologies.

[E&EB 62ob^u, Seminar in Conservation Genetics.]**E&EB 626b^u, Molecular Ecology. Adalgisa Caccone.**

TTh 11.30–12.45

This course provides an overview of molecular genetic tools used to investigate ecological and evolutionary processes in natural populations. The use of molecular markers is explored through the hierarchy of life from studies of genetic individuality, parentage, kinship, population substructure, species boundaries, phylogenetics of closely related species.

E&EB 646b^u, Plant Diversity and Evolution. Dianella Howarth.

MW 1–2.15

In recent years great progress has been made toward understanding the evolutionary relationships of plant lineages. This course explores the relationships and characteristics of the major plant groups including the green algae, mosses, ferns, conifers, and flowering plants within a phylogenetic context. The course addresses the depths of our understanding of ecology and development in the formation of the complexity and diversity among these plant groups. Students should have a general understanding of introductory biology and evolution.

E&EB 647Lb^u, Laboratory for Plant Diversity and Evolution. Dianella Howarth.

T 1

Laboratory sessions include local flora field research. Labs include hands-on experience in the plant groups examined in the course. Students should have a general understanding of introductory biology and evolution.

E&EB 660b^u, Wildlife Conservation Ecology. Oswald Schmitz.

3 HTBA; discussion 2 HTBA

An exploration of the evolutionary ecological basis for animal behavior and life history. Topics include how behavior evolves and what factors ultimately shape animal decision making and life histories; the link between animal behavior and population dynamics (demographic models that translate behavior into life-history strategies are used); and how environmental perturbations influence animal life histories to alter population structure and dynamics.

E&EB 665a^u, Landscape Ecology. David Skelly.

An introduction to the study of large-scale ecological patterns and processes. Through lectures and the completion of a project, students learn how to integrate a spatial perspective into consideration of major ecological questions. *Also F&ES 760a^u.*

E&EB 670a^u, Aquatic Ecology. David Skelly.

T 1–2.15, lab Th 1–5

An intensive introduction to the ecology of populations and communities in freshwater systems. Concepts, patterns, and organisms important in lakes and streams; techniques of information collection and analysis. Weekly field trips to gather data.

E&EB 691b, Developmental Evolution of Body Plans, Homology, and Evolutionary Innovations. Günter Wagner.

M 2.30–4.30

This course analyzes the contributions of developmental genetics, while trying to resolve some of the oldest questions in evolutionary biology: What is the nature of body plans?

How did they originate? What is the nature of homology? How do new characters evolve? Students are expected to present a paper on one subject and actively participate in the discussions.

[E&EB 722b, Topics in Microbial Toxin Evolution and Ecology.]

[E&EB 728b^u, Ecology and Evolution of Infectious Diseases.]

[E&EB 810a, Dynamics of Evolving Systems.]

[E&EB 845a, Advanced Evolutionary Theory.]

E&EB 900a–b, First-Year Introduction to Research and Rotations. Richard Prum.

[E&EB 930a, Seminar in Systematics.]

E&EB 950a or b, Second-Year Research.

By arrangement with faculty.

ECONOMIC HISTORY

Graduate Adviser

Timothy Guinnane

The program in economic history is designed to train a limited number of students who desire to be well grounded in the concepts of both history and economics and also of other relevant areas of social science in order to carry on research and teaching in economic history. Studies encompass (1) the economic development of Europe from the medieval period to the present; (2) the development of the American economy; and (3) the evolution of selected non-Western economies and their relation to the West.

Special Admissions Requirements

GRE scores in accordance with the requirements of either the Economics or the History department must be submitted as part of the application for admission.

Special Requirements for the Ph.D. Degree

In addition to the dissertation and language requirements (at least one European language is required), candidates must satisfy the course requirements and the qualifying examinations of either the Economics or the History department and must complete the equivalent of one additional year's work in the other discipline. Interested students should apply as regular Ph.D. candidates in either History or Economics, indicating on their application their interest in the program. Admission to this Ph.D. program is normally offered midway during a student's second year.

The course program is chosen by the student in consultation with the Graduate Adviser. Courses are selected from the offerings of the Economics and History departments in accordance with the requirements of the program selected by the student.

ECONOMICS

28 Hillhouse, 432.3575

M.A., M.Phil., Ph.D.

Chair

Steven Berry (28 Hillhouse, 432.3571)

Director of Graduate Studies

Truman Bewley (30 Hillhouse, Rm 30, 432.3719, truman.bewley@yale.edu)

Professors

Joseph Altonji, Donald Andrews, Dirk Bergemann, Steven Berry, Truman Bewley, William Brainard, Donald Brown, Eduardo Engel, Robert Evenson, Ray Fair, John Geanakoplos, Pinelopi Goldberg, Timothy Guinnane, Philip Haile, Koichi Hamada, Gerald Jaynes, Michael Keane, Yuichi Kitamura, Alvin Klevorick, Richard Levin, Robert Mendelsohn, Giuseppe Moscarini, Barry Nalebuff, William Nordhaus, Peter Phillips, Benjamin Polak, Gustav Ranis, John Roemer, Herbert Scarf, T. Paul Schultz, Robert Shiller, Martin Shubik, Anthony Smith, T. N. Srinivasan, Christopher Udry

Associate Professors

Patrick Bayer, Hanming Fang, George Hall, Carolyn Moehling, Rohini Pande

Assistant Professors

Irene Brambilla, Björn Bruegemann, Donato Gerardi, Galina Hale, Justine Hastings, Dean Karlan, Fabian Lange, Taisuki Otsu, Ebonya Washington

Fields of Study

Fields include economic theory, including microeconomics, macroeconomics, mathematical economics; econometrics; economic history; labor economics; market organization; money and banking; financial economics; economics of the public sector; international trade and finance; economic development; demography; history of economic thought; comparative economic systems; political economy.

Special Admissions Requirements

The GRE General Test is required of all applicants to the program. Students whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

The following requirements must be satisfied in addition to those prescribed by the Graduate School.

1. *Prior to Registration for the Second Year.* (a) Students must have taken for credit and passed at least six economics graduate courses. (b) Students must pass written comprehensive examinations in micro- and macroeconomics. These examinations, which are

given in May and late August of each year, must be taken in the spring term of the first year. Each exam will be graded separately, and in the event of failure, students will retake only the part of the exam they did not pass. Students may take the comprehensive examination no more than two times.

2. *Prior to Registration for the Third Year.* (a) Students must have met the two-Honors requirement specified by the Graduate School. (b) Students must have taken at least fourteen term courses in Economics and have received a grade of at least Pass – in each of them. With the permission of the director of graduate studies, courses in related fields and independent reading courses can be used to fulfill this requirement. Workshops may not be used to satisfy it. (c) Students must have received an average of at least High Pass in the courses they have taken. The admissibility of courses for this requirement is the same as for the fourteen-course requirement mentioned above.

3. *Admission to Candidacy.* The Graduate School requires that students be admitted to candidacy prior to registration for the fourth year of study. Students are recommended to the Graduate School for admission to candidacy by the director of graduate studies after having completed department requirements (1) and (2) above, the Graduate School's prospectus requirement, and the following additional requirements: (a) Students must have completed two one-term prospectus workshops. Prospectus workshops have the word "prospectus" in their title. (There are other workshops.) If students can find no workshop corresponding to their interests, they may substitute other workshops for this requirement. If students can find no workshop whatsoever in their areas of interest, they may substitute independent study guided by a faculty member, provided the independent study leads to a dissertation prospectus that is accepted. (b) Students must receive a grade of High Pass – or better in ECON 551b (Econometrics II) or 552b (Econometrics III). More advanced courses may be substituted for these with special permission of the director of graduate studies. (c) Students must receive a grade of Satisfactory on an applied econometrics paper, which is evaluated by the faculty adviser of the paper and another faculty member. In the paper, the student should (i) specify an economic model useful for the investigation of an interesting economic problem, (ii) select data and econometric methods appropriate to the question, (iii) conduct proper statistical analysis, and (iv) interpret the results in an intelligent way. (d) Students must complete with a grade of at least High Pass – a term of economic history, drawn from a list of courses approved by the director of graduate studies and economic history instructors. (e) Students must pass an oral examination.

4. *Submitting the Dissertation.* A student's dissertation research is guided by a committee of two Graduate School faculty members, at least one of whom must be a member of the Economics department. One of the committee members is designated as chair. When a first draft of the dissertation is completed, the director of graduate studies appoints, on request of the committee chair, a third reader.

Programs in Law and Economics

The Economics department participates in the J.D./M.A. and J.D./Ph.D. programs, which are described on pages 444–45 of this publication.

Master's Degrees

M.Phil. The M.Phil. degree is awarded to students in the Ph.D. program upon completion of fourteen term courses, with at least two grades of Honors. In addition, students must satisfy the qualifying requirements in economic theory, econometrics, economic history, and two special fields, as well as the oral examination.

M.A. (en route to the Ph.D.). The M.A. degree is awarded upon completion of eight term courses with an average grade of High Pass, and satisfactory completion of one of the following: the comprehensive examination in economic theory, the course requirement in econometrics, or the course requirement in economic history.

The M.A. in International and Development Economics is described on page 266 of this publication.

Program materials are available on our Web site: www.econ.yale.edu.

Courses

ECON 500a, General Economic Theory: Microeconomics. Truman Bewley, Benjamin Polak.

Introduction to optimization methods and partial equilibrium. Theories of utility and consumer behavior production and firm behavior. Introduction to uncertainty and the economics of information, and to noncompetitive market structures.

ECON 501b, General Economic Theory: Microeconomics. Dirk Bergemann.

General equilibrium and welfare economics. Allocation involving time. Public sector economics. Uncertainty and the economics of information. Introduction to social choice.

ECON 510a, General Economic Theory: Macroeconomics. Eduardo Engel, Anthony Smith.

Analysis of short-run determination of aggregate employment, income, prices, and interest rates in closed and open economies. Stabilization policies.

ECON 511b, General Economic Theory: Macroeconomics. George Hall, Giuseppe Moscarini.

Theories of saving, investment, portfolio choice, and financial markets. Longer-run developments; economic growth, capital accumulation, income distribution.

ECON 520a, Advanced Microeconomic Theory I. Itzhak Gilboa.

A formal introduction to game theory and information economics. Alternative noncooperative solution concepts are studied and applied to problems in oligopoly, bargaining, auctions, strategic social choice, and repeated games.

ECON 521b, Advanced Microeconomic Theory II. Staff.

Contracts and the economics of organization. Topics may include dynamic contracts (both explicit and implicit), career concerns, hierarchies, Bayesian mechanism design, renegotiation, and corporate control.

ECON 522a and 523b, Topics in Game Theory. Staff.

A forum for advanced students to examine critically recent papers in the literature and present their own work.

[ECON 524a, Behavioral Applied Theory.]

ECON 525a, Advanced Macroeconomics I. Eduardo Engel, Anthony Smith.

Aggregation, inventory models, externalities, spillovers, information, and adjustment. Time series models, expectations, models of financial markets, risk management, monetary policy, term structure of interest rates.

ECON 526b, Advanced Macroeconomics II. Björn Bruegemann, George Hall.

Selected empirical topics.

[ECON 527a, Behavioral and Institutional Economics.]**ECON 530a, Mathematical Economics I. Donald Brown.**

This is a first course in general equilibrium analysis of market economies. The focus of the course is Walrasian competition, monopolistic competition, and competition in markets with affective agents, i.e., affective competition. Topics include testable implications of these models, counterfactual analysis, and algorithms for solving calibrated models. The mathematical framework is Tame Topology and O-minimal Structures, where the Tarski-Seidenberg Theorem on Quantifier Elimination and Laskowski's Theorem on the VC-Dimension of Definable Sets are the basis of our analysis.

ECON 531a/b, Mathematical Economics II. John Geanakoplos.

This course examines the foundations of money and finance from the perspective of general equilibrium with incomplete markets. The relevant mathematical tools from elementary stochastic processes to differential topology are developed in the course. Topics include asset pricing, variations of capital asset pricing model, the "Hahn paradox" on the value of fiat money, default and bankruptcy, collateral equilibrium, market crashes, adverse selection and moral hazard with perfect competition, credit card equilibrium, and general equilibrium with asymmetric information.

[ECON 532a^U, General Equilibrium under Uncertainty.]**[ECON 533a and b, Workshop on Discrete Mathematics and Applications.]****ECON 535a and b, Prospectus Workshop in Mathematical Economics.**

Truman Bewley, John Geanakoplos.

Workshop for students researching in mathematical economics to meet to present and discuss work.

ECON 537a and 538b, Microeconomic Theory Workshop. Staff.

Presentations by research scholars and participating students.

ECON 540a and 541b, Student Workshop in Macroeconomics. Staff.

A course for third- and fourth-year students doing research in macroeconomics to prepare their prospectuses and to present their dissertation work. Each student is required to make at least two presentations per term. For third-year students and beyond, at least one of the presentations in the first term should be a mock job talk.

ECON 542a and 543b, Macroeconomics Workshop. Staff.

A forum for presentation and discussion of state-of-the-art research in macroeconomics. Presentations by research scholars and participating students of papers in closed economy and open economy macroeconomics and monetary economics.

ECON 544a, Economic Analysis. Cheryl Doss.

MW 9–10.15

An introduction for International Relations students to more advanced concepts of micro- and macroeconomic analysis in an applied context. Different economies in different stages of development are used as illustrations of these concepts. Areas covered include employment, income, and interest rate determination as well as theories of consumption, investment, pricing, money, and production. *Also INRL 560a.*

ECON 545a, Microeconomics. Michael Boozer.

A survey of the main features of current economic analysis and of the application of the theory to a number of important economic questions, covering microeconomics and demand theory, the theory of the firm, and market structures. For IDE Students.

ECON 546b, Macroeconomics. Douglas Gollin.

This course presents a basic framework to understand macroeconomic behavior and the effects of macroeconomic policies. Topics include consumption and investment, labor market, short-run income determinations, unemployment, inflation, growth, and the effects of monetary and fiscal policies. The emphasis is on the relation between the underlying assumptions of macroeconomic framework and policy implications derived from it. For IDE students.

ECON 550a, Econometrics I. Donald Andrews.

Probability: concepts and axiomatic development. Data: tools of descriptive statistics and data reduction. Random variables and probability distributions; univariate distributions (continuous and discrete); multivariate distributions; functions of random variables and transformations; the notion of statistical inference; sampling concepts and distributions; asymptotic theory; point and interval estimation; hypothesis testing.

ECON 551b, Econometrics II. Taisuki Otsu.

Provides a basic knowledge of econometric theory, and an ability to carry out empirical work in economics. Topics include linear regression and extensions, including regression diagnostics, generalized least squares, statistical inference, dynamic models, instrumental variables and maximum likelihood procedures, simultaneous equations, nonlinear and qualitative-choice models. Examples from cross-section, time series, and panel data applications.

ECON 552b, Econometrics III. Donald Andrews, Yuichi Kitamura.

The treatment of the subject is rigorous, attentive to modern developments, and proceeds to research level in several areas. Linear models from core curriculum. Topics include linear estimation theory, multiple and multivariate regressions, Kruskal's theorem and its applications, classical statistical testing by likelihood ratio, Lagrange multiplier and Wald procedures, bootstrap methods, specification tests, Stein-like estimation, instrumental variables, and an introduction to inferential methods in simultaneous stochastic equations.

ECON 553a, Econometrics IV: Time Series Econometrics. Peter Phillips.

A sequel to ECON 552, the course proceeds to research level in time series econometrics. Topics include an introduction to ergodic theory, Wold decomposition, spectral theory, martingales, martingale convergence theory, mixing processes, strong laws and central limit theory for weak dependent sequences with applications to econometric models and model determination.

ECON 554b, Econometrics V. Donald Andrews, Yuichi Kitamura.

The first half of this course is about nonlinear parametric models. Specification, estimation, and testing within the Likelihood and Generalized Method of Moments frameworks. First-order asymptotics for both smooth and non-smooth objective functions. Efficiency and robustness. A short account of high-order asymptotics for smooth problems. The second part is on nonparametric and semiparametric methods. Nonparametric estimation by kernels, series, splines, and other methods. Bias reduction and bandwidth selection. The curse of dimensionality and additive models. Specification and estimation of semiparametric models. U-statistics and asymptotic properties. Efficiency and adaptation.

ECON 555b, Applied Econometrics II: Microeconometrics. Michael Boozer.

This course develops the concepts needed to approach empirical problems in microeconomics with econometrics. The focus is less on developing a catalogue of econometric methods than on developing a conceptual basis for understanding how data, econometric methodology, and assumptions combine to produce statistical inference.

[ECON 557b, Time Series Econometrics II: Unit Roots and Co-Integration.]

ECON 558a, Statistics and Econometrics. Michael Boozer.

Application of statistical analysis to economic data. Basic probability theory, linear regression, specification and estimation of economic models, time series analysis, and forecasting. The computer is used. For IDE students.

ECON 561a, Computational Method for Economic Dynamics. Michael Keane, Anthony Smith.

The course aims to teach students how to use computational methods to solve and analyze dynamic economic models. The first part of the course covers standard tools of numerical analysis that are useful in economics (minimization of functions, root-finding, interpolation, approximation of functions, integration, simulation). The second part shows how to use these tools to study dynamic economic problems in macroeconomics, finance, labor economics, public finance, and industrial organization. This part of the course pays special attention to methods for solving stochastic dynamic programming problems and for computing equilibria in economic models with heterogeneous actors.

ECON 567a and 568b, Econometrics Workshop. Staff.

A forum for state-of-the-art research in econometrics. Its primary purpose is to disseminate the results and the technical machinery of ongoing research in theoretical and applied fields.

ECON 570a and 571b, Prospectus Workshop in Econometrics. Staff.

A course for third- and fourth-year students doing research in econometrics to prepare their prospectus and present dissertation work.

ECON 580a, General Economic History: Western Europe. Timothy Guinnane.

A survey of some major events and issues in the economic development of Western Europe during the eighteenth and nineteenth centuries, stressing the causes, nature, and consequences of the industrial revolution in Britain and on the Continent, and the implications of the historical record for modern conceptions of economic growth. Prerequisites: simultaneous enrollment in or successful completion of ECON 500a and ECON 510a; or permission of the instructor.

ECON 581b, American Economic History. Carolyn Moehling.

This course studies the process of economic growth as it has occurred in the American economy.

[ECON 582b, General Economic History: Latin America.]

[ECON 583a, Topics in Economic History.]

ECON 588a and 589b, Economic History Workshop. Timothy Guinnane, Carolyn Moehling.

A forum for discussion and criticism of research in progress. Presenters include graduate students, Yale faculty, and visitors. Topics concerned with long-run trends in economic organization are suitable for the seminar. Special emphasis given to the use of statistics and of economic theory in historical research.

ECON 600a, Industrial Organization I. Steven Berry, Justine Hastings.

Begins by locating the study of industrial organization within the broader research traditions of economics and related social sciences. Alternative theories of decision making, of organizational behavior, and of market evolution are sketched and contrasted with standard neo-classical theories. Then turns to a detailed examination of the determinants and consequences of industrial market structure.

ECON 601b, Industrial Organization II. Philip Haile.

Examination of alternative modes of public control of economic sectors with primary emphasis on antitrust and public utility regulation in the U.S. economy. Public policy issues in sectors of major detailed governmental involvement.

ECON 606a and 607b, Prospectus Workshop in Microeconomics. Staff.

For third-year students in microeconomics, intended to guide students in the early stages of theoretical and empirical dissertation research. Emphasis on regular writing assignments and oral presentations.

ECON 608a and 609b, Workshop in Applied Microeconomics. Staff.

For advanced graduate students in applied microeconomics, serving as a forum for presentation and discussion of work in progress of students, Yale faculty members, and invited speakers.

ECON 630a, Labor Economics. Michael Keane.

Topics include static and dynamic approaches to demand, human capital and wage determination, wage income inequality, unemployment and minimum wages, matching and job turnover, immigration and international trade, unions, implicit contract theory, and efficiency wage hypothesis.

ECON 631b, Labor Economics. Joseph Altonji, Fabian Lange.

Topics include static and dynamic models of labor supply, human capital wage function estimation, firm-specific training, compensating wage differentials, discrimination, household production, bargaining models of household behavior, intergenerational transfers, and mobility.

ECON 638a and 639b, Labor and Population Workshop. Staff.

A forum primarily for graduate students to exposit their research plans and findings. Discussions encompass empirical microeconomic research relating to both high- and low-income countries.

ECON 670a, Financial Economics I. Zhiwu Chen.

Current issues in theoretical financial economics are addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area. *Also MGMT 740a.*

ECON 671b, Financial Economics II. Jonathan Ingersoll.

Current issues in theoretical financial economics are addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area. *Also MGMT 741b.*

ECON 680a, Public Finance I. Hanming Fang.

Theoretical and empirical topics in public finance. Some emphasis on the relation between taxation and the following problems: efficiency, equity, and income distribution, uncertainty in capital markets, and aggregate capital accumulation.

ECON 681b, Public Finance II. Ebonya Washington.

Topics include theory of public goods, an introduction to preference revelation, the problem of externalities and their control, and the methodology of cost-benefit analysis and some applications.

ECON 702b, International Economics. Koichi Hamada.

International monetary theory and its implications for economic policy. Topics include mechanisms of adjustment in the balance of payments; fiscal, monetary, and exchange rate policy for internal and external balance; international movements of capital. For IDE students.

ECON 708b, International Economic Analysis. Cheryl Doss.

MW 9–10.15

A continuation of ECON 544a/INRL 560a. It extends the use of economic analysis to international trade and monetary policy including exchange rates and balance of payments with an emphasis on their relation to international trade, cross-border capital flows, and national economic policies. Introduction to quantitative tools and analysis as a way to determine the effects of various policies, building on concepts introduced in ECON 544a and the first part of this course. *Also INRL 561b.*

[ECON 709a, International Economics and Open Economy Macroeconomics.]**ECON 720a, International Trade I. Irene Brambilla.**

The course covers the theory of international trade, policy, and institutions. Classical, Neo-classical, and more recent Imperfect Competition Scale Economies–based static models of trade are discussed. Dynamic extensions of some of the models that explore the relations among trade, innovation, and growth are presented. The analytics of trade policy issues, such as gains from trade, tariffs, and quotas, customs unions and free trade areas, and political economy of trade policy making, are discussed. The economic foundations of multilateral institutions governing world trade, i.e., GATT and its successor the WTO, are analyzed.

ECON 721b, International Trade II. Pinelopi Goldberg.

This course covers empirical topics in international trade with particular emphasis on current research areas. Topics include tests of international trade theories; studies of the relationships among international trade, labor markets, and income distribution; recent trade liberalization episodes in developing countries; empirical assessment of various trade policies, such as VETs and Anti-Dumping; productivity (and its relation to international trade liberalization); exchange rates, market integration, and international trade. Methodologically, the course draws heavily on empirical models used in the fields of industrial organization and to a lesser degree labor economics; these courses are thus recommended (though not required).

ECON 724b, International Finance. Assaf Razin.

International monetary economics covering the following topics: the balance of payments and the foreign exchange market; the elasticities, absorption, and monetary approaches to the foreign exchange market; the elasticities, absorption, and monetary approaches to the adjustment mechanism; long-term and short-term capital flows; Euro-dollars, portfolio and asset market approaches, policies for internal balance, flexible exchange rates, international reserves, and the monetary system.

ECON 730a, Economic Development I. Dean Karlan, T.N. Srinivasan.

Development theory at both aggregate and sectoral levels; analysis of growth, employment, poverty, and distribution of income in both closed and open developing economy contexts.

ECON 731b, Economic Development II. Christopher Udry.

Analysis of development experiences since World War II. Planning and policy making across countries and time. Models of development, growth, foreign trade, and investment. Trade, capital, and technology flows and increasing interdependence. The political economy of policy making and policy reform.

ECON 732b, Economic Development IDE. Robert Evenson.

Examines the models of classical and modern economists to explain the transition of developing economies into modern economic growth, as well as their relevance to income distribution, poverty alleviation, and human development. For IDE students.

[ECON 735a^U, Economics of Agriculture.]

ECON 736a^U, Economics of Technology. Robert Evenson.

Focus on an analysis of the microeconomic incentives for the discovery and adoption of new technology and on the macroeconomic implications of technical change. Topics include the incentives to conduct research and development; patents and other means of appropriating the returns from R&D investment; measuring the effects of technical change; national policies for directing technical change.

ECON 737b^U, Economics of Natural Resources. Robert Mendelsohn.

Linking of abstract economic concepts to concrete policy and management decisions. Application of theoretical tools of economics to global warming, pollution control, fisheries, forestry, recreation, and mining.

ECON 738a or b, Workshop on Environmental and Natural Resources.

William Nordhaus, Robert Mendelsohn.

ECON 749a and 750b, Trade and Development Workshop. Staff.

A forum for graduate students and faculty with an interest in the economic problems of developing countries. Faculty, students, and a limited number of outside speakers discuss research in progress.

ECON 756a/b, Prospectus Workshop in Development. Christopher Udry.

Workshop for students doing research in development to present and discuss work.

ECON 776b^U, Economics of Population. T. Paul Schultz.

Analysis of economic aspects of population change, including fertility, mortality and health, composition of households, migration, and labor force behavior. Microeconomic models of household behavior and demographic measurement theory used to account for economic and demographic behavior of persons in low- and high-income countries.

[ECON 788a, Political Competition.]

[ECON 790b, Political Economy.]

ECON 791a, Theories of Distributive Justice. John Roemer.

We survey the main theories of distributive justice proposed by economists and political philosophers since 1950, critiquing each theory from both the economic and the philosophical perspectives. *Also PLSC 595a.*

ECON 802a^U, Economic Development of Japan. Koichi Hamada.

Economic performance of Japan: historical development since Meiji Restoration, postwar reconstruction and rapid growth including the industrial policy, government policy, the political economy of U.S./Japan economic relations.

ECON 899a or b, Individual Reading and Research.

By arrangement with faculty.

ELECTRICAL ENGINEERING

Dunham Laboratory, 432.4250

M.Eng., M.S., M.Phil., Ph.D.

Chair

Tso-Ping Ma

Professors

Richard Barker (*Emeritus*), Andrew Barron, Richard Chang, James Duncan, Peter Kindlmann (*Adjunct*), Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), J. Rimas Vaisnys, Jerry Woodall (*Adjunct*), Steven Zucker

Associate Professors

Jung Han, Yiorgos Makris, Janet Pan, Lawrence Staib, Hemant Tagare, Edmund Yeh

Assistant Professors

Eugenio Culurciello, Hür Köser, Richard Lethin (*Adjunct*), Andreas Savvides, Sekhar Tatikonda

FIELDS OF STUDY

Fields include control systems, neural networks, communications and signal processing, wireless networks, intelligent sensors, sensor networks, vision systems, microelectronic materials and semiconductor devices, nanoelectronic science and technology, optoelectronic materials and devices, microelectromechanical systems (MEMS), computer engineering, computer architecture, and VLSI design and testing.

For admissions and degree requirements, and for course listings, see Engineering and Applied Science.

ENGINEERING AND APPLIED SCIENCE

Dunham Laboratory, 432.4250

M.Eng., M.S., M.Phil., Ph.D.

Dean

Paul Fleury

Director of Graduate Studies

Eric Altman

Programs of study are offered in the areas of applied mechanics and mechanical engineering, applied physics, chemical engineering, electrical engineering, biomedical engineering, and environmental engineering. All programs are under the Faculty of Engineering.

Applied Physics

Chair

Daniel Prober

Professors

Sean Barrett, William Bennett, Jr. (*Emeritus*), Richard Chang, Michel Devoret, Joseph Dillon, Jr. (*Adjunct*), Paul Fleury, Steven Girvin, Robert Grober, Victor Henrich, Arvid Herzenberg (*Emeritus*), Marshall Long, Tso-Ping Ma, Daniel Prober, Nicholas Read, Mark Reed, Robert Schoelkopf, Ramamurty Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*)

Associate Professor

Charles Ahn

Assistant Professors

Sohrab Ismail-Beigi, Janet Pan

FIELDS OF STUDY

Fields include areas of theoretical and experimental condensed-matter physics, optical and laser physics, and material physics. Specific programs include surface science, microlithography and quantum transport, optical properties of micro-cavities, spectroscopy at the nanoscale, near-field microscopy, atomic force microscopy and ferro-electronic materials, molecular beam epitaxy, mesoscopic physics, first principles electronic structure methods, and medical instrumentation.

Biomedical Engineering

Chair

Mark Saltzman

Professors

Richard Carson, James Duncan, Douglas Rothman, Mark Saltzman, Steven Segal, Fred Sigworth, Steven Zucker (*Computer Science*)

Associate Professors

Jacek Cholewicki, Todd Constable, Fahmeed Hyder, Lawrence Staib, Hemant Tagare

Assistant Professors

Francesco d'Errico, Robin de Graaf, Themis Kyriakides, Mark Laubach, Erin Lavik, Michael Levene, Xenios Papademetris

FIELDS OF STUDY

Fields include the physics of image formation (MRI, ultrasound, nuclear medicine, and X-ray), NMR spectroscopy, PET and modeling, digital image analysis and processing, computer vision, biological signals and sensors, biomechanics, physiology and human factors engineering, drug delivery, biotechnology, biomechanics of the spine, and tissue engineering.

Chemical Engineering

Chair

TBA

Professors

Eric Altman, Daniel Crothers, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), Thomas Graedel, Gary Haller, Michael Loewenberg, Lisa Pfeifferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, L. Lee Wikstrom (*Adjunct*), Kurt Zilm

Associate Professors

Gaboury Benoit, Paul Van Tassel

Assistant Professors

Michelle Bell, Eric Dufresne, William Mitch, Jordan Peccia

FIELDS OF STUDY

Fields include combustion, separation processes, catalysis, statistical mechanics of adsorption, high-temperature chemical reaction engineering, convective heat and mass transfer, chromatography, biochemical and biomedical engineering, biotechnology, molecular beams, aerosol science and technology, materials processing, surface science, and environmental engineering.

Electrical Engineering

Chair

Tso-Ping Ma

Professors

Richard Barker (*Emeritus*), Andrew Barron, Richard Chang, James Duncan, Peter Kindlmann (*Adjunct*), Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), J. Rimas Vaisnys, Jerry Woodall (*Adjunct*), Steven Zucker

Associate Professors

Jung Han, Yiorgos Makris, Janet Pan, Lawrence Staib, Hemant Tagare, Edmund Yeh

Assistant Professors

Eugenio Culurciello, Hür Köser, Richard Lethin (*Adjunct*), Andreas Savvides, Sekhar Tatikonda

FIELDS OF STUDY

Fields include control systems, neural networks, communications and signal processing, wireless networks, intelligent sensors, sensor networks, vision systems, microelectronic materials and semiconductor devices, nanoelectronic science and technology, optoelectronic materials and devices, microelectromechanical systems (MEMS), computer engineering, computer architecture, and VLSI design and testing.

Program in Environmental Engineering

Professors

Gaboury Benoit, Menachem Elimelech, Thomas Graedel, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, James Saiers

Assistant Professors

Michelle Bell, Ruth Blake, William Mitch, Jordan Peccia

Lecturers

James Wallis, L. Lee Wikstrom

FIELDS OF STUDY

Fields include aquatic and environmental chemistry, physical and chemical processes for water quality control, transport and fate of pollutants in the environment, transport of microbial particles in groundwater, colloidal and interfacial phenomena in aquatic systems, environmental engineering microbiology, environmental molecular biology, fate of hormones and pharmaceutically active compounds in aquatic environments and engineering systems, removal and reactivity of emerging trace organic pollutants in advanced water reuse, membrane separations for water quality control, industrial ecology, geochemistry and geomicrobiology, and chemical reactions at the mineral-water interface.

Mechanical Engineering

Chair

Marshall Long

Professors

David Bercovici, Ira Bernstein (*Emeritus*), Boa-Teh Chu (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Robert Gordon, Shun-Ichiro Karato, Amable Liñan-Martinez (*Adjunct*), Marshall Long, Manohar Panjabi, Daniel Rosner, Ronald Smith, Mitchell Smooke, Katepalli Sreenivasan (*Adjunct*), George Veronis, Peter Wegener (*Emeritus*), Forman Williams (*Adjunct*)

Associate Professors

Jacek Cholewicki, Udo Schwarz, David Wu

Assistant Professors

Jerzy Blawdziewicz, Eric Dufresne, David LaVan, Corey O'Hern, Ainissa Ramirez

Lecturers

Beth Anne Bennett, Kailasnath Purushothaman, Glenn Weston-Murphy

FIELDS OF STUDY

Mechanics of Fluids: Dynamics and stability of drops and bubbles; dynamics of thin liquid films; macroscopic and particle-scale dynamics of emulsions, foams, and colloidal suspensions; electrospray theory and characterization; combustion and flames; computational methods for fluid dynamics and reacting flows; laser diagnostics of reacting and nonreacting flows.

Mechanics of Solids/Material Science: Mechanisms of deformation, mass transport, and nucleation within material systems through experimental, analytic, and computational studies; mechanical testing of small-scale structures; characterization of microscale inhomogeneities in plastic flow; impact loading of materials; diffusion of dopants within semiconductor films; evolution of surface roughness during plastic deformation; ion implantation-induced disorder in crystalline films; incorporation of microstructural information into constitutive laws; electromigration in metallic interconnects; transient nucleation in multicomponent systems; jamming in particulate systems such as glasses, colloids, granular materials; materials science of thin films; phase transformations; MEMS materials; atomic-scale investigations of surfaces, surface interactions, and surface properties (nanomechanics); nanotribology (atomic mechanisms of friction); and nanoelasticity.

Special Requirements for the Ph.D. Degree

A pamphlet titled *Qualification Procedures for a Ph.D. Degree in Engineering and Applied Science* describes the requirements in detail. The student is strongly encouraged to read it carefully. Here, key requirements are briefly summarized.

The student plans his/her course of study in consultation with faculty advisers (the student's advisory committee). A minimum of ten term courses is required, to be completed in the first two years. (Students registered in Applied Physics must take a minimum of twelve term courses.) Mastery of advanced math, for example, ENAS 500a, is expected. Students may take an examination to place out of ENAS 500a. Placing out of the course will meet the mathematical topics requirement but will not reduce the total number of required courses. In addition, core courses, as identified by each department/program, should be taken in the first year. No more than two courses can be Special Investigations, and at least two must be outside the area of the dissertation. Periodically, the faculty reviews the overall performance of the student to determine whether he/she may continue for the Ph.D. degree. At the end of the first year, a faculty member typically agrees to accept the student as a research assistant. By October 5 of the third year, an area examination must be passed and a written prospectus submitted before dissertation research is begun. These events result in the student's admission to candidacy. Subsequently, the student will report orally each year to the full advisory committee on progress. When the research is nearing completion, but before the thesis writing has commenced, the full advisory committee will advise the student on the thesis plan. A final oral presentation of the dissertation research is required to be given during term time. There is no foreign language requirement.

Honors Requirement

Students must meet the Graduate School's Honors requirement in at least two term courses (excluding Special Investigations) by the end of the second term of full-time study. An extension of one term may be granted at the discretion of the DGS.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. (en route to the Ph.D.). To qualify for the M.S., the student must pass eight term courses; no more than two may be Special Investigations. An average grade of at least High Pass is required, with at least one grade of Honors.

Master's Degree Program. Students may also be admitted directly to a terminal master's degree program. The requirements are the same as for the M.S. en route to the Ph.D. This program is normally completed in one year, but a part-time program may be spread over as many as four years. Some courses are available in the evening, to suit the needs of students from local industry.

Master of Engineering. This degree is designed to be taken in conjunction with Yale undergraduate B.S. degrees in Engineering. For details please see the Engineering entry in the *Yale College Programs of Study*, and www.eng.yale.edu/Select.

Program materials are available upon request to the Director of Graduate Studies, Engineering and Applied Science, Yale University, PO Box 208267, New Haven CT 06520-8267; e-mail, engineering@yale.edu; Web site, www.eng.yale.edu.

Courses

The list of courses may be slightly modified by the time term begins. Please check the Web site www.eng.yale.edu/graduate/course_descr.html for the most updated course listing.

ENAS 500a, Mathematical Methods I. Charles Ahn.

TTh 10.30–12

Vector analysis in three dimensions (2 weeks), linear algebra (4 weeks), functions of a complex variable (4 weeks), topics at the discretion of the instructor (3 weeks), e.g., (1) specific examples to reinforce the material already presented and (2) new topics (to choose among: Fourier series in one and more dimensions, Laplace transforms, Fourier integrals in one and more dimensions, optimization, elements of ODE).

ENAS 501b, Mathematical Methods II. Jerzy Blawdziewicz.

TTh 1–2.20

Special functions, the Laplace transformations, Fourier series, Fourier integrals, and partial differential equations including separation of variables, methods of characteristics, variational techniques, and the brief discussion of numerical methods.

ENAS 502b^U, Stochastic Processes. Edmund Yeh.

TTh 10.30–11.45

Elements of set and measure theory. Probability distributions, moments, characteristic functions. The central limit theorem. Basic properties of random processes. Stationarity and ergodicity. Correlation functions and power spectra. Linear and nonlinear operations on random processes.

[ENAS 503b, Networks, Algorithms, and Application.]

ENAS 505a, Advanced Engineering Mathematics. Michael Loewenberg.

TTh 10.30–12

A beginning graduate-level introduction is given to ordinary and partial differential equations, vector and tensor analysis, and linear algebra. Laplace transform, series expansion, Fourier transform, and matrix methods are given particular attention. Applications to problems frequently encountered by chemical, biomedical, and environmental engineers are stressed throughout.

ENAS 506a^U, Basic Quantum Mechanics. Daniel Prober.

TTh 1–2.15

Basic concepts and techniques of quantum mechanics essential for solid state physics and quantum electronics. Topics include the Schrödinger treatment of the harmonic oscillator, atoms and molecules and tunneling, matrix methods and perturbation theory.

ENAS 507b^U, Digital Systems Testing and Design for Testability. Yiorgos Makris.

MW 1–2.15

Introduction to the fundamental concepts, algorithms, and design techniques for testing digital systems. Covered topics include test issues and economics, fault modeling, logic and fault simulation, test generation algorithms for combinational and sequential circuits, testability analysis, design for testability, built-in self-test, delay fault test, functional test, case studies (memory test, FPGA test, system-on-chip test, etc). Lab work consists of projects employing logic and fault simulation, automatic test pattern generation, and design for testability software tools.

ENAS 509a^U, Electronic Materials: Fundamentals and Applications. Jung Han.

MW 11.30–12.45

Survey and review of fundamental issues associated with modern microelectronic and optoelectronic materials. Topics include band theory, electronic transport, surface kinetics, diffusion, materials defects, elasticity in thin films, epitaxy, and Si integrated circuits.

ENAS 510a^U, Physical and Chemical Basis Biosensing. Douglas Rothman.

TTH 1–2.15

Basic principles and technologies for sensing the chemical, electrical, and structural properties of living tissues and biological macromolecules. Topics include magnetic resonance spectroscopy, microelectrodes, fluorescent probes, chip-based biosensors, X-ray and electron tomograph, and MRI.

ENAS 511b^U, Physics and Devices of Optical Communication. Jung Han.

MW 11.30–12.45

A survey of the enabling components and devices that constitute modern optical communication systems. Focus on the physics and principles of each functional unit, its current technological status, design issues relevant to overall performance, and future directions. Permission of instructor required.

ENAS 513a^U, Introduction to Analysis. Peter Jones.

TTH 1–2.15

Foundations of real analysis, including metric spaces and point set topology, infinite series, and function spaces.

ENAS 514b^U, Real Analysis. Peter Jones.

TTH 1–2.15

The Lebesgue integral, Fourier series, applications to differential equations.

ENAS 521a, Classical and Statistical Thermodynamics. Abbas Firoozabadi.

MW 9–10.15

A unified approach to bulk-phase equilibrium thermodynamics, bulk-phase irreversible thermodynamics, and interfacial thermodynamics in the framework of classical thermodynamics, and an introduction to statistical thermodynamics. Both the activity coefficient and the equations of state are used in the description of bulk phases. Emphasis on classical thermodynamics of multicomponents, including concepts of stability and criticality, curvature effect, and gravity effect. The choice of Gibbs free energy function covers applications to a broad range of problems in chemical, environmental, biomedical, and petroleum engineering. The introduction includes theory of Gibbs canonical ensembles and the partition functions, fluctuations, and Boltzmann's statistics, Fermi-Dirac and Bose-Einstein statistics. Application to ideal monatomic and diatomic gases is covered.

ENAS 525a, Optimization I. Eric Denardo.

TTH 1–2.20

Focus on linear programming, a resource-allocation method widely used by engineers, managers, economists, and social scientists. The theory of linear programming (the simplex method, sensitivity analysis, prices, duality, and geometry) is coupled with a survey of its principal uses.

ENAS 530a, Nonlinear and Convex Optimization. Edmund Yeh.

Fundamental theory and algorithms of nonlinear and convex optimization, with applications to a wide range of scientific and engineering fields. Basic convex analysis, optimality conditions, duality theory, semidefinite programming. Numerical algorithms: steepest descent, Newton's Method, conditional gradient and subgradient algorithms, interior point methods. Applications to communication, control, signal processing, circuit design, statistics, and mechanical engineering. Prerequisites: linear algebra and multi-variable calculus.

ENAS 534b, Biomaterials. Erin Lavik.

MWF 10.30–11.20

Introduction to materials, classes of materials from atomic structure to physical properties. Major classes of materials: metals, ceramics and glasses, and polymers, addressing their

specific characteristics, properties, and biological applications. Throughout the presentation of the synthesis, characterization, and properties of the classes of materials, connections are made to their biological applications. Examples include the use of plasticizers in processing which may leach out during implantation and the increase in fracture toughness of ceramics by choosing dopants to promote phase transformations under stress. Case studies addressing the successes and failures of particular materials from each of the classes in biological applications.

ENAS 550a^U, Physiological Systems. Steven Segal and staff.

MWF 9:30–10:20

Regulation and control in biological systems, emphasizing human physiology and principles of feedback. Biomechanical properties of tissues emphasizing the structural basis of physiological control. Conversion of chemical energy into work in light of metabolic control and temperature regulation. *Also C&MP 550a, MCDB 550a^U.*

ENAS 551a^U, Biomedical Engineering I: Quantitative Physiology. Mark Saltzman.

TTh 11:30–12:45

Demonstration of the use of engineering analysis and synthesis in problems in the life sciences and medicine; focus on modeling of molecular physiological processes and design of artificial organs. The lectures in the course are coordinated with the sequence of lectures in ENAS 550a to illustrate how engineering analysis can be used to understand physiological processes. In addition, the course presents elements of pharmacokinetics, heat and mass transfer in physiological systems, hemodialysis, drug delivery, and tissue engineering.

[ENAS 554b^U, Biochemical Engineering: Biotechnology.]

ENAS 557b^U, Biomechanics. Jacek Cholewicki.

TTh 2:30–3:45

An introduction to the application of mechanical engineering principles to biological materials and systems. Topics include ligaments, tendons, bones, muscles; joints, gait analysis; exercise physiology. The basic concepts are directed toward an understanding of the science of orthopaedic surgery and sports medicine.

[ENAS 560a, Measurement and Noise.]

ENAS 570b^U, Cellular and Molecular Physiology: Molecular Machines in Human Disease. Michael Caplan, Emile Boulpaep, Mark Mooseker, Fred Sigworth.

MWF 9:30–10:20

This course focuses on understanding the processes that transfer molecules across membranes at the cellular, molecular, biophysical, and physiologic levels. Students learn about the different classes of molecular machines that mediate membrane transport, generate electrical currents, or perform mechanical displacement. Emphasis is placed upon the relationship between the molecular structures of membrane proteins and their individual functions. The interactions among transport proteins in determining the physiologic behaviors of cells and tissues are also stressed. Molecular motors are introduced and their mechanical relationship to cell function is explored. Students read papers from the scientific literature that establish the connections between mutations in genes encoding membrane proteins and a wide variety of human genetic diseases. *Also C&MP 560b, MCDB 560b^U.*

ENAS 575b^U, Computational Vision and Biological Perception. Steven Zucker.

MW 1–2:15

An overview of computational vision with a biological emphasis suitable as a introduction to biological perception for computer science and engineering students, as well as an introduction to computational vision for mathematics, psychology, and physiology students. After MATH 120a or b and CPSC 112a or b, or with permission of instructor. *Also CPSC 575b.*

ENAS 580a^U, Seminars in Biomedical Engineering. Staff.

Tutorial seminars illustrating applications of physics and engineering to biomedical problems. Students are required to attend the seminars, to do the readings assigned after each seminar, to ask questions, and to participate in the discussions. Four to five short papers are required on issues arising from selected topics. The final papers may be presented to the rest of the class.

[ENAS 589a, Introduction to Information Technology for Management.]

ENAS 600a^U, Computer-Aided Engineering. Marshall Long.

TTh 9–10.15

Aspects of computer-aided design and manufacture including reasons for increased use of CAD/CAM, the computer's role in the mechanical engineering design and its manufacturing process, hardware and software elements of typical commercial systems, and computer graphics and drafting.

ENAS 602b, Chemical Reaction Engineering. Lisa Pfefferle.

MW 4–6.30

Applications of physical-chemical and chemical-engineering principles to the design of chemical process reactors. Ideal reactors treated in detail in the first half of the course, practical homogeneous and catalytic reactors in the second.

ENAS 603b, Energy Mass and Momentum Processes. Daniel Rosner.

MW 9–10.15

Application of continuum mechanics approach to the understanding and prediction of fluid flow systems that may be chemically reactive, turbulent, or multiphase.

[ENAS 604b, Bioseparations: Science and Engineering.]

[ENAS 605b, Colloidal Chemical Engineering.]

[ENAS 607b^U, Microhydrodynamics.]

[ENAS 608b, Surface and Surface Processes.]

[ENAS 610a, Advanced Topics in Bioseparations.]

ENAS 611a^U, Separation Processes. Daniel Rosner.

MW 2.30–3.45

Theory and design of separation processes for multicomponent and/or multiphase mixtures via equilibrium and rate phenomena. Included are single-stage and cascaded absorption, adsorption, extraction, distillation, filtration, and crystallization processes.

[ENAS 612a, Colloidal Separations.]

[ENAS 614b, Surface and Thin-Film Characterization.]

[ENAS 618a, Principles and Practice of Heterogeneous Catalysis.]

[ENAS 619b, Advanced Transport: Topics in Multiphase Chemical Reaction Engineering.]

[ENAS 622b, Topics in Multiphase Chemical Reaction Engineering.]

ENAS 626a^U, Chemical Engineering Process Control. Yehia Khalil.

M 7–8.50

Modeling of steady- and unsteady-state behavior of chemical processes; optimal control strategies for processes of particular interest to chemical engineers; discussion of both classical and modern control theory, with applications.

ENAS 627b^U, Advanced Integrated Circuits. Eugenio Culurciello.

TTH 10.30–11.20

Neuromorphic analog integrated circuit design, fabrication processes, fundamentals of devices, circuits, and basic topologies. Analog and mixed-signal VLSI and SOC for biomedical instrumentation and bio-inspired circuits. System-level design, simulation, layout and tapeout. Examples of VLSI systems for biomedical applications: models of biological systems and circuit implementation. Biomedical sensors, SNR, and electronic circuit noise. Sensor arrays, communication, and analog-digital circuit interaction and co-design. Signal conversion, conditioning, compression, and reconstruction.

ENAS 639a, Management of Water Resources and Environmental Systems.**Gideon Oron.**

HTBA

The purpose of the course is to characterize, define, and solve water resources and environmental engineering problems implementing operation research (OR) methods. Topics include introduction to OR and its role in water resources and environmental systems, economic criteria in water and environmental systems, optimization criteria and optimality conditions, application of linear programming (river contamination), integer programming (solid waste disposal), fixed charge problems (reservoir operation), nonlinear programming (optimal water blending), and analytic hierarchy processes (selection of optimal waste treatment and reclamation).

ENAS 640b, Aquatic Chemistry. Gaboury Benoit.

TTH 11.30–12.45

A detailed examination of the principles governing chemical reactions in water. Emphasis is on developing the ability to predict the aqueous chemistry of natural and perturbed systems based on a knowledge of their biogeochemical setting. Focus is on inorganic chemistry, and topics include elementary thermodynamics, acid-base equilibria, alkalinity, speciation, solubility, mineral stability, redox chemistry, and surface complexation reactions. Illustrative examples are taken from the aquatic chemistry of estuaries, lakes, rivers, wetlands, soils, aquifers, and the atmosphere. A standard software package used to predict chemical equilibria may also be presented. *Also F&ES 544b.*

ENAS 641a, Biological Processes in Environmental Engineering. Jordon Peccia.

MW 4–5.15

Fundamental aspects of microbiology and biochemistry, including stoichiometry, kinetics, and energetics of biochemical reactions, microbial growth, and microbial ecology, as they pertain to biological processes for the transformation of environmental contaminants; principles for analysis and design of aerobic and anaerobic processes including suspended- and attached-growth systems, for treatment of conventional and hazardous pollutants in municipal and industrial wastewaters and in groundwater.

ENAS 642b, Environmental Physicochemical Processes. Menachem Elimelech.

TTH 2.30–3.45

Fundamental and applied concepts of physical and chemical (“physicochemical”) processes relevant to water quality control. Topics include chemical reaction engineering, overview of water and wastewater treatment plants, colloid chemistry for solid-liquid separation processes, physical and chemical aspects of coagulation, coagulation in natural waters, filtration in engineered and natural systems, adsorption, membrane processes, disinfection and oxidation, disinfection by-products.

[ENAS 643a, Transport and Fate of Organic Chemicals in the Environment.]

ENAS 644b, Environmental Chemical Kinetics. William Mitch.

TTh 9–10.15

Because equilibrium is rarely achieved in environmental systems, a fundamental understanding of the kinetics of environmentally relevant chemical reactions is necessary for the prediction of the fate of contaminants in the environment. After a brief review of chemical speciation and linear free energy relationships that govern the equilibrium behavior of chemicals in the environment, the course covers the theory underlying the use of similar free-energy relationships for the prediction of chemical reaction rates. The course then discusses the following environmentally relevant reactions: complexations, substitutions (e.g., hydrolysis), natural oxidation-reductions, biotransformations, engineered oxidation-reductions, photochemical reactions, and a brief introduction to surface reactions.

ENAS 645b, Industrial Ecology. Thomas Graedel.

MW 1–2.20

Industrial ecology is an organizing concept that is increasingly applied to define various interactions of today's technological society with both natural and altered environments. Technology and its potential for modification and change are central to this topic, as are implications for government policy and corporate response. The course discusses how industrial ecology is being applied in corporations to minimize the environmental impacts of products, processes, and services, and shows how industrial ecology serves as a technological framework for science, policy, and management in government and society. *Also F&ES 501b.*

[ENAS 646a, Environmental Hydrology.]

[ENAS 647b, Hydrologic Modeling.]

[ENAS 648a, Environmental Aspects of Emerging Technology.]

[ENAS 649a, Selected Topics in Environmental Engineering Science.]

ENAS 650a^U, Instrumentation and Product Design. Peter Kindlmann.

WF 2.30–3.45

Survey of broadly applicable design methods with initial emphasis on analog electronics: review of op amps and other integrated circuits and their specifications, data conversion fundamentals, the use of simulation and an online engineering database, exposure to such broader issues as user-interface design, user participation in design, and the transforming role of products at work and in the home.

ENAS 658a, MEMS Design. Hur Koser.

MW 10.30–12

Topics to include material properties, microfabrication technologies, structural behavior, sensing techniques, actuation schemes, fluid behavior, simple electronic circuits, and feedback systems. Student teams design a complete microsystem in line with their interests to meet a set of specifications based on realistic microfabrication processes. Modeling and simulation in the design process is emphasized.

[ENAS 704a^U, Theoretical Fluid Dynamics.]

[ENAS 705a, Numerical Simulations of Liquids.]

[ENAS 708b, Fundamentals of Combustion.]

[ENAS 709a, Special Topics in Combustion.]

[ENAS 713a^U, Acoustics.]

ENAS 718a^U, Heterojunction Devices. Mark Reed.

TTH 9–10.15

Survey of the physics, technology, and fabrication of semiconductor heterojunction materials and devices. Topics include contemporary compound semiconductor material properties and epitaxial growth techniques; high-speed analog and digital devices; microwave and millimeter wave devices for radar and wireless communications; the physics and device properties of quantum wells and superlattices; HEMTs and modulation-doped structures; resonant tunneling physics and devices; and device modeling using computer simulation tools. Lab includes fabrication of GAAs, FETs, and HBTs; fabrication and measurement of quantum Hall effect standards; LEDs; and resonant tunneling devices.

[ENAS 745a, Optical Diagnostics for Reacting and Nonreacting Flows.]**ENAS 747a^U, Applied Numerical Methods I. Beth Anne Bennett.**

TTH 2.30–3.45

A variety of numerical methods applied to problems in engineering and applied science. Topics include solutions of linear and nonlinear equations, interpolation and approximation, eigenvalue determination, and numerical integration.

ENAS 748b^U, Applied Numerical Methods II. Beth Anne Bennett.

TTH 11.30–12.45

An introduction to numerical methods for solution of ordinary and partial differential equations. One-step, multistep, and Runge-Kutta methods for initial value problems, finite difference methods in the solution of elliptic parabolic and hyperbolic partial differential equations.

[ENAS 750b^U, Mechanics of Deformable Solids.]**[ENAS 751a, Vibration Problems in Engineering.]****ENAS 761a, Introduction to Continuum Mechanics. Jerzy Bławdziewicz.**

TTH 9–10.15

Introduction to the physics of continuous media, with applications to physical, natural, and biological sciences and engineering. Topics include: tensor analysis; analysis of stress, motion, and strain; conservation of mass, momentum, and energy; rheology; examples in fluid dynamics, elasticity theory, and other topics at the discretion of instructor. *Also G&G 525a.*

[ENAS 763a, Introduction to Polymer Science and Engineering.]**ENAS 785a^U, Microstructural Development of Materials. David Wu.**

MW 1–2.15

An advanced course in the development of microstructure in a material. Topics include the nature of solids; thermodynamics of solids; atomic diffusion; solidification; the structure of internal interfaces; and diffusive and nondiffusive phase transformations.

[ENAS 786b, Mechanical Behavior of Materials.]**[ENAS 789a, Turbulence and Related Problems.]****ENAS 810a, Nonlinear Optics. Richard Chang.**

TTH 2.30–3.45

Fundamental aspects of laser interaction with matter, including both linear and nonlinear optical responses. The course introduces and analyzes actual electro-optical and magneto-optical devices (such as harmonic doublers, parametric oscillators, modulators, and isolators). *Also PHYS 679a.*

ENAS 811a, Stem Cells and Approaches to Repair in the Nervous System.**Erin Lavik.**

HTBA

A seminar in the isolation, differentiation, and therapeutic potential of neural stem cells. The seminar begins by focusing on the isolation of neural stem cells using a variety of techniques including FACS sorting, preferential passaging, and cloning. It then covers the development of techniques to control the differentiation of NSCs as well as identify their potential using gene and drug delivery approaches as well as novel high throughput assays. Comparisons are made between the *in vitro* and *in vivo* data across stem cell lines and models. The ultimate therapeutic potential of NSCs is then addressed and current results along these lines are compared with other stem cell populations as well as fetal tissue. Weekly readings are drawn from the current literature and are used to guide discussion. Experts in the field are also invited to lead sessions. *Also NSCI 611a.*

ENAS 812b, Molecular Transport and Intervention in the Brain. Mark Saltzman.

HTBA

This new course is a graduate-level seminar on mechanisms and rates of movement of molecules in the brain and the design of novel drug delivery systems. Topics include mathematical methods for modeling diffusion and flow processes, diffusion in the brain interstitium, fluid flows in the brain and spinal cord, the blood-brain barrier, microdialysis measurements, controlled release systems, microfluidic approaches for drug delivery. Weekly readings are assigned from neuroscience and engineering texts; current papers from the literature are used to guide discussion each week. *Also NSCI 612b.*

[ENAS 815b, Detection of Radiation.]**ENAS 816b, Techniques of Microwave Measurements and RF Design.****Robert Schoelkopf.**

TTH 10.30–12

An advanced course covering the concepts and techniques of radio-frequency design, and their application in making microwave measurements. The course begins with a review of lumped element and transmission line circuits, network analysis, and design of passive elements, including filters and impedance transformers. We continue with a treatment of passive and active components such as couplers, circulators, amplifiers, and modulators. Finally, we employ this understanding for the design of microwave measurement systems, techniques for modulation and signal recovery, to analyze the performance of heterodyne/homodyne receivers and radiometers. Prerequisite: E&M at advanced undergraduate level, such as AP322, or permission of instructor.

[ENAS 817a, Noise, Dissipation, and Amplification.]**ENAS 818a, Mesoscopic Physics. Michel Devoret.**

TTH 9–10.15

Introduction to the physics of nanoscale solid-state systems that are large and disordered enough to be described in terms of simple macroscopic parameters like resistance, capacitance, and inductance, but small and cold enough that effects usually associated with microscopic particles, like quantum-mechanical coherence and/or charge quantization, dominate. Emphasis is placed on transport and noise phenomena in the normal and superconducting regimes.

ENAS 821b^U, Physics of Medical Imaging. Todd Constable.

MW 11.30–12.45

The physics of image formation with special emphasis on techniques with medical applications. Concepts that are common to different types of imaging are emphasized, along with an

understanding of how information is limited by the basic physical phenomena involved. Mathematical concepts of image analysis, the formation of images by ionizing radiation, ultrasound, NMR, and other energy forms, and methods of evaluating image quality.

[ENAS 825a, Physics of Magnetic Resonance Spectroscopy *in Vivo*.]

ENAS 836b^u, Biophotonics and Optical Microscopy. Michael Levene.

MW 4–5.15

A review of linear and nonlinear optical microscopies and other biophotonics applications. Topics include wide-field techniques, linear and nonlinear laser scanning microscopy, fundamentals of geometrical and physical optics, optical image formation, laser physics, single molecule techniques, fluorescence correlation spectroscopy, and light scattering. Discussion of fluorescence and the underlying physics of light-matter interactions that provide biologically relevant signals.

ENAS 850a^u and 851b^u, Solid State Physics I and II. Victor Henrich [F], Charles Ahn [Sp].

TTH 1–2.15 [F], TTH 9–10.15 [Sp]

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonon, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. *Also PHYS 548a^u and 549b^u.*

ENAS 852b, Quantum Many-Body Theory. Yoram Alhassid.

TTH 10.45–12

Second quantization, quantum statistical mechanics, Hartree-Fock approximation, linear response theory, random phase approximation, perturbation theory and Feynman diagrams, Landau theory of Fermi liquids, BCS theory, Hartree-Fock-Bogoliubov method. Applications to solids and finite-size systems such as quantum dots, nuclei, and nanoparticles. *Also PHYS 610b.*

[ENAS 856a, Theory of Solids I.]

[ENAS 857b, Theory of Solids II.]

[ENAS 858a, Asymptotic Methods.]

ENAS 859b, Special Topics in Optics. Richard Chang.

TTH 2.30–3.45

A survey of the principles of optics. Topics include geometrical optics, optical imaging, interference, and diffraction. The course is taught from the experimentalist perspective and emphasizes real applications. *Also PHYS 675b.*

[ENAS 860a, Special Topics in Condensed Matter Physics: Quantum Hall Effect and Conformal Field Theory.]

[ENAS 863b, Introduction to Superconductivity.]

ENAS 866a, MOS Device Physics and Technology. Staff.

HTBA

Topics include basic MOS device physics, science and technology of thermal SiO₂, interface properties of MOS structures, experimental techniques to probe MOS parameters, hot-carrier effects, radiation effects, channel mobility and carrier transport in MOS inversion layers, scaling of MOS devices, low temperature properties of MOS devices, SOI device physics and technology, advanced gate dielectrics, MOS devices with wide-bandgap semiconductors, non-volatile memory devices, ferroelectric memory devices, single-electron MOS transistors, and other MOS topics of current interest.

ENAS 875a^u, Introduction to VLSI System Design. Richard Lethin.

TTh 1.30–3.20

Chip design. Provides background in integrated devices, circuits, and digital subsystems needed for design and implementation of silicon logic chips. Historical context, scaling, technology projections, physical limits. CMOS fabrication overview, complementary logical circuits, design methodology, computer-aided design techniques, timing, and area estimation. Case studies of recent research and commercial chips. Objectives of the course are (1) to give students the ability to complete the course project (design of a digital CMOS subsystem chip through layout), and (2) to understand the directions that future chip technologies may take. Selected projects are fabricated and packaged for testing by student. Prerequisite: circuits at the level of introductory physics and computer programming.

ENAS 887b^u, Dynamic Programming and Reinforcement Learning.

Sekhar Tatikonda.

HTBA

Sequential decision-making via dynamic programming. Unified approach to optimal control of stochastic dynamic systems and Markovian decision problems. Applications in communications, control, and networking. Infinite horizon problems. Value and policy iteration. Approximations and reinforcement learning.

ENAS 902a, Linear Systems. A. Stephen Morse.

MW 1–2.15

Background linear algebra; finite-dimensional, linear-continuous, and discrete dynamical systems; state equations, pulse and impulse response matrices, weighting patterns, transfer matrices. Stability, Lyapunov's equation, controllability, observability, system reduction, minimal realizations, equivalent systems, McMillan degree, Markov matrices. Recommended for all students interested in robotics, systems, and information sciences.

ENAS 907b^u, Computer Systems. Andreas Savvides.

TTh 2.30–3.45

The organization of computer systems as hardware and software systems. Instruction-set architecture, assembly programming, computer arithmetic, data-path architecture and control, pipelining, memory hierarchy. Concepts illustrated by exploration of an instructional RISC microprocessor. *Also CPSC 539b^u.*

[ENAS 908a, Advanced Topics in Computer Architecture.]**[ENAS 910a, Adaptive Control and Neural Networks.]****ENAS 912a^u, Digital Image Processing. James Duncan, Lawrence Staib.**

TTh 9–10.15

A study of the basic computational principles related to processing an analysis of biomedical images (e.g., magnetic resonance, computed X-ray tomography, fluorescence microscopy). Basic concepts and techniques related to discrete image representation, multidimensional frequency transforms, image enhancement/restoration, image segmentation, and image registration.

[ENAS 913a, Advanced Topics in Medical Imaging and Computer Vision.]**[ENAS 917a^u, Optical Properties of Semiconductors.]****[ENAS 918b, Data/Telecommunication Technology.]****[ENAS 919b, Advanced Heterojunction Devices.]**

ENAS 928b, Compound Semiconductor Materials Science, Processing, Devices, and Characterization. Staff.

F 10–12.30

Includes properties of important semiconductors, epitaxy, materials science, contacts, devices: fabrication, operation and applications, p-n and Schottky diodes, LEDs, lasers, photodetectors including Solar Cells, MESFETs and MOSFETs, HEMTs and HBTs, materials and device characterization.

[ENAS 929b, Advanced Semiconductors and Related Devices.]

ENAS 936b^U, Systems and Control. Kumpati Narendra.

TTh 2.30–3.45

State-variable analysis of linear time-invariant systems formulated in both continuous and discrete time. Topics include model building, state-space diagrams, equilibrium, stability, controllability, observability, transfer functions, various kinds of transformations. Several exercises use a digital computer.

[ENAS 944a^U, Digital Communications Systems.]**ENAS 954b^U, Information Theory. Andrew Barron.**

TTh 9–10.15

Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithmic complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, mutual information, channel capacity. Basic theorems of data compression and coding for noisy channels. Applications in statistics, communication networks, and finance. *Also STAT 664b^U.*

ENAS 960a, Networked Embedded Systems and Sensor Networks.**Andreas Savvides.**

TTh 2.30–3.45

Introduction to the fundamental concepts of networked embedded systems and wireless sensor networks, presenting a cross-disciplinary approach to the design and implementation of smart wireless embedded systems. Topics include embedded systems programming concepts, low-power and power-aware design, radio technologies, communication protocols for ubiquitous computing systems, and mathematical foundations of sensor behavior. Laboratory work includes programming assignments on low-power wireless devices. *Also CPSC 536a.*

[ENAS 964b^U, Communication Networks.]

[ENAS 974a, Math Tools/Biomed Signal Process.]

ENAS 986b^U, Semiconductor Silicon Devices and Microelectronics. Tso-Ping Ma.

MW 9–10.15

Fundamentals of integrated circuit technology, theory of solid-state devices, and principles of device design and fabrication. Laboratory involves the fabrication and analysis of semiconductor devices, including Ohmic contacts, Schottky diodes, p-n junctions, MOS capacitors, MOSFETs, and integrated circuits.

ENAS 990a and b, Special Investigations. Faculty.

Faculty-supervised individual projects with emphasis on research, laboratory, or theory. Students must define the scope of the proposed project with the faculty member who has agreed to act as supervisor, and submit a brief abstract to the director of graduate studies for approval.

[ENAS 995b, Technology Management Seminar Series.]

[ENAS 996a, SynThesis: Product Design for Entrepreneurial Teams.]

[ENAS 996b, SynThesis: Product Design for Entrepreneurial Teams.]

ENGLISH LANGUAGE AND LITERATURE

Linsly-Chittenden Hall, 432.2233

M.A., M.Phil., Ph.D.

Chair

Langdon Hammer

Director of Graduate Studies

Linda Peterson (106a LC, 432.2226, linda.peterson@yale.edu)

Professors

Harold Bloom, Leslie Brisman, David Bromwich, Jill Campbell, Janice Carlisle, Michael Denning, Wai Chee Dimock, Anne Fadiman (*Adjunct*), Roberta Frank, Paul Fry, Louise Glück (*Adjunct*), Sara Suleri Goodyear, Langdon Hammer, Margaret Homans, Lawrence Manley, Donald Margulies (*Adjunct*), J. D. McClatchy (*Adjunct*), Lee Patterson, Linda Peterson, Caryl Phillips, David Quint, Claude Rawson, Joseph Roach, Marc Robinson, John Rogers, Robert Stepto, Katie Trumpener, Alexander Welsh, Ruth Bernard Yeazel

Associate Professors

Murray Biggs (*Adjunct*), William Deresiewicz, Elizabeth Dillon, Laura Frost, Matthew Giancarlo, Blair Hoxby, Amy Hungerford, David Krasner, Pericles Lewis, Christopher R. Miller

Assistant Professors

Tanya Agathocleous, Ala Alryyes, Jennifer Baker, Shameem Black, Jessica Brantley, Wes Davis, El Mokhtar Ghambou, Hsuan Hsu, James Kearney, Sanda Lwin, Stefanie Markovits, Diana Paulin, Lloyd Pratt, Nicole Rice, Caleb Smith, Elliott Visconsi

Fields of Study

Fields include English from Old English to the present and American literature and language.

Special Requirements for the Ph.D. Degree

In order to fulfill the basic requirements for the program, a student must:

1. Complete thirteen courses — six courses with at least one grade of Honors and a maximum of one grade of Pass by July 15 following the first year; at least twelve courses with grades of Honors in at least four of these courses and not more than one Pass by July 15 following the second year. One of these thirteen courses must be The Teaching of English, ENGL 990.
2. Satisfy the language requirement. The requirement can be satisfied in two ways and is to be completed by the end of the second year.

The two-language option: two languages, one to be completed by passing two advanced literature courses (graduate or undergraduate courses taught in and requiring papers in the language in question) with a grade of Honors or High Pass; the other to be passed by

departmental exam. One of these two to be Latin or Greek. Students specializing in periods after 1750 may, with the permission of the director of graduate studies, substitute a second modern language.

The three-language option: three languages, all to be passed by departmental exam (in the case of the ancient language, by exam or by a year of successful Yale course work), selected from among the following: (a) Latin or Greek; (b) French or German; (c) one of the preceding languages, or Biblical Hebrew, Italian, Russian, Spanish, or another language agreed upon by the director of graduate studies. Students specializing in periods after 1750 may, with the permission of the director of graduate studies, substitute a third language for selection (a). Two terms of Old English (or one term of Old English and one of the History of the English Language) may be substituted for selection (c). The three-language requirement is to be completed by passing two exams by the end of the first year and the third by the end of the second year.

3. Pass the oral examination (before or as early as possible in the fifth term of residence).

4. Teach a minimum of two terms.

5. Submit a dissertation prospectus from three to six months after passing orals (depending on when these were taken).

6. Submit a dissertation.

Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the Ph.D. Admission to candidacy must take place by the end of the third year of study.

Combined Ph.D. Programs

ENGLISH AND AFRICAN AMERICAN STUDIES

A combined Ph.D. degree is available with African American Studies. Consult departments for details.

ENGLISH AND RENAISSANCE STUDIES

The Department of English Language and Literature also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in English Language and Literature and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in English are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program may receive the M.A. upon completion of six courses with at least one grade of Honors and a maximum of one grade of Pass, and the passing of *two* of the languages, ancient or modern, by departmental examinations.

Master's Degree Program

Students enrolled in the master's degree program must complete either seven term courses or six term courses and a special project within the English department (one or two of these courses may be taken in other departments with approval of the director of graduate studies). There must be at least one grade of Honors and there may not be more than one grade of Pass. Students must also pass examinations in two languages, ancient or modern. Full-time students normally complete the program in one year.

Program materials are available upon request to the Graduate Registrar, English Department, Yale University, PO Box 208302, New Haven CT 06520-8302.

Courses

ENGL 500a, Old English. Fred Robinson.

MW 9–10.15

Introduction to Old English language and style as well as reading and critical analysis of representative Old English poems (heroic narratives, elegies, religious meditations) and a few prose selections.

ENGL 500b, *Beowulf*. Roberta Frank.

MW 9–10.15

A close reading of the Old English poem *Beowulf* and related verse such as *Deor* and *The Finnsburg Fragment*. Attention is given to the general qualities of the Northern heroic tradition, and class members are asked to sample *Beowulf* scholarship and criticism, early and late. The course includes a final examination and a short paper.

ENGL 546b, Chaucer. Lee Patterson.

Th 3.30–5.20

A reading of the *Canterbury Tales*, with special attention to cultural and historical context. The goal of the course is to prepare non-medievalist students to teach Chaucer if called upon to do so, and to prepare medievalists for a professional career. Students are strongly encouraged to attend the lectures in ENGL 170b (TTh 1.30–2.20).

ENGL 550a^U, Spenser. Leslie Brisman.

MW 11.30–12.45, I HTBA

A reading of *The Faerie Queene*, together with a selection of the minor poems, against the background of Spenser's classical and Italian precursors.

ENGL 561b, Studies in Seventeenth-Century English Literature. John Rogers.

W 1.30–3.20

A survey of seventeenth-century poetry and prose, exclusive of Milton. Authors include Bacon, Lanyer, Donne, Hobbes, Herbert, Browne, Crashaw, Marvell, Cavendish, Bunyan, and Dryden.

ENGL 565a/b, Introduction to Renaissance Studies. David Quint [F], Lawrence Manley [Sp].

T 10.30–12.20 [F], W 3.30–5.20 [Sp]

An introduction to the major texts, issues, bibliography, and methods in the interdisciplinary study of the Renaissance. Emphasis in the first term on Italy and in the second on northern Europe. Also *CPLT 501a,b*, *RNST 500a,b*.

ENGL 574b, The Epic: Politics and Literary Form. David Quint.

T 10.30–12.20

A study of European epic poetry from its Roman traditions (Vergil, Lucan) to the Renaissance (Tasso, Camoes, Ercilla, d'Aubigne, and Milton). Areas of focus are the relationship between ideas of narrative and conflicting political ideologies and the problem of the representation of violence. *Also CPLT 684b.*

ENGL 688b, Race, History, and Memory after 1649. Elliott Visconsi.

M 1.30–3.20

A study of the braided histories of political belonging, sovereignty, and racial identity through a range of literary and philosophical texts written in the years between the killing of Charles I and the emergence of the United States. Topics include world history and the clash of civilizations; national literatures and poetic traditions; rights, citizenship, and political obligation; cultural memory and racial destiny. Authors include Shakespeare, Dryden, Milton, Locke, Behn, Defoe, Voltaire, Equiano, Paine, and Kant. *Also CPLT 688b.*

ENGL 709a, The Augustan Age. Jill Campbell.

W 1.30–3.20

A study of the writings of Alexander Pope, Jonathan Swift, Lady Mary Wortley Montagu, and members of their literary circles, including Finch, Gay, Addison and Steele, and Fielding. Readings in a variety of genres—poetry, essays, drama, prose fiction, and personal letters. Some sampling of work by members of the preceding generation (Rochester, Dryden) and by the contemporaries Pope named dunces (Cibber, Haywood). Particular attention to the lived connections among the writers we consider; practices of manuscript circulation and literary correspondence; the interactions of gender and authorship; and the emerging institutions of print culture.

ENGL 739b, Literature and Economics in the Eighteenth Century.

Catherine Labio.

W 3.30–5.20

The role played by literature in the formation of a new economic and moral subject as well as the key role played by modern economic thought and new economic realities in the emergence of modern literary forms and of literature as an academic discipline. Works by such authors as Defoe, Mandeville, Montesquieu, Rousseau, Hume, and Adam Smith. *Also CPLT 761b.*

ENGL 748a, The Life of the Author. Langdon Hammer.

T 1.30–3.20

The emergence of the author's life as a matter for literary representation and as a new kind of literary project in its own right. Our approach is a selective history of ideas of the author's life from the eighteenth to the twentieth century (roughly from Samuel Johnson's *Lives of the Poets* to Sylvia Plath's *Journals*), exploring a number of literary genres en route, including Keats's letters, Gaskell's *Life of Charlotte Brontë*, and fiction by James Joyce and Marcel Proust. Practical, historical, and theoretical comment on literary biography and the relation between life and art by Michel Foucault, Roland Barthes, William Wimsatt, Virginia Woolf, Pierre Bourdieu, Mark Rose, Salman Rushdie, and others.

ENGL 771b, Romantic Poetry and the Critical Tradition. Christopher R. Miller.

T 1.30–3.20

A study of Romantic poetry with attention to the history of ways in which it has been received and interpreted, beginning with Hazlitt and his contemporaries and continuing through recent scholarly developments.

ENGL 775a, The Contest between Poetry and Divinity. Geoffrey Hartman.

w 2–4.50

The honorific that the poet is like a god, or that art can conceive heterocosms, should not obscure the strange fact that writers, especially poets, keep falling back on a language “*plena Jovis*,” as the materialist Proudhon admitted. Or that many of them wish to reappropriate and reshape visionary conceptions they consider alienated by an established priesthood. “Who owns the gods?” Texts chosen from the following poets: Addison, Blake, Coleridge, Wordsworth, Shelley, Emily Dickinson, Christopher Smart, Hölderlin, and Nerval. *Also CPLT 526a*.

ENGL 801a, Victorian Prose: The Conditions of England. Janice Carlisle.

m 1.30–3.20

An examination of canonical works of Victorian nonfiction prose by Carlyle, Mill, Newman, Arnold, Ruskin, and Morris, as well as periodical essays by such women as Cobbe and Linton and texts by the working-class writers Brown and Dodd.

ENGL 829b, Late Victorian Poetry and Prose. Linda Peterson.

m 10.30–12.20

Poetry, essays, and novels of the 1870s, '80s, and '90s as they respond to and react against high Victorianism in both form and ideology. The focus is on the “new” movements: neo-Hellenism, neo-medievalism, aestheticism, decadence, and the New Woman. Authors include Swinburne, Pater, Wilde, and Hardy, with some attention to Kipling, Gissing, Grant Allen, Mary Ward, and Mary Cholmondeley.

ENGL 862a, African American Theater, Drama, and Performance. David Krasner.

w 10.30–12.20

Studies in African American theater, drama, and performance of the nineteenth through the twentieth century, including plays, performances, and theories during major periods of artistic development: the New Negro Movement, Harlem Renaissance, Federal Theater Projects, post-WWII Realism, Black Arts Movement, modernism, postmodernism, and feminist/womanist theater. Among the playwrights examined are Hansberry, Baraka, Shange, Bullins, Kennedy, and August Wilson. *Also AFAM 840a*.

ENGL 868b, American Renaissance. Jennifer Baker.

th 10.30–12.20

This course examines American writing of the 1850s. We study “American Renaissance” as it has been variously defined since F. O. Matthiessen coined the term in 1941. Writers include Melville, Hawthorne, Emerson, Thoreau, Whitman, Douglass, Poe, Dickinson, and Stowe.

ENGL 894a, Stevens and Frost. David Bromwich.

w 3.30–5.20

A seminar in Frost’s major poems and most of Stevens’s poems, the proportion being roughly four weeks on Frost, eight weeks on Stevens. Some attention is given to the prose writings of both poets.

ENGL 925a, American Literature and World Religions. Wai Chee Dimock.

th 10.30–12.20

Beginning with Cabeza de Vaca and Olaudah Equiano as instances of Christianity in the Atlantic world, this course studies the extension, migration, and transformation of world religions—Islam, Hinduism, Buddhism, and their folk variants—within the context of American literature, challenging the standard account of an exclusively Puritan heritage. Readings range from Emerson and Thoreau to Henry Adams, Willa Cather, Malcolm X, Allen Ginsberg, Gary Snyder, Amy Tan, and Bharati Mukherjee. *Also AMST 925a, CPLT 529a*.

ENGL 932b, Modern American Drama. Marc Robinson.

Th 10–12

A seminar on American drama from World War I to 1960. Among the playwrights to be considered are O'Neill, Stein, Wilder, Barnes, Hurston, Odets, Williams, Miller, and Bowles. *Also DRAM 366b.*

ENGL 947a, African American Poets of the Modern Era. Robert Stepto.

T 1.30–3.20

The African American practice of poetry between 1900 and 1960, especially of sonnets, ballads, sermonic, and blues poems. Poets studied include Paul Laurence Dunbar, Langston Hughes, Sterling Brown, Gwendolyn Brooks, Margaret Walker, and Robert Hayden. The classes include sessions at Beinecke Library for the inspection and discussion of original editions, manuscripts, letters, and other archival materials. *Also AFAM 596a, AMST 641a.*

ENGL 962b, Drama, Performance, and Mass Culture. Joseph Roach.

W 10.30–12.20

Taking account of the genealogy of modern drama in eighteenth-century performance, this seminar considers critical theories of the culture industry in relationship to selected canonical plays and popular theater-historical events from *The Beggar's Opera* (1728) to *The Threepenny Opera* (1928). Topics include the transformation of classical genres into the *drame*, the commercialization of leisure through the mass-marketing of vicarious experience, and the emerging culture of celebrity. Critical readings include selections from the Frankfurt School, Walter Benjamin, Bertolt Brecht, Raymond Williams, Roland Barthes, and Jean Baudrillard. Plays are drawn from popular comedies, Sheridan to Shaw (*Pygmalion* and *My Fair Lady*), and long-running bourgeois dramas, beginning with Lillo's *The London Merchant*. *Also CPLT 914b.*

ENGL 964b, Modernist Fiction: The Seen and the Unseen. Pericles Lewis.

Th 1.30–3.20

This seminar surveys a range of modernist stories and novels that describe the interaction between the visible world—of objects, bodies, and the natural and social environment—and the invisible world—of mental states, unconscious desires, unseen social forces, and the occult. Authors considered include Henry James, Marcel Proust, Franz Kafka, James Joyce, Virginia Woolf, and Samuel Beckett. Also readings from early twentieth-century social scientists such as Durkheim, Freud, and Weber. *Also CPLT 923b.*

ENGL 978a, Topics in Literary Theory. Paul Fry.

Th 1.30–3.20

Readings in twentieth-century literary theory that set the terms for its recurrent structures of argument, the premise being that the theoretical moment in thinking about literature can be reconsidered as a coherent tradition from Saussure to Butler. Some attention also to critics of this tradition like Searle, Knapp and Michaels, and Guillory. *Also CPLT 580a.*

ENGL 990a, The Teaching of English. Jessica Brantley.

M 3.30–5.20

An introduction to the teaching of literature and composition. Weekly seminars address a series of practical problems connected with teaching: preparing syllabuses and lesson plans; generating and guiding classroom discussion; lecturing and serving as a teaching assistant; introducing students to various literary genres; formulating aims and assignments in composition classes; grading and commenting on written work. Continuing attention to important theoretical issues in pedagogy.

ENGL 995a/b, Directed Reading. Staff.

Designed to help fill gaps in students' programs when there are corresponding gaps in the department's offerings. By arrangement with faculty and with the approval of the director of graduate studies.

PROGRAM IN ENVIRONMENTAL ENGINEERING

Dunham Laboratory, 432.4250

M.Eng., M.S., M.Phil., Ph.D.

Professors

Gaboury Benoit, Menachem Elimelech, Thomas Graedel, Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, James Saiers

Assistant Professors

Michelle Bell, Ruth Blake, William Mitch, Jordan Peccia

Lecturers

James Wallis, L. Lee Wikstrom

FIELDS OF STUDY

Fields include aquatic and environmental chemistry, physical and chemical processes for water quality control, transport and fate of pollutants in the environment, transport of microbial particles in groundwater, colloidal and interfacial phenomena in aquatic systems, environmental engineering microbiology, environmental molecular biology, fate of hormones and pharmaceutically active compounds in aquatic environments and engineering systems, removal and reactivity of emerging trace organic pollutants in advanced water reuse, membrane separations for water quality control, industrial ecology, geochemistry and geomicrobiology, and chemical reactions at the mineral-water interface.

For admissions and degree requirements, and for course listings, see Engineering and Applied Science.

EPIDEMIOLOGY AND PUBLIC HEALTH

60 College Street, 785.6383

M.S., M.Phil., Ph.D.

Interim Chair

Brian Leaderer

Director of Graduate Studies

Nancy Ruddle (785.6383)

Director of Medical Studies

Robert Dubrow

Director of Medical Research

Elizabeth Claus

Professors

Serap Askoy, Michael Bracken, Kelly Brownell (*Psychology*), Michael Cappello (*Pediatrics*), Mark Cullen (*Medicine*), Arthur DuBois, Erol Fikrig (*Medicine*), Durland Fish, Theodore Holford, Edward Kaplan (*School of Management*), Stanislav Kasl, Harlan Krumholz (*Medicine*), Brian Leaderer, Robert Makuch, Lawrence Marks, Susan Mayne, Diane McMahon-Pratt, Michael Merson, I. George Miller (*Pediatrics*), Curtis Patton, Harvey Risch, Nancy Ruddle, Peter Salovey (*Psychology*), Mark Schlesinger, Eugene Shapiro (*Pediatrics*), Jody Sindelar, Mary Tinetti (*Medicine*), Derek Yach, Daniel Zelterman, Heping Zhang, Tongzhang Zheng

Associate Professors

Elizabeth Bradley, Elizabeth Claus, Loretta DiPietro, Robert Heimer, Josephine Hoh, Jeannette Ickovics, Beth Jones, Amy Justice (*Medicine*), Becca Levy, Haiqun Lin, A. David Paltiel, Kathleen Sikkema, Nina Stachenfeld, Christian Tschudi, Herbert Yu, Hongyu Zhao, Liangbiao Zheng

Assistant Professors

Louis Alexander, Colleen Barry, Michelle Bell (*Forestry & Environmental Studies*), Susan Busch, Andrew Epstein, Alison Galvani, Ralitzia Gueorguieva, Karen Hudmon, Melinda Irwin, Patricia Keenan, Trace Kershaw, Kaveh Khoshnood, Douglas Leslie, Judith Lichtman, Xiaomei Ma, Annette Molinaro, Linda Niccolai, Melinda Pettigrew, Jennifer Ruger, Hong Wang, Yawei Zhang, Yong Zhu

Fields of Study

Programs of study are offered in the areas of biostatistics, chronic disease epidemiology, environmental health sciences, genetic epidemiology, health policy and administration, and epidemiology of microbial diseases (infectious disease epidemiology, vector-borne diseases, immunology, parasitology, and virology). The Social and Behavioral Program (SBS), within the Chronic Disease Epidemiology division, offers students specialized

instruction in the theory and methods of the social and behavioral sciences. All programs are under the faculty of the Department of Epidemiology and Public Health.

Special Admissions Requirements

Applicants should have a strong background in the biological and/or social sciences. Students pursuing a Biostatistics specialty should have a strong background in mathematics. The GRE General Test is required. Students whose native language is not English must submit scores from the TOEFL, TSE, or IELTS examination.

Special Requirements for the Ph.D. Degree

To be admitted to candidacy, students must: (1) satisfactorily complete the course requirements for their division as outlined in the most current *EPH Bulletin*, achieving grades of Honors in at least two; (2) obtain satisfactory grades in the comprehensive examination; and (3) submit an acceptable dissertation prospectus. The comprehensive examination must be taken by the end of the second full academic year. With the assistance of his/her faculty adviser, each student requests appropriate faculty members to join a dissertation advisory committee (DAC). The dissertation prospectus must be approved within a year of passing the comprehensive examination.

The DAC reviews and approves the prospectus as developed by the student and recommends to the director of graduate studies (DGS) and the Departmental Doctoral Committee that the prospectus be approved. Each DAC is expected to meet at least once each year, and more frequently if necessary. Since Dissertation Progress Reports are due at the close of the spring term, it is advised that the annual meeting be scheduled during this term. The student schedules meetings of the DAC. The chairperson of the DAC produces a summary evaluation of progress and plans for the coming year. This document is to be distributed to each committee member for comments and signature. Each student and the DGS are to receive a copy of the signed document from the DAC chairperson.

After approval of the prospectus the DAC reviews the progress of the dissertation research and the dissertation and decides when it is ready to be submitted to the readers. At that time the chair of the DAC submits its recommendation to the DGS and the Departmental Doctoral Committee, together with the approved dissertation and its recommendation of suitable readers.

Doctoral dissertations originating in EPH must be presented in a public seminar. This presentation is scheduled after the submission of the dissertation to the readers and preferably prior to the receipt and consideration of the readers' reports. At least one member of the DAC supervising the dissertation and at least one member of the departmental Doctoral Committee are expected to attend the presentation.

All doctoral students are required to successfully complete a minimum of ten graduate-level courses and must also satisfy the individual divisional requirements.

The special course requirements for each division are:

- Biostatistics — an average of three to four courses per term plus seminars and colloquia;
- Chronic Disease Epidemiology — an average of three to four courses per term plus seminars and colloquia;
- Environmental Health Sciences — an average of three to four courses per term plus seminars and colloquia;
- Epidemiology of Microbial Diseases — two years of course work and seminars developed with a faculty adviser;
- Health Policy Administration — an average of three to four courses per term plus seminars and colloquia.

Teaching experience is regarded as an integral part of the graduate training program. Doctoral students are required to satisfactorily complete four terms as Teaching Fellows (10 hours/week). During the second and third years of study, students serve as Teaching Fellows (10 hours/week) each term. First-year students are encouraged to focus their efforts on course work and in most instances are not permitted to serve as Teaching Fellows. First-year students may be allowed to serve as Teaching Fellows if they have been awarded advanced standing. Advanced standing is only available to students who have completed previous graduate study at Yale (e.g., the M.P.H. program); see page 438. If a student has been awarded one year of advanced standing, he/she will be allowed to teach both fall and spring terms of the first year. If a student has been awarded one term of advanced standing, he/she will only be allowed to teach during the spring term of the first year. Students interested in serving as Teaching Fellows during their first year of doctoral study should submit a petition to the DGS well before the start of the term in which they hope to participate in a course. In some instances, when a student has demonstrated excellent teaching abilities and with the approval of the DGS, graduate research assistantship opportunities may take the place of teaching in the third year of study. By year four, all students are expected to be engaged in full-time research activities.

Master's Degrees (in Epidemiology and Public Health)

M.Phil. (en route to the Ph.D.). Students who have completed all requirements for the Ph.D. except the dissertation may petition the Graduate School for the Master of Philosophy degree.

M.S. This degree is normally granted only to students who are withdrawing from the Ph.D. program. Students are not admitted to this degree. However, within Epidemiology and Public Health, students can be admitted to the terminal M.S. in EPH in two specialty areas: Biostatistics and Chronic Disease Epidemiology (see below). Students withdrawing from the doctoral program in the divisions of Biostatistics or Chronic Disease Epidemiology must satisfy the requirements of the terminal master's degree program as described below. In other divisions (Environmental Health Sciences, Epidemiology of Microbial Diseases, or Health Policy Administration) students must have successfully completed (prior to withdrawal) at least one year of the doctoral program in order to receive an M.S.

Terminal M.S. in EPH. The department offers a terminal master's degree program leading to an M.S. in Epidemiology and Public Health in two specialty areas: Biostatistics and Chronic Disease Epidemiology. The terminal master's degree program specializing in Biostatistics is a two-year program. The master's degree program specializing in Chronic Disease Epidemiology is a one-year program. All students must fulfill the Graduate School requirements for a terminal M.S. degree listed on pages 442–44. A Biostatistics or Chronic Disease Epidemiology student who is withdrawing from the Ph.D. program must apply and be recommended for the M.S. in EPH, provided he or she meets the requirements of the M.S. in EPH program.

Fields of Study

M.S. IN EPH—BIOSTATISTICS

Faculty in the Biostatistics division of the Department of Epidemiology and Public Health offer a two-year terminal Master of Science degree. Fields include clinical trials, epidemiologic methodology, statistical genetics, and mathematical models for infectious diseases.

Requirements for M.S. in EPH—Biostatistics

Applicants should have a strong background in quantitative sciences such as mathematics. In addition, it is recommended that applicants have undergraduate course work in the biological and social sciences. At a minimum, applicants would have taken one year of calculus and a course in linear algebra prior to enrolling in this program.

The GRE General Test is required. Students whose native language is not English must submit scores from the TOEFL, TSE, or IELTS examination.

A minimum of twelve courses must be completed, and a grade of Honors achieved in at least two courses. An acceptable master's thesis must be submitted.

M.S. IN EPH—CHRONIC DISEASE EPIDEMIOLOGY

Faculty in the Chronic Disease Epidemiology division of the Department of Epidemiology and Public Health offer a one-year terminal Master of Science degree. This one-year program is designed for individuals who work in the pharmaceutical industry, other science Ph.D.s, or medical professionals who seek the skills necessary to conduct epidemiological research in their professional practice.

Requirements for M.S. in EPH—Chronic Disease Epidemiology

Applicants should have a basic understanding of quantitative science and statistics. It is recommended that candidates have strong science backgrounds and demonstrated competency in statistical analysis and logical thinking. Applicants from rigorous programs in the biological or social sciences will be given preference. At a minimum, applicants should have one year of course work in statistics or equivalent prior to enrolling in this program. Part-time enrollment will not be permitted.

Applicants must take the GRE General Test. Students whose native language is not English must take the TOEFL or IELTS examination.

A minimum of ten courses must be completed and a grade of Honors achieved in at least one course. It is expected that this program will be completed during a single academic year. Satisfactory completion of the Capstone experience is required. In the Capstone experience the student is required to complete an NIH-type grant application that is deemed reasonably competitive by a faculty member. An optional Capstone experience is an individualized tutorial in which the student completes a manuscript that is suitable for submission for publication in a relevant journal. This manuscript may be an extension of course work from any of the courses taken by the student.

Ph.D. or terminal M.S. degree program materials are available upon request from the Office of the Director of Graduate Studies (c/o M. Elliot), Epidemiology and Public Health, Yale University, PO Box 208034, New Haven CT 06520-8034; 203.785.6383; e-mail, eph.doctoral@yale.edu.

Courses

BIS 505a, Introduction to Statistical Thinking I. Elizabeth Claus.

This course provides an introduction to the use of statistics in the fields of epidemiology and public health. Topics include descriptive statistics, probability distributions, parameter estimation, and hypothesis testing, as well as an introduction to sampling and simple linear regression. Statistical analysis using the Statistical Analysis Systems (SAS) software on the PC is introduced.

BIS 505b, Introduction to Statistical Thinking II. Daniel Zelterman.

This continuation of BIS 505a covers multiple regression, analysis of variance, nonparametric tests, survival analysis, poisson regression, and logistic regression. The course concludes with a review of commonly used statistical methods. As in the first term, the Statistical Analysis Systems (SAS) software package is used for statistical analysis. Prerequisite: BIS 505a.

BIS 511a, GIS Applications in Epidemiology and Public Health. Theodore Holford.

The study of epidemiology often seeks to determine associations between exposure risk and diseases that are spatially dependent. Geographic information systems (GIS) are modern computer-based tools for the capture, storage, analysis, and display of spatial information. GIS technologies are just beginning to be used for public health planning and decision making. Public health applications of GIS provide cost-effective methods for evaluation interventions and modeling future trends, and also provide a visual tool for data exploration. This class teaches the technical and design aspects of implementing a GIS project in public health and provides students with basic tools for using GIS. Examples are given to introduce a variety of applications in the field of epidemiology. No prior GIS experience necessary.

BIS 525a and b, Seminar in Biostatistics. Annette Molinaro, Ralitz Gueorguieva.

Faculty and invited speakers present and discuss current research.

BIS 538b, Survey Sampling: Methods and Management. Robert Makuch.

This course reviews the major sampling plans: simple, stratified, systematic, and cluster random sampling. The uses of weighted data and ratio estimation are discussed. The course emphasizes application of methodology, including use of SUDAAN. Prerequisite: BIS 505b or equivalent.

BIS 540a, Fundamentals of Clinical Trials. Robert Makuch.

This course addresses issues related to the design, conduct, and analysis of clinical trials. Topics include protocol development, examination and selection of appropriate experimental

design, methods of randomization, sample size determination, appropriate methods of data analysis including time-to-event (possibly censored) data, and interim monitoring and ethical issues. Prerequisite: BIS 505a or equivalent. Enrollment limited to second-year students.

[BIS 560b, Database Management in Medicine and Epidemiology.]

BIS 561b, Advanced Topics and Case Studies in Multicenter Clinical Trials.

Peter Peduzzi, Pamela Hartigan.

This course addresses advanced issues related to the design, conduct, monitoring, and analysis of multicenter randomized clinical trials. Topics include organizational, regulatory, and human rights issues; an overview of design strategies; advanced topics in sample size estimation and monitoring; data management and quality assurance procedures; cost-effectiveness and quality of life; and case studies of vaccine trials, factorial trials, primary and secondary prevention trials, large simple trials, strategy trials, and cost-effectiveness. The case studies include many of the classical and landmark clinical trials, such as the polio vaccine field trial, Physicians Health Study, and the trials of AZT for the treatment of AIDS. Prerequisites: BIS 505a and BIS 540b. Enrollment limited to second-year students.

BIS 623a, Applied Regression Analysis. Ralitza Gueorguieva.

This course covers linear regression, estimation and hypothesis in multivariate regression, regression diagnostics, analysis of variance, and adjusting for covariates. Emphasis is on the application of methods. SAS is used throughout the course. Prerequisite: BIS 505b or equivalent.

BIS 625a, Categorical Data Analysis. Daniel Zelterman.

This course presents methods for analyzing categorical data in public health, epidemiology, and medicine. Topics include discrete distributions, log-linear models, and logistic regression. Emphasis is placed on the application of the methods and the interpretation of results by applying the techniques to a variety of data sets. Prerequisite: BIS 505b.

BIS 628b, Longitudinal Data Analysis. Faculty.

This course covers methods for analyzing data in which repeated measures have been obtained for individuals over time. Different methods are discussed to handle both continuous and discrete longitudinal response data. Both subject-specific and population-averaged approaches are covered (with particular reference to capturing the heterogeneity between different individuals). Some of the approaches covered include linear, nonlinear, and generalized mixed effects models, as well as generalized estimating equations. The course also covers exploratory methods, approaches for handling missing data, and possibly transition models and advanced topics such as multivariate longitudinal responses, nonparametric longitudinal responses, the joint consideration of longitudinal and survival data, and the joint consideration of longitudinal and spatial data. Emphasis is placed on applying the methods, understanding underlying assumptions, and interpreting results. Both SAS and S-Plus are used throughout the course. Prerequisites: BIS 623a and BIS 625a.

[BIS 631b, Topics in Genetic Epidemiology.]

BIS 635b, Topics in Statistical Epidemiology. Faculty.

This course considers methods for analyzing the association of one or more factors with disease. Topics include the analysis of cohort studies, case-control studies, and vital rates. The analysis of matched data is also discussed. Emphasis is placed on the application and interpretation of the techniques. Prerequisites: BIS 505a and BIS 505b, BIS 623a or BIS 625a.

[BIS 637b, Stochastic Processes in Biology and Medicine.]

[BIS 640a, Quantitative and Computational Methods in Bioinformatics.]

BIS 643b, Theory of Survival Analysis and Its Applications. Haiqun Lin.

This course presents the statistical theory underlying survival analysis. It covers different models of censoring and the three major approaches to analyzing this type of data: parametric, nonparametric, and semi-parametric methods. The application of this theory through some exemplary data sets is also presented. Prerequisites: STAT 541a and STAT 542b.

BIS 645a, Statistical Methods in Human Genetics. Hongyu Zhao, Elizabeth Claus, Kenneth Kidd.

Probability modeling and statistical methodology for the analysis of human genetics data are presented. Topics include population genetics, single locus and polygenic inheritance, segregation analysis using the transmission probability model and the mixed model, linkage analysis using LOD scores, genetic risk prediction models, disease-marker associations, and DNA fingerprinting. Prerequisites: genetics; BIS 505a and b, or equivalent; and permission of the instructor.

BIS 646a, Nonparametric Statistical Methods and Their Applications. Faculty.

Nonparametric statistical procedures including recursive partitioning techniques, splines, bootstrap, and other sample reuse methods are introduced. Some of the supporting theory for these methods is proven rigorously, but some are described heuristically. Advantages and disadvantages of these methods are illustrated by medical and epidemiological studies. Students may be required to compare these methods with parametric methods when analyzing data sets. Familiarity with basic statistical theory and computer languages is assumed. Prerequisites: STAT 541a and STAT 542b.

[BIS 691b, Theory of Generalized Linear Models.]**CDE 505a, Social and Behavioral Influences on Health. Jeannette Ickovics.**

This course provides students with an introduction to social and behavioral science issues that influence patterns of health and health care delivery. The focus is on the integration of biomedical, social, psychological, and behavioral factors that must be taken into consideration when public health initiatives are developed and implemented. This course emphasizes the integration of research from the social and behavioral sciences with epidemiology and biomedical sciences. *Also PSYC 657a.*

CDE 508a, Principles of Epidemiology I. Robert Dubrow.

This course presents an introduction to epidemiologic concepts and methods. Topics include measurement of disease rates, descriptive epidemiology, ecologic studies, cohort studies, case-control studies, cross-sectional studies, randomized controlled trials, causation, random variation and statistical significance, bias, confounding, effect modification, epidemic investigation, measurement validity, screening, and molecular epidemiology. The course utilizes a wide variety of case studies from both chronic and infectious disease epidemiology. *Also EMD 508a.*

CDE 516b, Principles of Epidemiology II. Xiaomei Ma.

This is an intermediate-level course on epidemiologic principles and quantitative methods used in epidemiologic studies. Topics covered at the introductory level are revisited and covered in more depth and breadth, with an emphasis on quantitative issues involved in the design, analysis, and interpretation of epidemiologic studies. Certain new concepts and areas of studies are also introduced. Through readings, lectures, and problem sets, students are expected to (1) develop an increased understanding of epidemiologic principles and methods; (2) identify strengths and pitfalls in the design, analysis, and interpretation of epidemiologic studies in the literature; (3) improve relevant quantitative skills; and (4) master epidemiologic methods to a degree necessary to initiate their own research projects and analyses. Prerequisites: CDE 508a and BIS 505a.

CDE 517a, Developing a Research Protocol. Melinda Irwin.

The objective of this course is to develop a research protocol from hypothesis formation to appropriate study design. Review of relevant background literature, consideration of appropriate statistical techniques, provision of adequate personnel and environment, and understanding of strengths and weaknesses of the proposed study are included. Students are divided into groups with each group responsible for developing a research protocol suitable for submission as a grant proposal to NIH. Special attention is given to writing techniques and style. Prerequisites: CDE 516b, second-year M.P.H. or doctoral status.

[CDE 518b, Introduction to Pharmacoepidemiology.]**CDE 521b, The Epidemiology of Selected Chronic Diseases. Beth Jones.**

This survey course covers some of the major chronic diseases, including coronary artery disease, cancer, stroke, chronic obstructive pulmonary disease, diabetes, major depression, and Alzheimer's. Invited lecturers who are experts in the field cover the basic pathophysiology, etiology, epidemiology, risk factors, and public health importance of each. Approximately half of the scheduled classes are devoted to discussions of major research articles on these diseases. The course emphasizes developing a working knowledge of chronic diseases, the application of epidemiologic methods, and the capacity to read the literature critically. Prerequisites: CDE/EMD 508a, CDE 516b.

CDE 523b, Measurement Issues in Chronic Disease Epidemiology. Susan Mayne.

This course addresses the measurement issues in chronic disease epidemiology from a practical perspective. The first part of the course covers the use and limitations of currently available techniques for measuring exposure to a number of etiologic factors such as diet, alcohol, tobacco, physical activity, psychological factors, and environmental/occupational exposures. The latter part of the course focuses on the measurement of outcome for some of the major chronic diseases, along with some practical considerations involved in conducting chronic disease epidemiology research. Prerequisite: CDE/EMD 508a.

[CDE 525a and b, Seminar in Chronic Disease Epidemiology.]**CDE 530a, Molecular Epidemiology of Chronic Disease. Herbert Yu.**

The course provides an in-depth overview of issues addressed in molecular epidemiology and its application in cancer research. Subjects covered in the course include basic biochemistry and molecular biology, biological mechanisms related to molecular epidemiology research, principles of molecular and biochemical analysis, biotechnologies and laboratory methods used in molecular epidemiology, and interpretation of study results. The course emphasizes the development of abilities to design and conduct molecular epidemiology research and to critically evaluate findings in the literature. Prerequisite: CDE/EMD 508a or permission of the instructor (biochemistry, cell and molecular biology are helpful, but not required).

CDE 531a, Health and Aging. Becca Levy.

Since 1900, the number of individuals sixty-five years and older has tripled and life expectancy has increased by about thirty years. In the course we examine some of the health issues related to this growing segment of the population. The class discussions address such questions as (1) How does the aging process differ between cultures? (2) What kind of interventions can best reduce morbidity in old age? and (3) How can health policy adapt to the aging population? This course integrates psychosocial and biomedical approaches to the study of aging. *Also PSYC 664a.*

CDE 532b, Epidemiology of Cancer. Brenda Cartmel.

This course applies epidemiologic methods to the study of cancer etiology and prevention. Introductory sessions cover cancer biology, carcinogenesis, cancer incidence and mortality rates in the United States, and international variation in cancer rates. The course then focuses

on risk factors for cancer (including tobacco, alcohol, diet, radiation, and occupation) and on major cancer sites (including colon, breast, and prostate). Emphasis is placed on critical reading of the literature. Prerequisites: CDE/EMD 508a, or permission of the instructor.

CDE 533b, Topics in Perinatal Epidemiology. Kathleen Belanger.

Pregnancy, delivery, and reproduction provide the course's organizing focus. The current perinatal epidemiologic literature is critically reviewed from a methodological perspective. Subjects studied include infertility, miscarriage, fetal growth retardation, preterm labor and delivery, aspects of prenatal care, perinatal risks for cancer and other chronic diseases, SIDS, and infant mortality. Students develop an understanding of what evidence is needed to establish causal relationships in this specialty. Implications of research findings for public health policy, individual decision making, and future studies are considered.

CDE 534b, Approaches to Data Management and Analysis of Epidemiologic Data.

Mayur Desai.

This course provides students with basic skills of data management and data analysis. The SAS statistical program is used. Main topics include using SAS data sets, data manipulation, bivariate and multivariable analyses. Using existing data sets, students test their own hypotheses and develop a research project. Emphasis is placed on the practical application of the skills learned. The course is a useful preparation for the summer internship and for thesis data analysis. Prerequisites: BIS 505a, CDE/EMD 508, and CDE major or doctoral status (permission of the instructors for non-CDE majors required); students must have taken or must be currently taking BIS 505b and CDE 516b.

CDE 535b, Vascular Epidemiology. Judith Lichtman.

Vascular disease is the leading cause of death and disability among industrialized nations. This course introduces students to the major categories of cerebrovascular and cardiovascular disease. Students are challenged to think about how individual diseases contribute to the epidemic of vascular disease in the United States. In this course, students learn basic principles about the rates of disease, risk factors, clinical trial results, and outcomes of vascular diseases. Through the analysis of actual studies, students apply basic epidemiology to critically evaluate current literature and topics in the field of vascular epidemiology. Sessions include a clinical overview of a specific disease or risk factor, as well as highly interactive discussion of a specific epidemiologic topic or principle. Students are encouraged to develop their own solutions to current gaps in the epidemiologic literature.

CDE 545b, Health Disparities by Race and Sex: Epidemiology and Intervention.

Jeannette Ickovics.

The United States Public Health Service states that "eliminating health disparities" is one of the two overarching goals for the national health promotion/disease prevention agenda. This course takes a life course perspective to examine the epidemiology of disparities from the perinatal period (e.g., birth weight) to older adulthood (e.g., mortality). We focus on differences in morbidity and mortality between females and males and between diverse racial/ethnic groups. The primary focus of this course is on understanding the critical determinants and consequences of health disparities, learning to think critically about studies in the field, and developing creative ideas for new approaches to research, intervention, and policy. The course covers state-of-the-science information, taken primarily from journal articles, across a broad range of topics including heart disease, cancer, and AIDS, as well as important psychological, social, and behavioral factors that influence health. Emphasis is placed on methodological issues, including measurement, study design, and conducting ethically responsible community-based research. This course focuses not just on understanding disparities, but on evaluating and developing interventions to reduce or eliminate them. Prerequisite: CDE 505a or 571b.

CDE 550a, Introduction to Evidence-Based Health Care. Michael Bracken.

Evidence-based health care uses best current evidence in addressing clinical or public health questions. This course introduces principles of evidence-based health care in formulating clinical or public health questions, systematically searching for evidence, and applying it to the question. Types of questions considered include treatment/prevention of disease, etiology, diagnostic testing, and prognosis. Particular consideration is given to the methodology of synthesizing evidence in a systematic review. Also addressed is the role of evidence in informing economic analysis of health care programs, clinical decision analysis, and clinical practice guidelines. Using a problem-based approach, students contribute actively to the classes and small-group sessions. Students complete a systematic review in their own field of interest using Cochrane Collaboration methodology. Prerequisites: students must have passed or be concurrently taking CDE 516b, or obtain permission of instructor.

[CDE 562a, Nutrition and Chronic Disease.]**CDE 570a, Epidemiology of Psychiatric Disorders. Selby Jacobs.**

This course reviews the application of traditional epidemiologic methods to the study of psychiatric disorders. Emphasis is on study design and assessments. New technologies for case identification are discussed. Application of these methods to studies of the epidemiology and genetics of the major psychiatric disorders (e.g., depression, schizophrenia, anxiety disorders) is reviewed. Prerequisite: CDE/EMD 508a.

CDE 571b, Psychosocial and Behavioral Epidemiology. Stanislav Kasl.

This course provides a systematic overview of psychosocial and behavioral influences on health, illness, and recovery. The factors of interest that influence health include: individual stable characteristics (e.g., traits), characteristics of the primary social environment (e.g., family, friends), settings defined by social roles (e.g., work), and broader contextual factors reflecting social structural variables (e.g., social class). The interplay of the foregoing factors of interest with biomedical and clinical variables constitutes a central theme. Prerequisite: CDE 505a.

CDE 572a, Preventive Interventions: Theory, Methods, and Evaluation.

Melinda Irwin.

This course reviews the theory, methods, and evaluation of health promotion and disease prevention interventions conducted in multiple settings. Topics of promotion and prevention include physical activity, nutrition, obesity, cancer, cancer screening, cardiovascular disease, diabetes, smoking, alcohol and substance abuse, HIV and STDs, condom and contraception use, adolescent pregnancy, and psychiatric and mental health problems. The course combines didactic presentations, discussion, and critiques of health promotion and disease prevention interventions by students. This course is intended to increase the student's skills in evaluating health promotion and disease prevention interventions, at both the individual and community levels. Prerequisite: CDE 505a.

CDE 574b, Developing a Health Promotion and Disease Prevention Intervention.

Trace Kershaw.

This course is intended to be a practical "how to" application of concepts and methods learned in CDE 572a. The primary objective of this course is to gain experience in intervention research by developing a health promotion and disease prevention intervention. Students choose a health problem (e.g., physical inactivity, smoking, HIV risk) and develop an intervention focused on favorably changing the determinants and behavior that influence the health problem. The course emphasizes transferring concepts from the abstract to the concrete. Students develop an intervention manual consisting of actual intervention materials, and methods that specifically outline how the intervention will be designed, conducted, eval-

uated, and disseminated. Throughout the course students participate in a peer review process to evaluate and give feedback for each section of the intervention manual. Prerequisite: CDE 572a.

[CDE 575b, Religion, Health, and Society.]

CDE 578b, Applied Research Methods for the Social and Behavioral Sciences.

Karen Hudmon.

This course equips students with hands-on experience with qualitative and quantitative research methods that are integral to the social and behavioral sciences. Key concepts include (1) study design and threats to validity as related to program evaluation, (2) measurement issues within the context of the development, conduct, and analysis of health-related surveys, (3) qualitative research, (4) application of statistical concepts relative to the social and behavioral sciences, and (5) research with human subjects.

CDE 619a, Advanced Epidemiologic Research Methods. Harvey Risch.

This advanced course focuses on quantitative issues and techniques relevant to the design and analysis of observational epidemiologic studies. Starting with formal definitions of the commonly used epidemiologic parameters, and assuming a working knowledge of ANOVA and linear regression, the course covers analyses based on various related types of regression, e.g., logistic, Poisson, Cox, etc. The GLIM and PECAN computer programs are described and used throughout. Students analyze and discuss data sets of generally increasing complexity. Prerequisites: BIS 505a, 505b, Ph.D. student status, or permission of the instructor.

[CDE 638a, HIV/AIDS Prevention Research Seminar.]

[CDE 669a, Research Seminar in Psychosocial Epidemiology.]

EHS 502a, Physiology for Environmental Health Sciences. John Stitt.

The purpose of this course is to describe the basic physical properties associated with exposure to environmental stress and the physiological strategies used to maintain homeostasis in the human body. Prerequisites: biology, chemistry.

EHS 503b, Introduction to Toxicology. Jonathan Borak, Cheryl Fields.

This course examines factors that affect the toxicity of foreign substances. The course first focuses on absorption, distribution, excretion, and metabolism and their contributions to dose-response relationships. Specific toxicological problems are then considered including the effects of metals and solvents, chemical carcinogenesis, neurotoxicology, and developmental toxicology.

EHS 505b, Introduction to Industrial Hygiene. Judith Sparer.

Students are introduced to the practice of industrial hygiene: the recognition, evaluation, and control of health hazards in the workplace. A systematic approach to identifying hazards in the workplace is presented, and students are asked to exercise these techniques in at least one industrial worksite. Topics include regulation of health and safety in the workplace, air sampling and interpretation of sampling results, and approaches to reducing place exposures.

EHS 507a, Environmental Epidemiology. Tongzhang Zheng.

Environmental epidemiology can provide insight about the association between environmental exposures of a population and adverse health outcomes. The potentials and the limitations of environmental epidemiology are explored as they are inherent in the design of suitable studies and as they manifest themselves in actual studies that have been conducted. The analysis and interpretation of such studies, as well as the consequences for the design and conduct of proposed studies, are examined. Prerequisite: CDE/EMD 508a or permission of the instructor.

EHS 508a, Assessing Exposures to Environmental Stressors. Brian Leaderer.

This course examines human exposure to environmental stressors as it applies to environmental epidemiology and risk assessment. Indirect and direct methods of assessing exposures are reviewed and case studies are presented.

[EHS 509a, Environmental Toxicology.]**EHS 510b, Fundamentals of Environmental Health and Risk Assessment.**

Loretta DiPietro, Youcheng Liu.

This course is an overview of environmental health. Students are introduced to the fundamentals of environmental health from the perspective of using risk analysis to reduce environmentally induced disease. The principles used to apply toxicologic, statistical, and pharmacokinetics factors in the assessment of health risk from chemicals are emphasized. Quantitative risk assessment, exposure assessment, and risk characterization are emphasized.

EHS 511a, Applied Risk Assessment I. Jonathan Borak.

Applied environmental risk assessment consists of the effective integration in a specific situation of what is known about pollution sources and their characteristics, about human exposures, about the entry and absorption of pollutants, and about the adverse health effects associated with dosage exposure. In any actual situation there are uncertainties in all of the elements to be integrated. This course emphasizes methodologies in use and the limitations that inevitably constrain the process. A number of applied risk assessments are analyzed.

EHS 514a, Environmental Chemistry. Meredith Stowe.

The basic chemical principles underlying environmental pollutants in water, soil, air, and specialized media are introduced. Various categories of federally regulated compounds and elements are examined with respect to group characteristics, analytical measurement techniques of choice, sampling methods, and data interpretation. Selected chemical agents are studied with regard to their fate (possible transformations/decomposition) in the environment. Students develop insight into some current problems faced in applying pollutant measurements to public health, e.g., analytical precision, uncertainty, detection limits, chemical speciation, and toxicological properties.

[EHS 518a, Environmental Measurement.]**EHS 525a and b, Seminar in Environmental Health. Nina Stachenfeld.**

Students are introduced to a wide variety of research topics, policy topics, and applications in environmental health. Faculty members, public health professionals, and students make brief oral presentations and engage in related dialogues. The course is designed to help students develop topics for their M.P.H. theses. Second-year students have the opportunity to receive feedback on their developing research. Prerequisite: permission of the instructor.

[EHS 532b, Indoor Climate.]**EHS 535a, Disaster Preparedness. David Cone, Donald MacMillan.**

This course focuses on the practical application of theoretical concepts related to disaster preparedness through a series of lectures by experts. Students are expected to actively participate in the sessions.

EHS 545b, Introduction to Environmental Genetics. Yong Zhu.

The course provides an introduction to genetic susceptibility markers and their interactions with environmental exposures in human disease development. The first part of the course covers basic concepts of human genetics that are fundamental to understanding and conducting environmental genetic studies. The second part of the course emphasizes the genetic responses and effects of exposures to environmental agents. The final part of the course utilizes profiles from gene-environment interactions to illustrate possible etiology of human diseases such as cancer and asthma.

EHS 553b, Epidemiological Methods in Injury Control. Linda Degutis.

This course addresses the application of epidemiological methods to injury surveillance, etiology of injuries, and the evaluation of the effects of injury control programs. Major topics include methods of scoring injury severity; distribution of injury types and severity in segments of the U.S. population; exemplar epidemiological studies of etiology; strategies to reduce incidence and severity; evaluation of attempts to change environments and behavior by standards, laws, persuasion, and economic incentives; and the use of cost-effectiveness, cost-benefit, and cost-savings analysis. Prerequisite: permission of the instructor or completion of epidemiologic methods course work.

EHS 570a, Public Health Management of Disasters. David Cone.

This course addresses the role of public health in disaster preparedness and management. It includes discussion of concepts in basic science, human responses to injury and illness, public health systems, and policy. Major topics include types of disasters and their consequences; the role of public health systems in disasters; hazard assessment and community vulnerability management; and mental health and environmental health issues in disasters. Practical applications of the concepts developed are emphasized, as are both the similarities and differences between domestic and foreign disaster management. Prerequisite: CDE/EMD 508a.

[EHS 573b, Occupational Epidemiology.]**EHS 575a and b, Introduction to Occupational and Environmental Medicine.**

Mark Cullen [F], Mark Russi [Sp].

This yearlong course presents a broad overview of the principles of occupational and environmental medicine. In the fall term the major diseases of environmental origin are presented. In the spring term the major hazards — chemical, physical, and biologic — and the settings in which they occur are examined. Prerequisite: M.D. degree or permission of the instructor.

[EHS 621b, Seminar in Environmental Health Risk Assessment.]**[EHS 655, Readings in Environmental Health.]****EMD 508a, Principles of Epidemiology I. Robert Dubrow.**

This course presents an introduction to epidemiologic concepts and methods. Topics include measurement of disease rates, descriptive epidemiology, ecologic studies, cohort studies, case-control studies, cross-sectional studies, randomized controlled trials, causation, random variation and statistical significance, bias, confounding, effect modification, epidemic investigation, measurement validity, screening, and molecular epidemiology. The course utilizes a wide variety of case studies from both chronic and infectious disease epidemiology. *Also CDE 508a.*

EMD 512a, Immunology for Epidemiologists. Nancy Ruddle.

This course is designed to introduce students to the fundamentals of immunology including antigens, antibodies, methods for detecting antibodies, cells of the immune system, products of such cells, and immune mechanisms. Experience will be gained in the analysis of primary research papers with relevance to immunologic aspects of epidemiologic studies. Prerequisite: two terms of college biology.

EMD 516a, Biology of Viruses of Humans. Louis Alexander.

This course consists of a systematic review of the spectrum of viruses and their modes of replication, dissemination, pathogenesis, and immunogenicity. Special problems representative of the characteristics of individual families of viruses are discussed. Prerequisite: biology.

EMD 541b, Infectious Diseases: Epidemiology, Prevention, and Control.

Kaveh Khoshnood.

Students learn epidemiologic methods and concepts in infectious diseases, specific viral and bacterial infections, and problems illustrative of the methods and/or disease. Methods include surveillance, seroepidemiology, case/control and cohort studies, vaccine trials, epidemic

investigation, principles of causation, immunization policies and their implementation, and evaluation in developed and developing countries. Specific viral and bacterial infections of the central nervous, respiratory, and intestinal tracts; the herpes viruses; slow and persistent viral infections; retroviruses, including AIDS; the exanthems; nosocomial infections; and the relation between viruses and cancer are discussed. The use of epidemiological concepts in the prevention of disease is emphasized. Prerequisite: microbiology.

EMD 557a, Public Health Issues in HIV/AIDS. Kaveh Koshnood.

An introductory, broad-based survey course for students of all levels interested in the epidemiology of HIV/AIDS. The course covers virology, clinical issues, natural history of infection, laboratory testing, transmission, and prevention of HIV/AIDS. The course, designed to give students a general, comprehensive understanding of HIV/AIDS issues, is targeted to students beginning work in public health or HIV/AIDS, or for those who wish to expand their specialized knowledge base regarding HIV/AIDS. Regular attendance at the Yale AIDS Colloquium Series (YACS) and written synopsis are required. *Also NURS 713a.*

EMD 560b, Epidemiologic Methods in STD/HIV Research. Linda Niccolai.

The purpose of this course is to explore epidemiologic concepts and methods in the design, implementation, and interpretation of studies focused on sexually transmitted infections including the human immunodeficiency virus. Students learn how to address analytical research challenges including, but not limited to, choice of study design; sample selection; data collection; minimizing bias and confounding; generalizability. This course utilizes a combination of lectures and case studies. Through this course, students learn to critically read the published literature as well as design a methodologically rigorous research study. Prerequisite: EMD 508a.

EMD 630a, Modeling Infectious Diseases: Theory and Applications.

Edward Kaplan.

This course provides an introduction to the mathematical modeling methods that have developed over the years for the description and control of infectious diseases, and also considers applications of such models to standard problems in epidemiology and more broadly in contemporary public health. The course emphasizes the formulation of basic models, the insight that derives from the formal analysis of such models, and the translation of such insights into the world of real problems. Prerequisites: CDE/EMD 508a and permission of the instructor, or doctoral status.

EMD 642a, Roles of Microorganisms in the Living World. Christian Tschudi,

L. Nicholas Ornston, Dieter Söll.

This topical course explores the biology of microorganisms. Emphasis is placed on mechanisms underlying microbial adaptations and how they influence biological systems. Prerequisites: biology, chemistry, and biochemistry. Requirements: class participation and three exams. *Also GENE 642a, MBIO 642a, MCDB 642a.*

[EMD 650b, Biology of Disease Vectors.]

EMD 664b, Biology of Parasitic Protozoa and Helminths. Curtis Patton,

Serap Aksoy, Christian Tschudi.

The course focuses on developmental biology, natural history, form, function, and cell and molecular biology of the major eukaryotic parasites of public health importance. Host parasite integration, co-evolution, diagnosis, pathogenesis, and control strategies are emphasized. Prerequisites: one year of biology, two years of chemistry. *Also MBIO 664b.*

EMD 670a and b, Advanced Research Laboratories. Faculty.

This course is taken for three terms. The course offers experience in directed research and reading in selected research laboratories. The first two terms must be taken in the first year of

the doctoral program while the third term is taken at a time determined after faculty consultation with the student. Prerequisite: Ph.D. student status.

EMD 675a and b, Advanced Topics in Infectious Disease Epidemiology.
Durland Fish.

A required course for EMD first-year doctoral students. Participating EMD faculty present real and theoretical situations relating to problems or situations in contemporary infectious disease epidemiology and provide specific questions or problems to be solved by the students. The students have two weeks to research the problem and prepare answers, which they then present and discuss during ninety-minute biweekly meetings with faculty. The goal is to provide doctoral students with an opportunity to apply the principles and practice of infectious disease epidemiology at an advanced level with close mentoring by faculty with diverse professional interests which will provide an overview of the discipline. Topics include biological and social aspects of infectious disease control and prevention, vaccine efficacy, molecular epidemiology, disease surveillance, and risk assessment.

EMD 680b, Advanced Topics in Molecular Parasitology. Diane McMahon-Pratt,
 Curtis Patton, Christian Tschudi.

An advanced graduate-level seminar course in modern parasitology. The class is focused on the reading and critical evaluation of papers from the current literature selected by the students in cellular and molecular mechanisms of parasitism. Prerequisites: EMD 684a is highly recommended; permission of the instructor. *Also MBIO 680b.*

EMD 682a and b, Advanced Topics in Vector Biology. Serap Aksoy,
 Liangbiao Zheng.

This broadly based seminar is on current research topics in the biology of medically important vectors, vector-pathogen interactions, vector ecology, disease management, and vector control strategies. Topics are chosen from the current literature. Prerequisite: Ph.D. student status or permission of the instructor.

EMD 684a, Molecular and Cellular Processes of Parasitic Eukaryotes.
 Curtis Patton, Christian Tschudi.

An introductory graduate-level seminar course in modern parasitology. The class is focused on the reading and critical evaluation of papers and reviews from the current literature in cellular and molecular mechanisms of parasitism. Permission of instructor required. *Also MBIO 684a.*

EMD 694a, Tutorial in Population Genetics of Vectors. Leonard Munstermann.

EMD 695a, Readings in Vector Ecology. Durland Fish.

[EMD 728b, Ecology and Evolution of Infectious Diseases.]

HPA 510a, Health Policy and Health Systems. Mark Schlesinger.

This course provides an introduction to the making and understanding of health policy. The various goals of policy making and the alternative means of achieving those goals are examined. Health issues are placed in the context of broader social goals and values. The current performance of the health care system is assessed, with particular emphasis on shifting needs, rising costs, and changing institutional arrangements. The course provides an overview of the important actors in the health care and political systems and introduces students to methods for understanding their behavior. Students apply these methods to a set of concrete policy issues.

HPA 514b, Government and Health Policy. Colleen Barry.

This course is designed to familiarize students with the various processes by which governmental health policy is made in the United States, and with current policy debates. One focus

of the course is to understand the politics underlying the successes and failures of health policy making during the course of the twentieth century. This includes a discussion of the relevant governmental institutions, political actors, the major national programs that have been established, and how political actors use resources and set their strategies.

HPA 516a, Clinical Concepts: Individuals, in Sickness and in Health. David Katz.

This course is directed at students with no or little background in biomedical or clinical sciences. The normal anatomy and physiology of the major organ systems are described to serve as a basis for understanding disease processes of public health importance. The course is taught by a practicing clinician and draws liberally from actual patient care experiences, as well as from the current medical literature. The course assumes little prior knowledge, but does develop some fairly complex concepts necessary to understand the workings of the human body. There is substantial emphasis placed on the interdependence of clinical medicine and public health, and on medical humanism. (An appreciation for poetry is desirable, but not required.) Upon completing the course, students will have a working knowledge of the human body, its remarkable adaptations, and its myriad vulnerabilities; facility with medical terminology; an understanding of clinical decision making; and familiarity with medical technology.

HPA 529a, Policy Analysis and Health Politics. Patricia Keenan.

This course provides students with policy analysis skills and teaches students to think critically and write succinctly about health care policy. The course integrates the study of policy analysis and the world of health politics as analysts must do in real life. The course begins broadly by thinking first about the nature of public policy and the theories of policy analysis and policy decision making. Next, eight key components of the policy analysis process are considered, and the impact of major political organizations and institutions on the process of analyzing and selecting public health care policy is jointly examined. Prerequisite: HPA 510a.

[HPA 538a, Regulation and Public Health Policy.]

HPA 542a, Health of Women and Children. Mary Alice Lee.

The focus of this course is women's and children's health care in the United States. Emerging health issues and related health policy are presented and discussed in terms of epidemiology, including racial/ethnic disparities and effects of poverty; utilization and financing of children's health care; and existing programs and public policies that facilitate access to care. Data sources and data needs are identified. Topics may include history of MCH programs and policy, Medicaid and SCHIP, low birth weight and infant mortality, maternal mortality, reproductive health, breast and cervical cancer screening, pediatric oral health, pediatric asthma, childhood obesity, adolescent health care and teen pregnancy, children with special health care needs, childhood injuries and injury prevention. Students are expected to critically evaluate the public health implications of selected conditions and the effect of public policy on availability, accessibility, acceptability of services and accountability in health care for women and children.

HPA 544a, Public Law and Public Health: The Law, the Individual, and the State. John Culhane.

This course provides students with a basic orientation to the law, the legal system, and legal decision making as they relate to the public's health. Emphasis is on the relation between the autonomy of the individual and the power of the state in addressing issues affecting the public's health. Topics include civil commitment, right to refuse treatment, foster care, religious practices, and seat belt and helmet laws. Issues that must be considered in assessing the state's silence, omission, intervention, or intrusion into health matters of the person, the family, or the group are discussed. Prerequisite: second-year M.P.H. status.

HPA 545b, Health Care Disparities. Faculty.

This course explores what constitutes and explains a disparity in health care. Emphasis is placed on studying the history of disparities in the United States in order to understand the current state of disparities, and on evaluating the effectiveness of ongoing strategies to eliminate them, such as increasing insurance coverage and the delivery of culturally competent health care. The course also examines sociological models that explain disparities in health care and requires students to evaluate and expand on these models. Prerequisites: HPA 510a, CDE 505a.

[HPA 546b, Ethical Issues in Public Health.]**HPA 547b, Law and Ethics for Health Care Organizations. Theodore Ruger.**

This course is a survey of legal topics important to the management of health care organizations. It is designed to acquaint the future health care manager with the basic legal issues that daily affect the provision of health care services. The course examines the relationships among the parties involved in the delivery of health care; the law of business organizations, including that of corporations and partnerships; the legal constraints that affect health care organizations, including state and federal regulatory laws, labor relations, and antitrust doctrines; and doctrines particularly applicable to managed care organizations. The course also considers a variety of emerging legal issues in the health care field.

HPA 560b, Health Care Finance and Delivery. Susan Busch.

This course introduces students to the organization and operation of the American health care system. The course examines systems of health care delivery and finance and recent trends in their organization, including the growth of managed care. The course seeks to provide students with an understanding of the existing structure of the system and to provide them with conceptual frameworks.

[HPA 564a, Integrated Clinical/Financial Information Management.]**HPA 570b, Cost-Effectiveness Analysis and Decision Making. A. David Paltiel.**

This course introduces students to the methods of decision analysis and cost-effectiveness analysis in health-related technology assessment, resource allocation, and clinical decision making. The course aims to develop the following: (1) technical competence in the methods used; (2) practical skills in applying these tools to case-based studies of medical decisions and public health choices; and (3) an appreciation of the uses and limitations of these methods at the levels of national policy, health care organizations, and individual patient care.

HPA 583b, Methods in Health Services Research. Andrew Epstein.

This course introduces students to both quantitative and qualitative methods for research in health services. Topics include research objectives and hypotheses formulation, study design, sampling techniques, measurement, data analysis, results presentation, and discussion. Students synthesize these skills in the final paper. Prerequisite: BIS 505a.

HPA 586b, Microeconomics for Health Care Professionals. Susan Busch.

This course introduces students to microeconomics. Emphasis is placed on topics in microeconomics of particular relevance to the health care sector. Attention is paid to issues of equity and distribution, uncertainty and attitudes toward risk, and alternatives to price competition. This course is designed for students with minimal previous exposure to economics.

HPA 587a, Health Care Economics. Douglas Leslie.

This course applies the principles learned in Microeconomics for Health Care Professionals (HPA 586b) to the health of individuals, to health care institutions and markets, as well as to health care policy. The economic aspects of health behaviors, hospital markets, cost-benefit analysis, regulation, and the market for physician services are covered. Prerequisite: microeconomics or permission of the instructor.

[HPA 588b, Multivariate Statistical Methods: Causal Modeling and Measurement Theory.]**[HPA 590b, Economics of Drugs and Crime.]****HPA 592a, Concepts and Principles of Aging. Mary Bourbonniere.**

This multidisciplinary course provides the major concepts and principles of gerontology. Students are introduced to a variety of theories of aging in the biopsychosocial spheres. Delivery systems of care for the elderly are explored along with recent social policy initiatives as they relate to the elderly. Research initiatives are presented throughout the course. *Also NURS 723a.*

[HPA 596b, Critical Policy Issues in the AIDS Pandemic.]**HPA 597b, Capstone Course in Health Policy. Colleen Barry, Mark Schlesinger.**

This seminar is designed as the capstone educational experience for students concentrating in health policy. It integrates previous course work in health policy and public health and facilitates students' transition from the academic setting into the world of professional policy analysis. Students explore different strategies for policy analysis and associated models of professionalism. They learn how to select the appropriate strategy and disciplinary perspective for addressing a social problem. Students also learn how to identify and frame health policy problems. They gain an understanding of how framing may be used to change the focus of policy debates. Finally, students learn to present ideas in the sort of crisp and concise fashion required of professional policy analysis. These issues are studied in a series of applied areas, including substance abuse and the community obligations of managed care plans. Prerequisite: HPA 510a or equivalent.

HPA 600a and b, Readings in Health Services Research and Policy. Faculty.

This seminar explores current and cutting-edge topics in the broad fields of community and personal health services. It is designed to familiarize students with a breadth of research opportunities. Students review existing research projects and critique recent research publications. Prerequisite: Ph.D. student status or permission of the instructor.

[HPA 603b, The Ethical Conduct of Research.]**HPA 612a and b, Interface of Health Policy and Clinical Care. David Katz.**

This course explores health policy dilemmas that have an impact on both populations and individual patients. The emphasis is on balancing the demands of public and private health care delivery, and on critical decision making. Current topics are chosen each term. Examples include resource allocation in end-of-life care, breast cancer screening, medical malpractice and tort law, physician-assisted dying, and appropriateness of invasive hemodynamic monitoring. Students receive a packet of readings from the current literature each week. Classes consist of student presentations followed by discussion and debate. Discussions are moderated by an expert faculty member from EPH, the School of Medicine, or outside institutions as indicated. The course is open to M.D./M.P.H. students, physicians, and others by permission of the instructor.

HPA 617a, Colloquium in Health Policy and Health Services Research I. Faculty.

This seminar focuses on the analysis of current issues in health policy and on state-of-the-art methodological issues in health services research. The format includes guest speakers and presentations by EPH as well as other faculty and graduate students of ongoing research projects. Students participate in critical discussions of the issues that arise in both types of sessions. Prerequisite: Ph.D. student status or permission of the instructor.

HPA 617b, Colloquium in Health Policy and Health Services Research II. Faculty.

This seminar includes in-depth discussions of major policy concerns in the health and health care of vulnerable populations such as the poor, young, old, and disabled. The seminar also includes student presentations of their own research. Prerequisite: Ph.D. student status or permission of instructor.

HPA 650a, Colloquium on Mental Health Services Research I. Faculty.

This seminar focuses on the state-of-the-art methods in the evaluation and the measurement of need for treatment and organization of mental health services. Students review ongoing research projects and develop research on the use of mental health services, prepare annotated bibliographies, and participate in the examination of relevant issues. Prerequisite: Ph.D. student status or permission of the instructor.

HPA 650b, Colloquium on Mental Health Services Research II. Faculty.

This seminar focuses on social and cultural factors in the development, diagnosis, treatment, and prevention of mental illness. Attention is given to the underlying theory and research in the social epidemiology of mental illness and the relation between stress and psychiatric status. The seminar also includes student presentations of their own research in mental health services and/or social psychiatry. Prerequisite: Ph.D. student status or permission of the instructor.

COUNCIL ON EUROPEAN STUDIES

Yale Center for International and Area Studies (YCIAS)

242 Luce Hall, 34 Hillhouse, 432.3423

www.yale.edu/ycias/europeanstudies

M.A.

Graduate Certificate of Concentration in European Studies

Chair

Stathis Kalyvas (*Acting*)

Director of Graduate Studies

Timothy Snyder (245 Luce Hall, 432.3423)

Professors

Julia Adams (*Sociology*), Vladimir Alexandrov (*Slavic Languages & Literatures*), Ivo Banac (*History*), Dirk Bergemann (*Economics*), Paul Bushkovitch (*History; on leave* [F]), David Cameron (*Political Science*), Katerina Clark (*Slavic Languages & Literatures*), Mirjan Damaška (*Law*), Edwin Duval (*French*), Laura Engelstein (*History; on leave*), Robert Evenson (*Economics*), Paul Freedman (*History*), Ute Frevert (*History*), John Gaddis (*History*), Harvey Goldblatt (*Slavic Languages & Literatures*), Philip Gorski (*Sociology*), Robert Greenberg (*Adjunct, Slavic Languages & Literatures*), Cyrus Hamlin (*Germanic Languages & Literatures*), Benjamin Harshav (*Comparative Literature*), Stathis Kalyvas (*Political Science*), Paul Kennedy (*History*), John Merriman (*History*), Steven Pincus (*History*), Susan Rose-Ackerman (*Law*), Frank Snowden (*History*), Ivan Szelenyi (*Sociology*), Katie Trumpener (*Comparative Literature*), Tomas Venclova (*Slavic Languages & Literatures; on leave* [Sp]), Miroslav Volf (*Divinity*), Jay Winter (*History; on leave*)

Associate Professors

Hilary Fink (*Slavic Languages & Literatures; on leave* [F]), Lawrence King (*Sociology*), Nicholas Sambanis (*Political Science*), Timothy Snyder (*History*)

Assistant Professors

Keith Darden (*Political Science*), Kate Holland (*Slavic Languages & Literatures*), John MacKay (*Slavic Languages & Literatures*)

Senior Lectors

Irina Dolgova (*Slavic Languages & Literatures*), Rita Lipson (*Slavic Languages & Literatures*), Slobodan Prosperov Novak (*Slavic Languages & Literatures*)

Participating Staff

Jonathan Brent (*Yale University Press*), Brian Carter (*PIER*), Tatjana Lorkovic (*Library*), Kevin Repp (*Beinecke Library*)

The European Studies Council formulates and implements new curricular and research programs reflective of current developments in Europe. The geographical scope of the council's activities extends from Ireland to the lands of the former Soviet Union. Its definition represents a concept of Europe that embraces the conventional divisions into Western, Central, and Eastern Europe, and is understood to include the Balkans and Russia. In 2000 and 2003, the U.S. Department of Education designated the council a National Resource Center under its HEA Title VI program.

The European Studies Council builds on existing programmatic strengths at Yale, while serving as a catalyst for the development of new initiatives. Yale's current resources in European Studies are vast and include the activities of many members of the faculty who have teaching and research specialties in the area. Such departments as Comparative Literature, Economics, History, History of Art, Political Science, Slavic Languages and Literatures, and Sociology regularly offer courses with a European focus. These are complemented by the rich offerings and faculty strength of the French, German, Italian, and Spanish and Portuguese language and literature departments, as well as the European resources available in the professional schools and other programs, such as Film Studies. By coordinating Yale's existing resources, including those in the professional schools, encouraging individual and group research, and promoting an integrated comparative curriculum and degree programs, the council strongly supports the disciplinary and interdisciplinary study of European regions and their interactions. The council is also the home to a special program in European Union Studies and also to the Hellenic Studies program, which offers instruction in Modern Greek language, literature, and culture.

The council administers an M.A. program in European and Russian Studies. This M.A. program is unusual in its embrace of the entire spectrum of European nations and cultures. The requirements permit students to choose a particular national or thematic focus, geared to their individual interests and language skills, while demanding that they acquaint themselves with the traditions and issues associated with the other parts of Europe. Students specializing in Russia, for example, will concentrate their efforts in that area, but will also take courses that may concern Europe-wide problems or the countries of Central or Western Europe. In this way, the program translates the political realities and challenges of the post-Cold War era into a flexible and challenging academic opportunity. In addition to the M.A. degree program, the council offers students in the University's doctoral and other professional degree programs the chance to obtain a Certificate in European Studies, by fulfilling a supplementary curriculum. The undergraduate major in Russian and East European Studies is administered by the Department of Slavic Languages and Literatures.

The benefits provided to the Yale community by the European Studies Council include not only its status as an HEA Title VI National Resource Center, but also its affiliation with interuniversity and international organizations that can offer specialized training programs and research grants for graduate students, support conferences among European and American scholars, and subsidize European visitors to Yale. The Fox

International Fellowship Program, for example, offers generous fellowship support to qualified students who undertake research at specified institutions in the United Kingdom, Germany, France, and Russia. Furthermore, the council supplements the regular Yale curriculum with lectures and seminars by eminent European and American scholars, diplomats, and political officials. Each year, the European Commission sponsors a European Union Fellow at Yale. The European Union visiting fellow during the 2005–2006 academic year will be Peter Oliver, a lawyer who is attached to the commission's legal service. He specializes in competition policy (i.e., anti-trust and merger policy) and represents the commission in competition cases before the European Court of Justice and the Court of First Instance. Also in 2003–2004 and 2004–2005, European Studies hosted the distinguished scholar Slobodan Prosperov Novak, who teaches the Serbian and Croatian languages as well as courses on South Slavic literatures and cultures.

Given the special objective of the European Studies Council to encourage research and discussion on projects of a pan-European nature or those involving comparison among several countries, the faculty are available to supervise work on European economic, political, and cultural integration. Specific studies might focus on such themes as labor migration and the issue of immigration in general; the problems of socialist or center parties in countries with or without Communist experiences; the common tendencies in various national literatures or art; or common problems in the relations between European countries and other parts of the world.

Fields of Study

Comparative literature; economics; history; political science; law; Slavic languages and literatures; sociology.

Special Requirements for the M.A. Degree

When applying to the program, students will specify as an area of primary concentration either (1) Russia and Eastern Europe, or (2) Central and Western Europe. Those wishing to focus on Russia and Eastern Europe will need to demonstrate knowledge of Russian or an Eastern European language; those focusing on Central and Western Europe will need to demonstrate knowledge of one of the appropriate languages. All students must complete sixteen term courses (or their equivalent) in the various fields related to European and Russian studies. Students are required to take courses in at least three of the major disciplines relevant to the program (history, literature, social sciences, and law). One of the sixteen term courses may be taken for audit. For students focusing on Russia and Eastern Europe, two of the sixteen required courses (excluding language courses) must concern the nations of Central and Western Europe. For those focusing on Central and Western Europe, two courses must concern Russia and Eastern Europe. Students may substitute a yearlong course of language study for two terms of graduate course work. Under this option the language course may not be taken for audit. Students with previous language preparation may in certain cases receive credit for this work. In

all cases, students are required to pass examinations in two European languages (one of which may be Russian) by the end of the third term at Yale. Students with Russian competence must receive the grade of 1+ or higher on the ACTFL/ETS Rating Scale as administered by the Slavic Languages and Literatures department at Yale, including reading, oral, and grammar portions. Students with competence in an East European language (such as Polish, Czech, Ukrainian, Hungarian, and others by special arrangement) or other European languages must take Yale department-administered examinations. A joint degree is available with the School of Management. Interested students must apply separately to the School of Management as well as to European Studies for a joint degree.

The Master's Thesis

The master's thesis is based on research in a topic approved by the director of graduate studies and advised by a faculty member with specialized competence in the chosen topic. The thesis is normally written in conjunction with E&RS 950.

Special Requirements for the Graduate Certificate of Concentration in European Studies

Students may pursue the graduate Certificate of Concentration in European Studies in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools. Candidates will specify as an area of primary focus either (1) Russia and Eastern Europe, or (2) Central and Western Europe. Admission is contingent upon the candidate's acceptance into a Yale graduate-degree program. To complete the certificate, candidates must demonstrate expertise in the area through their major graduate or professional field, as well as show command of the diverse interdisciplinary, geographic, and cultural-linguistic approaches associated with expertise in the area of concentration. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on successful completion of the candidate's Yale University degree program. For general certificate guidelines, see the YCIAS section (under Research Institutes) in this bulletin.

Specific Requirements

1. Language proficiency in two modern European languages, in addition to English. For each language students must demonstrate the equivalent ability of two years of language study at Yale with a grade of HP or better. Language proficiency must encompass reading, writing, speaking, and listening skills plus grammar. Students may demonstrate proficiency through completing course work, by testing at Yale, or by other means as approved by the council adviser. Those wishing to focus on Russia and Eastern Europe will need to demonstrate knowledge of Russian or an Eastern European language; those focusing on Central and Western Europe will need to demonstrate knowledge of one of the appropriate languages.

2. Six courses in the area of concentration, of which:
 - a. three courses must offer transnational approaches to Europe-related issues, and
 - b. of the remaining three courses, students focusing on Russia and Eastern Europe must take at least one course concerning the nations of Central and Western Europe. For those focusing on Central and Western Europe, at least one course must concern Russia and Eastern Europe.

The courses should also include a variety of disciplines, and only two courses may be “directed readings” or “independent study.” No more than four of the six courses may count from any one discipline or school. Courses may count toward the student’s degree, as well as toward the certificate. A minimum grade of HP must be obtained for the course to be counted toward the certificate. Courses from the student’s home department are eligible.

3. Interdisciplinary research paper written either:
 - a. in the context of one of the six courses in the area of concentration, or
 - b. as independent work under faculty supervision, replacing one of the six required courses.

A qualifying research paper is required to demonstrate field-specific research ability focused on the area of concentration. After they have completed substantial course work in the area, students must seek approval from the council faculty adviser for the research project they propose as the qualifying paper. Normally, students will submit their proposals no later than the fourth week of the term in which they plan to submit the qualifying paper.

The paper will be read by two faculty members selected by the council adviser. The readers will be evaluating the paper for the quality of research, knowledge of the relevant literature, and the depth of analysis of the topic. The qualifying paper must be fully footnoted and have a complete bibliography.

Progress Reports and Filing for the Award of the Graduate Certificate of Concentration

Students should submit a progress report along with a copy of their unofficial transcript to the council faculty adviser at the end of each term.

A student who intends to file for the final award of the certificate should contact the council no later than the end of the term prior to award. No later than the fourth week of the term of the expected award, the candidate should demonstrate how he/she has or will have completed all the requirements in a timely fashion.

At the end of the term as grades are finalized, the council will confirm that the candidate is cleared to receive the home degree and has fulfilled all the requirements of the certificate. Students may elect to retrieve the certificate award in person from the council after commencement. Otherwise, the council will send the certificate award to the student by mail after commencement.

Program materials are available upon request to the Council on European Studies, Yale University, PO Box 208206, New Haven, CT 06520-8206.

Courses

E&RS 652b, The European Union's Contemporary Challenges. Peter Oliver.

Each year, this course addresses a different set of issues facing the EU. Recent issues have included trade policy, regulation policy, building European monetary power, international trade policy and the WTO, and science, precaution, and policy making. The course is taught by the EU fellow visiting YCIAS. *Also INRL 549b.*

E&RS 940a or b, Independent Study.

By arrangement with faculty.

E&RS 950a or b, Master's Thesis.

By arrangement with faculty.

EXPERIMENTAL PATHOLOGY

342 Brady Memorial Laboratory, 785.6721
M.S., M.Phil., Ph.D.

Chair

Jon Morrow (*Molecular, Cellular & Developmental Biology*)

Director of Graduate Studies

David Stern (785.4832, df.stern@yale.edu)

Professors

Philip Askenase (*Internal Medicine*), Richard Bucala (*Internal Medicine*), Young Choi, José Costa, S. Evans Downing (*Emeritus*), Stuart Flynn, Nikki Holbrook (*Internal Medicine*), Michael Kashgarian (*Molecular, Cellular & Developmental Biology*), Jung Kim, Paul Lizardi, Marc Lorber (*Surgery*), Joseph Madri, Nita Jane Maihle (*Obstetrics, Gynecology & Reproductive Sciences*), Vincent Marchesi (*Director, Boyer Center for Molecular Medicine; Cell Biology*), Mark Mooseker (*Molecular, Cellular & Developmental Biology*), Jon Morrow (*Molecular, Cellular & Developmental Biology*), Jordan Pober (*Immunobiology; Dermatology*), John Rose (*Cell Biology*), Jeffrey Sklar, David Stern, Fattaneh Tavassoli, Raymond Yesner (*Emeritus*)

Associate Professors

Janet Brandsma (*Comparative Medicine*), Shawn Cowper (*Dermatology*), Earl Glusac (*Dermatology*), Robert Homer, Diane Krause (*Laboratory Medicine*), Jennifer McNiff (*Dermatology*), Wang Min, Archibald Perkins (*Molecular, Cellular & Developmental Biology*), Miguel Reyes-Mugica (*Pediatrics*), David Rimm, Marie Robert, Gerry Shadel, John Sinard (*Ophthalmology*), Wenxin Zheng

Assistant Professors

Serguei Bannykh, Demetrios Braddock, Mary Chacho, Tamara Handerson (*Dermatology*), Liming Hao, Pei Hui, Dhanpat Jain, Diane Kowalski, Michael Krauthammer, Themis Kyriakides, Rossitza Lazova (*Dermatology*), Robert Means, Marguerite Pinto, Pars Ravichandran, Ali Riba, Antonio Subtil-Deoliveira, Jr. (*Dermatology*), Idris Tolgay Ocal, David Tuck, Zenta Walther, Eduardo Zambrano

Instructor

Cesar Angeletti

Research Scientists

Christine Howe, Deepti Pradhan

Associate Research Scientists

Robert Camp, Gouri Chatterjee, Jan Czycyk, Amy Jackson-Fisher, Nancy Kirkiles-Smith, Sabine Lang, Jie Hui Li, Meng Liu, Mark Mattie, Nina Rose, Michael Stankewich, Alexi Stortchevoi, Bogdan Yatsula, Zhushan Zhang

Fields of Study

Fields include molecular and cellular basis of cancer; biology, biochemistry, and pathology of the plasma membrane; cells, molecules, and response to stimuli of connective tissue; interaction of viruses with animal cells; pathology of organ systems; somatic cell genetics and birth defects; biology of endothelial cells; assembly of viruses.

Special Admissions Requirements

A strong background in basic sciences is recommended for applicants to the program, including biology, chemistry through organic and physical chemistry, mathematics through calculus, biochemistry, genetics, or immunology. GRE General Test or MCAT is required.

To enter the Ph.D. program, students apply to an interest-based track, usually the Pharmacological Sciences and Molecular Medicine track, within the interdepartmental graduate program in the Biological and Biomedical Sciences (see pages 71–73).

Special Requirements for the Ph.D. Degree

There is no foreign language requirement. Three to four terms of course work including courses in biochemistry, genetics, immunology, cell biology, and pathology are selected according to the student's background and choice. The qualifying examination has both written and oral parts. After a reading period of six weeks the student will answer, in essay form, one of two questions in each of three subject areas, which include a brief research proposal. The oral examination will specifically address the chosen areas of interest in addition to general problems of pathology. Upon completing the course requirement with at least two terms of Honors, passing the qualifying examination, and submitting a thesis prospectus, students will be admitted to candidacy. They must then submit a written thesis describing the research and present a thesis research seminar.

In accordance with the BBS program, Ph.D. students are expected to participate in two terms (or the equivalent) of teaching.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Awarded only to students who are continuing for the Ph.D. Students are not admitted for this degree.

M.S. Awarded only to students who are not continuing for the Ph.D., but who have successfully completed one year of the doctoral program. Students are not admitted for this degree.

Program materials are available upon request to the Director of Graduate Studies, Department of Experimental Pathology, Yale University, PO Box 208023, New Haven CT 06520-8023; Web site, www.yalepath.org/DEPT/edu/gradtraing.htm.

Courses

Note: Pathology 600, 616, 617, and 618b are primarily geared toward medical students, but may be taken by graduate students with the permission of the director of medical studies (Dr. Joseph Madri).

PATH 600, Pathological Basis of Human Disease. Joseph Madri and staff.

Fundamental principles underlying the pathological alterations in function and structure that constitute the reaction of the organism to injury. Pathology of diseases involving special organs and systems. Correlation of the clinical and anatomical manifestations is emphasized. For EPH graduate students and MSTP students who are required to take PATH 100 for graduate credit.

PATH 616, Autopsy Pathology. John Sinard and staff.

Participation in the autopsy service with members of the house staff in pathology. Participation in autopsies and the presentation and review of the clinical and anatomical findings of postmortem examinations with senior members of the department. Opportunities exist for correlation studies with previous biopsies, and clinical investigative and cell biologic techniques in relation to necropsy material. Six weeks minimum, full time. Enrollment limited to two students.

PATH 617, Anatomic Pathology. José Costa and staff.

The department offers an elective to medical students in the third and fourth years that provides a broad experience in general diagnostic techniques. Students have opportunities to participate in surgical pathology, cytology (including fine-needle aspiration), and autopsy. A daily diagnostic conference is scheduled for both residents and students, and an additional two hours of conference are provided each week exclusively for the students. In addition to direct responsibilities in the handling of the cases, the student has the opportunity to apply the special techniques of electron microscopy, immunohistochemistry, and flow cytometry. A minimum of four weeks is suggested for this elective. Five students are accommodated every four to six weeks.

PATH 618b, Clinical and Pathologic Correlates in Renal Disease.

Michael Kashgarian, Norman Siegel.

A series of clinical pathologic conferences designed to illustrate clinicopathologic correlates in renal disease. At each session, one student acts as clinician and another as pathologist in the evaluation and discussion of case material from autopsies or renal biopsies. Discussions are informal, but require preparation in advance and all participants are expected to contribute in each session. One two-hour session per week for six weeks. Given once in spring term. Limited to twelve students.

PATH 620a and b, Laboratory Rotations in Experimental Pathology. David Stern.

Laboratory rotations for first-year graduate students.

PATH 650b, Cellular and Molecular Biology of Cancer. David Stern, Archibald Perkins.

A comprehensive survey of cancer research from the cellular to the clinical level. The relation of cancer to intracellular and intercellular regulation of cell proliferation is emphasized, as are animal models for cancer research. Background in molecular genetics and cell biology is assumed. Open to advanced undergraduates with permission of the organizers.

PATH 670b, Biological Mechanisms of Reaction to Injury. Michael Kashgarian, Jon Morrow, José Costa, and Archibald Perkins.

An introduction to human biology and disease as a manifestation of reaction to injury. Topics include organ structure and function, cell injury, circulatory and inflammatory responses, disordered physiology, and neoplasia.

PATH 680a, Seminar in Pharmacology and Molecular Medicine. Faculty.

M 3–5 (or 5.30)

Readings and discussion in topics relevant to cell biology and molecular medicine. The overall theme for the papers discussed is stem cell biology. The class emphasizes analysis of the primary research literature and development of presentation skills. Note: Meetings last until 5.30 P.M. when more than one presentation is given.

PATH 690, Molecular Mechanisms of Disease. Jeffrey Sklar.

TH 2–3

The molecular and cellular basis of human diseases. The course covers the fundamental mechanisms of infectious and degenerative diseases, vascular and inflammatory processes, AIDS, and cancer. The objective is to highlight advances in experimental and molecular medicine as they relate to understanding the pathogenesis of and formulating therapies for selected examples of major human diseases.

FILM STUDIES

53 Wall, Rm 216, 436.4668

M.Phil., Ph.D.

Co-Chairs

Dudley Andrew

Charles Musser

Director of Graduate Studies

Dudley Andrew (Rm 219, 53 Wall, dudley.andrew@yale.edu)

Professors

Dudley Andrew,* Ora Avni, David Bromwich, Hazel Carby, Katerina Clark,* Michael Denning, John Mack Faragher, Benjamin Harshav, David Joselit, Thomas Kavanagh,* Christopher L. Miller, Charles Musser,* Brigitte Peucker,* Joseph Roach, Michael Roemer, John Szwed, Katie Trumpener,* Laura Wexler

Assistant Professors

Seth Fein, Terri Francis,* Aaron Gerow,* John MacKay,* Kristin Phillips-Court, Noa Steimatsky*

Fields of Study

Film Studies is an interdisciplinary field drawing on the study of the history of art, national cultures and literatures, literary theory, philosophy, sociology, and other areas. Film Studies offers a combined Ph.D. with a number of other departments and programs, currently including American Studies, Comparative Literature, East Asian Languages and Literatures, French, German, History of Art, Italian, and Slavic Languages and Literatures. In addition to acquiring a firm grounding in the methods and core material of both film studies and another discipline, the candidate is advised to coordinate a plan of study involving comprehensive knowledge of one or more areas of specialization. Such areas include:

1. Historiography, including archival history, history of technology, early cinema.
2. Aesthetics: theories of the image, adaptation, film/philosophy.
3. European film: British, French, German, Italian, Slavic.
4. American culture: Hollywood, independent film, African American cinema.
5. World film: global image exchange; cinema in Asia, Latin America, and Africa.
6. Documentary film and media.

Through course work, examinations, and the dissertation, the candidate links a film specialty with material and methods coming from the participating discipline. Directors of graduate studies from both programs monitor the candidate's plans and progress.

*Member of the Graduate Committee

Special Admissions Requirements

Interested students must select Film Studies as their program of interest on their application and also indicate the participating department they plan to work within in combination with Film Studies.

Special Requirements for the Ph.D. Degree

Every student selected for the combined program is subject to the supervision of the Film Studies program and the relevant participating department. A written protocol between each department and Film Studies outlines the requirements and schedule to be borne in mind as a plan of study is worked out in consultation with the director of graduate studies of Film Studies and the director of graduate studies of the participating department. In all cases, students are required to take two core seminars in Film Studies (FILM 601 and FILM 603) as well as at least four additional Film Studies seminars. Course requirements vary for participating departments but comprise a total of sixteen courses (fourteen for American Studies, fifteen for History of Art). A student advances to candidacy by completing a number of formal procedures by the end of the sixth semester:

1. One-hour oral examination covering basic primary and secondary texts in Film Studies and administered by two members of the Film Studies Graduate Committee.
2. Qualifying examinations, following the regulations of the participating department with at least one member of the Film Studies Graduate Committee participating.
3. The dissertation prospectus presented to a faculty committee consisting of at least one member of the Film Studies Graduate Committee and one member of the participating department who is not also on the Film Studies Graduate Committee. Once the student and dissertation adviser deem the dissertation finished, a public defense of the completed work shall be held. At least one examiner of the dissertation must be a member of the Film Studies Graduate Committee and one a member of the participating department who is not on that committee.

The faculty in Film Studies considers participation in the Teaching Fellows Program to be essential to the professional preparation of graduate students. Students normally teach in years three and four. Every student is required to serve as a teaching fellow in two of the following courses: Introduction to Film; Film Theory; World Cinema.

Master's Degree

M.Phil. See Graduate School requirements, page 442.

Program materials are available upon request to the Director of Graduate Studies, Yale Film Studies Program, Yale University, PO Box 208363, New Haven CT 06520-8363.

Courses

FILM 601a, Films and Their Study. Dudley Andrew.

W 10.30–12.20, screenings M 7 P.M.

“Films and Their Study” sets in place some undergirding for graduate students who want to anchor their film interest to something like the “professional discourse” of this field. A coordinated set of topics in film theory is interrupted first by the often discordant voice of history and second by the obtuseness of the films examined each week. As the title of this seminar is meant to convey, films themselves take the lead in our discussions. *Also CPLT 917a.*

FILM 710b^U, Questions of Realism in Cinema. Noa Steimatsky.

Th 1.30–3.20

Examinations of the historical premise, conflicting definitions, and diverse traditions of realism in the cinema, with reference to other arts and literature.

FILM 716a^U, Film and the Harlem Renaissance. Terri Francis.

W 3.30–5.20, screenings M 7 P.M.

Consideration of the Harlem Renaissance’s cinematic expressions. Focusing on the period from the 1890s to the late 1940s, screenings include early images of African Americans, “race movies” of the silent and sound eras, and American and foreign films that feature black stars. This interdisciplinary seminar brings together early African American films with canonical writings of the Renaissance in an international context. *Also AFAM 732a^U.*

FILM 717b^U, Black Women’s Film and Video. Terri Francis.

T 7–8.50 P.M., screenings M 7 P.M.

Study of films and videos made by women of African descent during the twentieth and twenty-first centuries. Focus on filmmaking as a critical practice and an art form, particularly how it engages cinematic perceptions of black womanhood. Films placed in a matrix of African American film history, feminist film theory, and legacies of black feminist writing and image-making. Topics include film language, authorship, performance, and the question of audience. *Also AFAM 731b^U.*

FILM 721b^U, Spatial Dimensions in Cinema. Dudley Andrew.

W 1.30–3.20, screenings M 7 P.M.

Investigation of how cinema orients its spectators, how nations orient their citizens through cinema, and how businessmen and bureaucrats map the territories that images reach and affect. Examination of space in films and the distribution patterns of cinema. *Also CPLT 922b.*

FILM 762a^U, Weimar Cinema. Brigitte Peucker.

Th 1.30–3.20, screenings W 7 P.M.

The German cinema, 1919–1930. Expressionist films and films of the New Objectivity. The pressures of technology, psychoanalysis, and the other arts on cinema; issues of spectatorship, visual pleasure, and distraction in the context of a national cinema. Readings by Kracauer, Benjamin, and others. Films by Murnau, Lang, Pabst, Brecht, von Sternberg, and others. Conducted in English, with readings in English. *Also GMAN 633a.*

FILM 765b^U, The Aesthetics of Occupation: Arts and Politics of Everyday Life in Fascist-Occupied Europe. Katie Trumpener.

W 3.30–5.20, screenings W 7 P.M.

Examining literary and visual texts from across fascist-occupied Europe, this course explores the ways artists invoked everyday life to ground aesthetic and political strategies. Attention to diaristic forms, to children’s experience, and to the war’s continuing impact on postwar aesthetics. All texts available in English translation. *Also CPLT 929b, GMAN 666b.*

FILM 774b^U, Soviet and Post-Soviet Film. John MacKay.

Th 7–8.50 P.M.

Close, contextualized examination of major films produced in the former Soviet Union after 1945, and in Russia since 1991. We consider films by such directors as Kalatozov, Muratova, Tarkovsky, Paradzhanov, Abuladze, German, and Sokurov. Open to graduate and undergraduate students. No knowledge of Russian necessary. *Also RUSS 713b^U.*

FILM 811a, Cinematic Landscapes in Postwar Europe. Noa Steimatsky.

T 11.30–3

This seminar traces a trajectory of postwar European film production that privileges actual locations, the landscape of the everyday, as arenas where realist and modernist discourses converge. Focus on the work of Antonioni, Rossellini, Bresson, Godard, Straub-Huller, and Akerman, among others. Discussion of the periodizing of film history; new articulations of cinematic space and temporality, the tracing of action and affect, the restoration of identity in the quotidian landscape. *Also HSAR 715a.*

FILM 824a, Alternative Cultures in Communist Central and Eastern Europe.

Katerina Clark, Katie Trumpener.

M 7–9 P.M.

Exploring a range of texts — from film and media culture, literary and visual culture to youth culture and popular music — from across Communist (and post-Communist) Europe, this course examines a range of dissident cultures, subcultures, and countercultures. Topics to include the relationship between official and experimental modes of culture, transnational circuits of influence, the construction of subcultural worlds, and the range of dissident ideologies (nationalist, liberal, religious, and reform-Marxist). *Also CPLT 928a, GMAN 611a, RUSS 746a.*

FILM 830b, Literature into Cinema in Italy. Millicent Marcus.

W 3.30–5.20

This course undertakes a series of twelve case studies of films adapted from literary works, identifying the challenges that specific texts present to filmmakers in their attempts to transform verbal fictions into mass media spectacles. *Also CPLT 916b, ITAL 590b.*

FILM 861b, From New American Cinema to Global Hollywood. Thomas Elsaesser.

T 11.30–1.20

This course looks at the various economic, cultural, and formalist arguments put forward in debate about American mainstream cinema between the late 1960s and the re-consolidation of Hollywood as the world's premier entertainment industry by the mid-1990s. Does this period, with slight modifications, prove the persistence of classical Hollywood, or do we have to posit a post-Fordist, post-classical Hollywood? What are the (multi-)cultural implications of Hollywood having become global? The course suggests several lines of argument and research-strategies, and also puts forward the idea of “parapractical” readings, as possibly more appropriate to an understanding of Hollywood genres and event movies than either close textual analysis or symptomatic readings. Films discussed range from *Five Easy Pieces*, *Chinatown*, *Apocalypse Now*, *Back to the Future* to *JFK*, *Forrest Gump*, *Schindler's List*, *Jurassic Park*, but may also include *Silence of the Lambs*, *Pulp Fiction*, *Memento*, *The Player*, *Fight Club*, *Mulholland Drive*, *Adaptation* and *Nurse Betty*. *Also AMST 817b.*

FILM 880b, Theorizing Popular Cultures and Subcultures of Modern Japan.

Aaron Gerow.

T 1.30–3.20

An intense survey of postwar Japanese theories of subculture and popular image culture, focusing on the intellectual debates and the texts they discussed. *Also JAPN 872b.*

FORESTRY & ENVIRONMENTAL STUDIES

205 Prospect, 432.5100

M.S., M.Phil., Ph.D.

Dean

James Gustave Speth

Director of Doctoral Studies

Xuhui Lee (338 ESC, 432.6271, xuhui.lee@yale.edu)

Professors

Mark Ashton, Gaboury Benoit, Graeme Berlyn, Garry Brewer, William Burch, Jr., Michael Dove, Daniel Esty, Thomas Graedel, Timothy Gregoire, Stephen Kellert, Xuhui Lee, Robert Mendelsohn, Chadwick Oliver, James Saiers, Oswald Schmitz, David Skelly, John Wargo

Associate Professors

Benjamin Cashore, Lisa Curran

Assistant Professors

Michele Bell, Marian Chertow, Erin Mansur, Sheila Olmstead, Peter Raymond

Non-Ladder Faculty

Shimon Anisfeld, Ellen Brennan-Galvin, Ann Camp, Carol Carpenter, Timothy Clark, Amity Doolittle, Paul Draghi, Gordon Geballe, Bradford Gentry, Arnulf Grübler, Reid Lifset, Florencia Montagnini, Robert Repetto, Jonathan Reuning-Scherer, Thomas Siccama

Courtesy Joint Appointments

James Axley, Ruth Blake, Adalgisa (Gisela) Caccone, Michael Donoghue, Menachem Elimelech, Roger Ely, Robert Evenson, Jonathan Feinstein, Mary Helen Goldsmith, Nathaniel Keohane, Brian Leaderer, William Nordhaus, Jeffrey Powell, James Scott, Ronald Smith, Stephen Stearns, Karl Turekian, Eric Worby

Visiting Faculty, Fellows, Adjunct Faculty, and Faculty with Primary Appointments

Elsewhere

Diana Balmori, Dale Bryk, Maureen Burke, Richard Burroughs, William Butler, Mary Cadenasso, Michael Conroy, Angela Cropper, Douglas Daly, William Ellis, Andrew Henderson, Lloyd Irland, Richard Jones, John Kakonge, Lye Lin Heng, James Lyons, James MacBroom, David McGrath, Arvid Nelson, Daniel Nepstad, Michael Northrop, Tatsuhiro Ohkubo, Christine Padoch, Charles Peters, Nicholas Robinson, Holmes Rolston, David Runnalls, Marjorie Shansky, Dennis Stevenson, Fred Strebeigh, Dorceta Taylor, Charles Dana Tomlin, William Vance, Andrew Willard

Fields of Study

Fields include agroforestry; biodiversity conservation; biostatistics and biometry; community ecology; ecosystems ecology; ecosystems management; environmental biophysics and meteorology; environmental chemistry; environmental ethics; environmental governance; environmental health risk assessment; environmental history; environmental law and politics; environmental and resource policy; forest ecology; hydrology; industrial ecology; industrial environmental management; plant physiology and anatomy; pollution management; population ecology; resource economics; energy and the environment, silviculture, social ecology; stand development, tropical ecology and conservation; urban planning; water resource management; environmental management and social ecology in developing countries.

Special Admissions Requirements

Applicants should hold a bachelor's or master's degree in a field related to natural resources, such as forestry, or in a relevant discipline of the natural or social sciences, such as biology, chemistry, economics, or mathematics. The GRE General Test is required but Subject Tests are optional.

Special Requirements for the Ph.D. Degree

Students are required to take the Doctoral Student Seminar, 824a/b, before the second term of their program. Aside from this requirement, there is no required curriculum of credit courses and no formal language requirement. Courses of study are individually designated through consultation between degree candidates and their advisers and dissertation committees. The amount of course work required will depend on the previous training of the student but the normal requirement for a student with no previous graduate training is three or four courses per term for four terms. The program of each student will be evaluated at the end of the first year of residence. At least two term grades of Honors are required in the first two years of study; however, it is anticipated that grades of Honors or High Pass will be achieved in two-thirds of all courses taken. A written and oral qualifying examination is required upon completion of the course requirements. Students are expected to take the examination by the end of their second or third term. All students must complete the examination at the end of their fourth term of study. At the time of the qualifying examination, the student must present a prospectus of the research work proposed for the dissertation. Successful completion of the qualifying examination and submission of the prospectus will result in admission to candidacy. Upon completion of the dissertation, the candidate must make unbound copies of the dissertation available to the faculty and appear for an oral examination at a time and place designated by the director of graduate studies. Copies of the approved dissertation must be submitted to the Graduate School, and one copy to the library of the School of Forestry & Environmental Studies. Depending upon the nature of the dissertation topic, completion of the Ph.D. degree normally requires four years. Teaching and research experiences are regarded as integral parts of the graduate training program in Forestry

& Environmental Studies. All students are required to serve as teaching fellows (10 hours per week) for two terms prior to the end of their fourth year of study. In addition, before the end of their fourth year of study, all doctoral students must complete a two-term research project/assistantship with their major adviser (10 hours per week). The nature of teaching assignments and research duties is determined in cooperation with the student's major adviser and the director of graduate studies.

Master's Degrees

M.Phil (en route to the Ph.D.) Students may petition for this degree after they have passed the qualifying exam and advanced to candidacy. Applications for this master's degree are not accepted.

M.S. (en route to the Ph.D.) This degree is normally granted only to students who are withdrawing from the Ph.D. program. Applications for this master's degree are not accepted. Requirements that must be met for award of the M.S. are (1) successful completion of two years of course work in residence with two grades of Honors; (2) a written prospectus; (3) fulfillment of one term of the teaching requirement.

For information on the terminal master's degrees offered by the Yale School of Forestry & Environmental Studies (the Master of Forestry, Master of Forest Science, Master of Environmental Management, and Master of Environmental Science degrees) visit the School's Web site, www.yale.edu/environment, or contact Admissions Director, Yale School of Forestry & Environmental Studies, 205 Prospect Street, New Haven CT 06511.

For courses, see the *Bulletin of the School of Forestry & Environmental Studies*.

FRENCH

82–90 Wall Street, 3d floor, 432.4900

M.A., M.Phil., Ph.D.

Chair

Edwin Duval

Director of Graduate Studies

Howard Bloch [F] (82–90 Wall Street, Rm 325, 432.4902, howard.bloch@yale.edu)

Thomas Kavanagh [Sp] (82–90 Wall Street, Rm 316, 432.4902,
thomas.kavanagh@yale.edu)

Professors

Ora Avni, Howard Bloch, Edwin Duval, Thomas Kavanagh, Christopher L. Miller,
Martine Reid (*Visiting* [F])

Associate Professors

Catherine Labio, Farid Laroussi

Assistant Professors

Donia Mounsef, Jean-Jacques Poucel, Julia Prest

Fields of Study

Fields include French literature, criticism, theory, and culture from the early Middle Ages to the present, and the French-language literatures of Africa, the Caribbean, and the Maghreb.

Special Admissions Requirements

A thorough command of French is expected, as well as a good preparation in all fields of French literature. A strong background in at least one other foreign language is also expected. Applicants should submit a twenty-page writing sample in French.

Special Requirements for the Ph.D. Degree

(1) Candidates must demonstrate a reading knowledge of Latin and a second language by passing department-administered examinations, Yale undergraduate courses, or Yale Summer Language Institute courses with at least a B or High Pass grade. Students must fulfill the Latin requirement before the beginning of their third term of study. The other language requirement must be satisfied before the beginning of the fifth term, and before the oral qualifying examination. (2) During the first two years of study, students normally take sixteen term courses. These *must* include Old French and at least two graduate-level term courses outside the department. They *may* include one term of a language course (Latin or other) taken as a means of fulfilling one of the language requirements, and as many as four graduate-level term courses outside the department. A grade of Honors must be obtained in at least four of the sixteen courses, two or more of which must be in

courses offered by the department. (3) A qualifying oral examination takes place during the sixth term. The examination is designed to demonstrate students' mastery of the French language, their knowledge and command of selected topics in literature, and their capacity to present and discuss texts and issues. (4) After having successfully passed the qualifying oral examination, students are required to submit a dissertation prospectus for approval, normally no later than the end of the term following the oral examination.

In order to be admitted to candidacy for the Ph.D., students must complete all pre-dissertation requirements, including the prospectus. Students must be admitted to candidacy by the end of the seventh term.

Teaching is considered an integral part of the preparation for the Ph.D. degree and all students are required to teach for at least one year. Opportunities to teach undergraduate courses normally become available to candidates in their third year, after consideration of the needs of the department and of the students' capacity both to teach and to fulfill their final requirements. Prior to teaching, students take a language-teaching methodology course.

Combined Ph.D. Program

The French department also offers two combined Ph.D.s: one in French and African American Studies (in conjunction with the program in African American Studies), and one in French and Film Studies (in conjunction with the program in Film Studies). Students in both of these combined degree programs are subject to all the requirements for a Ph.D. in French. In addition, they must fulfill certain requirements particular to the conjoined program.

The combined Ph.D. in French and African American Studies is most appropriate for students who intend to concentrate in and write a dissertation on the literature of the francophone Caribbean. Students must complete two core courses in African American Studies and a third-year colloquium. For this degree, the French department's requirement for a language in addition to Latin will normally be filled by demonstrating reading competence in a Creole language of the Caribbean or in Spanish. The students' oral examinations normally include two topics of African American content. The dissertation prospectus must be approved by the director of graduate studies both in the French department and in African American Studies, and final approval of the dissertation must come from both departments. For further details see African American Studies.

For students in the combined Ph.D. program in French and Film Studies, the oral examination will normally include one topic on film theory and one on French film. Both the dissertation prospectus and the final dissertation must be approved by the French department and the program in Film Studies. In addition, Film Studies requires a dissertation defense. For further details see Film Studies.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in French are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program may petition for the M.A. degree after a minimum of one year of study in residence, upon completion of the Latin requirement, and of eight courses, of which at least six are in French. Two grades of Honors in French graduate courses are required.

Program materials are available upon request to the Administrative Assistant to the Director of Graduate Studies, French Department, Yale University, PO Box 208251, New Haven CT 06520-8251.

Courses

All classes are taught in French unless otherwise noted.

FREN 610a, Old French. Howard Bloch.

w 3.30–5.20

An introduction to the historical grammar of Old French through reading, translation, and discussion of some of its major literary forms, including epic, romance, allegory, *fabliau*, and drama.

FREN 682a, Stylistics and Rhetoric. Ora Avni.

T 1.30–3.20

Practice in oral and written presentation of ideas for all occasions: thesis prospectus, proposals for colloquia or grants, twenty-minute talks, first class meetings, job interviews, and so on. Practical work in oral and written French, including phonetics. Daily writing in French.

FREN 715a, Theatrical Postmodernisms. Donia Mounsef.

w 5.30–7.20

This course examines the paradigm shift in French theater from Modern to Postmodern by looking at the correspondence between practice and theory, the departure from a realist and Marxist tradition in the light of the May 1968 events, the contestation of the *nouveau théâtre* and the rejection of absurdism, the rediscovery of the sacred aspects of the theatrical event through collective creation, the fragmentation of theatrical textuality with the *théâtre du quotidien* and the *théâtre éclaté*, the rise of a director's theater in the 1980s, postcolonial and diasporic theaters at the turn of the century. Readings from Gatti, Cixous, Vinaver, Koltès, Novarina, Reza, Bouchard. Theoretical readings from: Lyotard, Foucault, Barthes, Sarrazac, Féral, Pavis.

FREN 741b, The Bayeux Tapestry and the Anglo-Norman World. Howard Bloch.

w 3.30–5.20

A study of the Bayeux Tapestry in the context of the Conquest and the Anglo-Norman world. Topics include origin, formal description, fabrication, Nordic and continental homologies; relation of inscription to image, of borders to central panels, of decoration to narration; representations of the protagonists, of the events, of the everyday, of military, nautical, architectural, social, political, religious, and natural worlds; mixing of Viking, Celtic, Saxon, and Gallic cultures; literary and chronicle accounts. Basic text, the Bayeux Tapestry Digital Edition CD, 2003. In English. *Also CPLT 732b, HSAR 593b.*

FREN 759b, Colonizer and Colonized in Africa. Christopher L. Miller.

Th 10.30–12.20

The literature and film of the colonial encounter in French and British Africa, with attention to modes of interaction and representation. Early travel accounts and their impact on European philosophy and anthropology; the emergence of counterdiscourses. Theories of Lugard, Lyautey, Memmi, Fanon. Novels include *Heart of Darkness*, *Une Vie de boy*, *Things Fall Apart*,

L'Aventure ambiguë, *La Noire de...*, *L'Etrange destin de Wangin*, *A Bend in the River*, *Nervous Conditions*. Films include *Zou-Zou*, *La Noire de...*, *Black and White in Color*, *Coup de Torchon*, *Chocolat*. Reading knowledge of French required. Also AFAM 783b, AFST 859b, CPLT 948b.

FREN 763a, Readings in Critical Theory. Catherine Labio.

M 1.30–3.20

An introduction to twentieth-century French/francophone thought. Emphasis on the post-World War II era and on the concepts of structure, *récit*, *altérité*, difference, judgment, and economy. Also CPLT 858a.

FREN 830a, L'École de Lyon et la Pléiade. Edwin Duval.

W 10.30–12.20

Focus on the poetic revolutions that took place in the 1540s and 1550s in the two great centers of Renaissance culture, Lyon and Paris. Emphasis is on close readings in the best work of the greatest poets of the century – Maurice Scève and Louise Labé, Joachim Du Bellay and Pierre de Ronsard – but with due attention to the necessary background in poetics and literary history, and occasional forays into the works of *minores*.

FREN 864b, Roman et société au dix-huitième siècle. Thomas Kavanagh.

M 10.30–12.20

This seminar focuses on the growing importance and diverse forms of the novel in eighteenth-century France. Placing the novel in its historical, cultural, and literary contexts, our goal is to understand this form as a genre whose development both reflects and consolidates the emerging forms of consciousness and sociability that distinguish the Enlightenment. Works by Montesquieu, Prévost, Crébillon, Jourdan, Denon, Graffigny, Charrière, Laclos, Diderot, and Duras.

FREN 898a, Gendered Representations in the Nineteenth-Century French Novel.

Martine Reid.

M 10.30–12.20

This seminar examines representations of the masculine and the feminine in a series of nineteenth-century novels written by both male and female authors. The course's critical framework encompasses historical reference, the history and sociology of literature, psychoanalysis, and recent feminist studies (such as Françoise Héritier, Sylviane Agacinski, Pierre Bourdieu, and Monique Schneider). Readings include Chateaubriand, *Atala/René*; Mme de Staël, *Corinne ou l'Italie*; Benjamin Constant, *Adolphe*; Balzac, *La Duchesse de Langeais*; Sand, *Made-moiselle Merquem*; and Hugo, *Quatrevingt-Treize*.

FREN 932b, The German Occupation in Film and Fiction. Ora Avni.

T 10.30–12.20

An examination of the evolving representations of German Occupation for the last fifty years. The course has a strong historical component (the years immediately preceding the war, the shift in public opinion after the defeat, the politics of the Vichy regime, the cleansing after the liberation, etc.). Film and fictions are viewed for their intrinsic value as well as for the ways in which they illustrate and problematize national memory, writing (and rewriting) history, carrying on cultural and political legacies, and the relationship of the arts and the realities they purport to depict.

FREN 938b, L'Extrême Contemporain: Late Twentieth-Century Poetics.

Jean-Jacques Poucel.

W 1.30–3.20

An in-depth study of six major poets (Y. Bonnefoy, F. Ponge, D. Roche, M. Deguy, J. Roubaud, and Emmanuel Hocquard), drawing on selections from their poetry as well as from their theoretical writing. This initiation to contemporary poetic concerns is enriched by a sampling of recent works by younger poets.

FREN 947a, African-Caribbean Connections in French. Christopher L. Miller.

Th 10.30–12.20

The intertwined literary and cultural relations between Africa and the Caribbean, as made possible by the slave trade and French colonialism. Focus on changing models of linkage and exile, beginning with nineteenth-century experiments, continuing with: early twentieth-century movements in Haiti and in France; two versions of Negritude; social realism; independence; “creoleness.” Authors include Maran, Senghor, Césaire, Roumain, Sembene, Glissant, Condé, Warner-Vieyra, Lopes. Reading knowledge of French required. *Also AFAM 847a, AFST 847a, CPLT 947a.*

GENETICS

I-313 Sterling Hall of Medicine, 785.5846

M.S., M.Phil., Ph.D.

Chair

Richard Lifton

Director of Graduate Studies

Michael Stern (I-352 SHM, 737.2283, michael.stern@yale.edu)

Professors

Edward Adelberg (*Emeritus*), Nancy Berliner (*Internal Medicine/Hematology*), Douglas Brash (*Therapeutic Radiology*), W. Roy Breg, Jr. (*Emeritus*), Lynn Cooley, Daniel DiMaio, Jerome Eisenstadt (*Emeritus*), Bernard Forget (*Internal Medicine/Hematology*), Peter Glazer (*Therapeutic Radiology*), Arthur Horwich, Paula Kavathas (*Laboratory Medicine*), Kenneth Kidd, Richard Lifton (*Internal Medicine/Nephrology; Molecular Biophysics & Biochemistry*), Maurice Mahoney, Charles Radding (*Emeritus*), Shirleen Roeder (*Molecular, Cellular & Developmental Biology*), Margretta Seashore, Carolyn Slayman, Stefan Somlo (*Internal Medicine/Nephrology*), Kay Tanaka (*Emeritus*), Peter Tattersall (*Laboratory Medicine*), Sherman Weissman, Tian Xu

Associate Professors

Allen Bale, Susan Baserga (*Molecular Biophysics & Biochemistry*), Michael Stern, Hong Sun, Joann Sweasy (*Therapeutic Radiology*), Kevin White, Hui Zhang, Hongyu Zhao (*Epidemiology & Public Health; Biostatistics*)

Assistant Professors

Kei-Hoi Cheung (*Medical Informatics*), Valerie Reinke, Matthew State (*Child Study Center*), Zhaoxia Sun

Fields of Study

Molecular Genetics: chromosome structure and function, genetic recombination, viral genetics, DNA damage repair, ribosome biogenesis, protein folding, and the regulation of gene expression. Genomics: genome mapping, genome modification, high-throughput technology, evolutionary genetics and functional genomics. Cellular and Developmental Genetics: genetic control of the cytoskeleton, cell death, aging, cell fate determination, cell cycle progression, cell migration, cell signaling and growth control. Cancer Genetics: oncogenesis and tumor suppression. Medical Genetics: genetic basis of human disease, chromosome rearrangements, population and quantitative genetics.

Special Admissions Requirements

The department welcomes applicants who have a bachelor's or master's degree in biology, chemistry, or a related field, with experience (from course work and/or research) in the field of genetics. GRE General Test scores are required. A pertinent Subject Test in Biochemistry and Molecular Biology, Biology, or Chemistry is recommended.

To enter the Ph.D. program, students apply to the Molecular Cell Biology, Genetics and Development (MCGD) track within the interdepartmental graduate program in the Biological and Biomedical Sciences (BBS) (see pages 71–73).

Special Requirements for the Ph.D. Degree

The Ph.D. program in Genetics is designed to provide the student with a broad background in general genetics and the opportunity to conduct original research in a specific area of genetics. The student is expected to acquire a broad understanding of genetics, spanning knowledge of at least three basic areas of genetics, which include molecular, cellular, organismal, and population genetics. Normally this requirement is accomplished through the satisfactory completion of formal courses, many of which cover more than one of these areas. Students are required to pass at least six graduate-level courses that are taken for a grade. Advanced graduate study becomes increasingly focused on the successful completion of original research and the preparation of a written dissertation under the direct supervision of a faculty adviser along with the guidance of a thesis committee.

A qualifying examination is given during the second year of study. This examination consists of a period of directed reading with the faculty followed by the submission of two written proposals and an oral examination. Following the completion of course work and the qualifying examination, the student submits a dissertation prospectus and is admitted to candidacy for the Ph.D. degree. There is no language requirement. An important aspect of graduate training in genetics is the acquisition of communication and teaching skills. Students participate in presentation seminars and two terms (or the equivalent) of teaching. Teaching activities are drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school level. Students are not expected to teach during their first year.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see pages 438–39).

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. Students are not admitted for this degree. An M.S. degree is awarded to students who are not continuing for the Ph.D. degree but who have successfully completed at least one year of the doctoral program. A student must pass at least five graduate-level term courses related to molecular, cellular, organismal, or population genetics, and obtain at least one term grade of Honors or three of High Pass in these courses. The student must also satisfactorily complete the required first-year seminar and research courses, and be in residence one full year.

Prospective applicants are encouraged to visit the BBS Web site (info.med.yale.edu/bbs), MCGD Track.

Courses

GENE 500b, Principles of Human Genetics. Allen Bale.

HTBA

A genetics course taught jointly for graduate students and medical students, covering current knowledge in human genetics as applied to the genetic foundations of health and disease.

GENE 603a and b, Teaching in the Science Education Outreach Program (SEOP).

Paula Kavathas.

Students teach seventh-graders in the New Haven schools as part of the Science Education Outreach Program (SEOP). TAs head programs in the schools with training from Dr. Kavathas. TAs along with two volunteers teach three projects in Genetics (Genotype/Phenotype, Mitosis and Chromosomes, DNA) in two or three schools. In addition, they are required to take a short course on teaching, which is offered by the McDougal Graduate Teaching Center and serve as a science fair judge in one school. Opportunities for developing a new project exist. Dates and times to be determined. Please contact the course director, Paula Kavathas, at 785.6223. *Also IBIO 603.*

GENE 625a, Basic Concepts of Genetic Analysis. Tian Xu, Michael Koelle, Richard Lifton, Shirleen Roeder, Michael Stern, Kevin White.

TTh 1.05–2.20

The universal principles of genetic analysis in eukaryotes are discussed in lectures. Students also read a small selection of primary papers illustrating the very best of genetic analysis and dissect them in detail in the discussion sections. While other Yale graduate molecular genetics courses emphasize molecular biology, this course focuses on the concepts and logic underlying modern genetic analysis. *Also MB&B 625a^{II}, MCDB 625a^{II}.*

GENE 642a, Roles of Microorganisms in the Living World. L. Nicholas Ornston, Diane McMahon-Pratt, Dieter Söll.

TTh 11.30–12.45

A topical course exploring the biology of microorganisms. Emphasis on mechanisms underlying microbial adaptations and how they influence biological systems. *Also EMD 642a, MBIO 642a, MCDB 642a.*

GENE 645a, Statistical Methods in Human Genetics. Hongyu Zhao, Kenneth Kidd.

Th 10–11.50

Probability modeling and statistical methodology for the analysis arising from human genetics studies are presented. Topics include: population genetics, single locus and polygenic inheritance, linkage analysis using parametric models and allele-sharing methods, population-based and family-based disease-marker associations, genetic risk prediction models, sequence analysis, microarray data analysis. Prerequisites: introductory Genetics; BIS 505a and b, or equivalent; permission of instructor.

GENE 675, Graduate Student Seminar. Joann Sweasy and staff.

w 4–5

Students gain experience in preparing and delivering seminars and in discussing presentations by other students. A variety of topics in molecular, cellular, developmental, and population genetics are covered. Required for all second-year students in Genetics. Graded Satisfactory/Unsatisfactory.

GENE 705a, Molecular Genetics of Prokaryotes. Nigel Grindley, Patrick Sung, Joann Sweasy.

MW 11.30–12.45

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Required: previous or concurrent introductory courses in genetics and biochemistry. *Also MB&B 705a^{II}, MCDB 505a.*

[GENE 734a, Molecular Biology of Animal Viruses.]

GENE 743b, Advanced Eukaryotic Molecular Biology. Anthony Koleske, Mark Hochstrasser, Patrick Sung.

TTH 11.30–12.45

Selected topics in regulation of gene expression, genome structure and evolution, signal transduction, cellular physiology, development, and carcinogenesis. Prerequisite: biochemistry or permission of the instructor. *Also MB&B 743b^{II}.*

GENE 749a, Medical Impact of Basic Science. Joan Steitz, Enrique De La Cruz, Mark Hochstrasser, Andrew Miranker, Lynn Regan, Patrick Sung.

TTH 1–2.30

Consideration of examples of recent discoveries in basic science that have elucidated the molecular origins of disease or that have suggested new therapies for disease. Emphasis is placed on the fundamental principles on which these advances rely. Reading is from the primary scientific and medical literature, with emphasis on developing the ability to read this literature critically. Aimed primarily at undergraduates. Prerequisite: MB&B 600a^{II}/601b^{II} or permission of the instructor. *Also MB&B 749a^{II}.*

GENE 777b, Mechanisms of Development. Lynn Cooley, Xing-Wang Deng, Scott Holley, Valerie Reinke, Michael Stern, Zhaoxia Sun.

M 9.45–11, F 2–3.15

This is an advanced course on mechanisms of animal and plant development focusing on the genetic specification of cell organization and identity during embryogenesis and somatic differentiation. The use of evolutionarily conserved signaling pathways to carry out developmental decisions in a range of animals is highlighted. Course work includes student participation in critical analysis of primary literature and a research proposal term paper. *Also MCDB 677b.*

[GENE 810a, Human Molecular Genetics.]

GENE 840a and b, Medical Genetics. Margretta Seashore.

Clinical rotation offering medical and graduate students the opportunity to participate in the Genetic Consultation Clinic, genetic rounds, consultation rounds, and genetic analysis of clinical diagnostic problems.

GENE 900a, First-Year Introduction to Research. Shirleen Roeder, Craig Crewes.

Lab rotations, grant writing, and ethics for Molecular Cell Biology, Genetics, and Development track students. *Also CBIO 900a, MCDB 900a.*

GENE 901b, First-Year Introduction to Research. Michael Stern, Carl Hashimoto.

Lab rotations, topic-based seminars for Molecular Cell Biology, Genetics, and Development track students. *Also CBIO 901b, MCDB 901b.*

GENE 921a and b, Reading Course in Genetics and Molecular Biology.

Michael Stern and staff.

Directed reading with faculty. Term paper required. Permission of Genetics DGS is required.

GEOLOGY AND GEOPHYSICS

Kline Geology Laboratory, 432.3124

M.S., M.Phil., Ph.D.

Chair

Leo Hickey

Director of Graduate Studies

David Bercovici

Professors

Jay Ague, David Bercovici, Robert Berner, Mark Brandon, Derek Briggs, Leo Buss, Michael Donoghue, Jacques Gauthier, Robert Gordon, Thomas Graedel, Leo Hickey, Shun-ichiro Karato, Jeffrey Park, Danny Rye, Adolf Seilacher (*Adjunct*), Brian Skinner, Ronald Smith, Karl Turekian, George Veronis, Elisabeth Vrba, John Wettlaufer

Associate Professors

Peter Reiners, Steven Sherwood

Assistant Professors

Ruth Blake, David Evans, Alexey Federov, Jun Korenaga, Mark Paganì

Lecturer

Catherine Skinner

Fields of Study

Fields include geochemistry and petrology, geophysics, mineral physics, seismology and geodynamics, structural geology and tectonics, paleontology and paleoecology, and oceanography, meteorology, and climatology.

Special Admissions Requirements

The department welcomes applicants oriented toward the earth sciences who have a bachelor's or master's degree in such fields as biology, chemistry, engineering, mathematics, meteorology, or physics, as well as those trained in geological, geophysical, and geochemical sciences. Scores from a pertinent GRE Subject Test are desirable but not required. The TOEFL or IELTS exam is required for all applicants for whom English is a second language.

Special Requirements for the Ph.D. Degree

There is no formal language requirement and no required curriculum. Students plan their course of study in consultation with their adviser to meet individual interests and needs and to lay the foundations for dissertation research. At the end of the first year the faculty reviews the standing of each student. A student recommended for continuation in the Ph.D. program will be so notified. Some students may be encouraged at that time to pursue only the M.S. degree. At the end of the second year the faculty reviews each stu-

dent's overall performance to determine whether he or she is qualified to continue for the Ph.D. degree. In order to qualify, a student must have met the Graduate School Honors requirement and maintained a better than passing record in the areas of concentration. Also a student must have satisfied the requirements of the Qualifying Exam by having completed two Research Discourses termed (according to their degree of development) the Minor and the Major Discourses. The Major Discourse will be presented at the Qualifying Presentation, followed by an extended question period wherein the student must successfully defend both Discourses. Remaining degree requirements include a dissertation review in the third year; the preparation and defense of the dissertation; and the submission of the dissertation to the Graduate School. The department requires that an additional copy, for which the student will be reimbursed, be deposited with the librarian of the Kline Geology Library.

Teaching experience is regarded as an integral part of the graduate training program in Geology and Geophysics. For that reason all students are required to serve as teaching fellows (5 hours per week) for two terms during the course of their predoctoral training.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. Awarded only to students who are not continuing for the Ph.D. Students are not admitted for this degree.

Program materials are available at www.geology.yale.edu or upon request to the Director of Graduate Studies, Department of Geology and Geophysics, Yale University, PO Box 208109, New Haven CT 06520-8109; e-mail, dgs@geology.yale.edu.

Courses

G&G 500b^U, Mineral Deposits. Brian Skinner.

An introduction to the formation and distribution of mineral deposits.

[G&G 501b^U, Radiative Transfer and Climate.]

G&G 502a^U, Introduction to Geochemistry. Peter Reiners, Mark Pagani.

MW 11.30–12.45

Basic principles of geochemistry and their use in geological science. Thermodynamics of aqueous and igneous systems. Element fractionation and isotope geochemistry. Biogeochemical cycles, geochronology, cosmochemistry.

[G&G 504a^U, Minerals in the Biosphere: The Geochemistry of Human Health.]

[G&G 505a^U, Geochemistry of Planetary Evolution.]

[G&G 506b^U, Chemical Cycles, Pollution, and the Global Environment.]

G&G 507a, Radiogenic Isotopes and Geochronology. Peter Reiners.

Introduction to natural radioactive decay and growth and use in geochronology, thermochronology, and the dynamics of earth reservoirs and cosmochemistry. Includes reading and discussion of current topics.

G&G 511a, Stratigraphic Principles and Applications. Leo Hickey.

Principles of classification, age determination, and paleoenvironmental interpretation of stratified rocks with application to actual cases drawn from various geological disciplines.

G&G 512b^U, Structural Geology and Tectonics. Mark Brandon.

TTH 11.30–12.45, Lab 2 HTBA

An introduction to the origin and structure of the lithosphere and continental and oceanic crust. Questions addressed include: what controls the solid versus fluid behavior of rocks during deformation; and what controls the character and motion of tectonic plates? Laboratory exercises and field trips.

G&G 515b^U, Paleobotany. Leo Hickey.

TTH 9–10.15

A detailed survey of the evolutionary history of plants through geological time, the origin and diversification of their major lineages and of plant communities, and the interactions of plants and their physical environment. Laboratory exercises involve fossil and modern plants and include a field trip to study an ancient plant community.

[G&G 516a^U, The Invertebrates.]**[G&G 517La^U, Laboratory for the Invertebrates.]****G&G 518a^U, Trace Fossil Analysis. Derek Briggs, Adolf Seilacher.**

MW 11.30–12.45

A study of trace fossils, which provide a rich record of animal activities spanning almost a billion years of Earth's history. Analysis in terms of biomechanics, behavioral programs, and substrate properties. How trace fossils are used in evolutionary biology, paleoenvironmental interpretation, and biostratigraphy.

G&G 519a^U, Introduction to the Physics and Chemistry of Earth Materials.

Shun-ichiro Karato.

TTH 11.30–12.45

Basic principles that control the physical and chemical properties of earth materials. Equation of state, phase transformations, chemical reactions, elastic properties, diffusion, kinetics of reaction, and mass/energy transport.

G&G 520b^U, Petrology and Mineralogy. Jay Ague.

TTH 9–10.15; Lab 2 HTBA

Comprehensive study of the structures, chemistry, and physical properties of minerals. Interpretation of mineral associations and textures in terms of processes acting in the formation of igneous and metamorphic rocks. Study of the interplay between plate tectonics and the genesis of igneous and metamorphic rocks.

G&G 521b^U, Geophysical Fluid Dynamics. George Veronis.**G&G 522a^U, Introduction to Meteorology and Climatology. Steven Sherwood.**

TTH 9–10.15

The climatic system; survey of atmospheric behavior on timescales from days (i.e., weather) to decades (i.e., climate); formulation of mathematical equations describing weather and climate with selected applications to small- and large-scale phenomena.

G&G 523b^U, Theory of Climate. Alexey Fedorov.

TTH 11.30–12.45

An introduction to climate dynamics. Special emphasis on phenomena controlled by large-scale interactions between the ocean and the atmosphere, from El Niño to decadal climate variability. Topics include climate modeling, the role of oceanic circulation in climate, and conceptual models of glacial cycles. Prerequisite: PHYS 181b and MATH 120a or b or equivalent, or instructor permission.

G&G 525a, Introduction to Continuum Mechanics. Jerzy Blawdziewicz.

TTH 9–10.15

Introduction to the physics of continuous media, with applications to physical, natural, and biological sciences and engineering. Topics include tensor analysis; analysis of stress, motion, and strain; conservation of mass, momentum, and energy; rheology; examples in fluid dynamics, elasticity theory, and other topics at the discretion of instructor. *Also ENAS 761a.*

[G&G 526b^u, Introduction to Geophysics and Planetary Physics.]

[G&G 527b, Dynamics of Earth and Planets.]

[G&G 530a^u, Large-Scale Atmospheric Motions I.][G&G 531b^u, Large-Scale Atmospheric Motions II.][G&G 533b^u, Paleomagnetism.]**G&G 535a^u, Physical Oceanography. George Veronis.**

TTH 1–2.15

An introduction to ocean dynamics. Exploration of the physical mechanisms underlying the large-scale ocean circulation, the Gulf Stream, wind-driven waves, tides, coastal upwelling, and phenomena attributable to the Earth's rotation.

G&G 536b, Atmospheric Waves, Convection, and Vortices. Ronald Smith.

This is an advanced course on atmospheric dynamics covering internal gravity waves, mountain waves and wind storms, the turbulent boundary layer, vortices (tornadoes, hurricanes, frontal cyclones, lee eddies, and rotors), K-H and vortex stability, and convection-mean flow interaction. Basic principles are emphasized.

G&G 538b, Computational Methods in Astrophysics and Geophysics. Paolo Coppi.

The analytic and numerical/computational tools necessary for effective research in astronomy, geophysics, and related disciplines. Topics include numerical solutions to differential equations, spectral methods, and Monte Carlo simulations. Applications are made to common astrophysical and geophysical problems including fluids and N-body simulations. *Also ASTR 520b.*

G&G 540a^u, Geomicrobiology: Microbial Processes in the Geologic Environment.**Ruth Blake.**

TTH 1–2.15

Microbial processes in geologic environments; control through microbial metabolism of the geochemistry of natural waters, sediments, and soils, with emphasis on microbe-mineral interactions. Microbially mediated cycling and transport of metals.

G&G 550a^u, Paleontology and Evolutionary Theory. Elisabeth Vrba.

TTH 11.30–12.45

Current concepts in evolutionary and systematic theory with particular reference to how they apply to the fossil record. Emphasis on use of paleontological data to study evolutionary processes.

[G&G 555a^u, Ocean Circulation.][G&G 556a^u, Introduction to Seismology.]

[G&G 557a, Advanced Seismology.]

[G&G 559b, Data Analysis in the Earth Sciences.]

[G&G 560a^u, Theory of Viscous Flow.]

G&G 562b^U, Remote Sensing: Observing the Earth from Space. Ronald Smith and staff.

TTH 9–10.15

Topics include the spectrum of electromagnetic radiation; satellite-borne radiometers; data transmission and storage; computer image analysis; and GIS analysis of satellite imagery with applications to weather and climate, oceanography, surficial geology, snow and ice, forestry, agriculture, and watershed management. *Also ANTH 762b^U, ARCG 762b^U, F&ES 506b.*

G&G 565a^U, Archaeometallurgy. Robert Gordon.

MWF 10.30–11.20

Evidence of the winning and use of metals by people in different cultures from earliest to modern times. The role of science; environmental consequences. Interpretation of artifacts and of smelting and metalworking sites. Laboratory demonstrations and field trips. *Also ARCG 765a^U.*

[G&G 567b^U, Geochemical Approaches to Archaeology.]**[G&G 601b, Topics in Earth Science.]****G&G 602a, Introduction to Paleoclimates. Alexey Fedorov, Mark Pagani.**

TTH 11.30–12.45

This is a seminar course for graduate/upper-level undergraduate students focusing on the dynamics of past climates. The purpose of the course is to familiarize students with major phenomena in the evolution of the Earth's climate, important from the point of view of climate dynamics. Topics include the snowball Earth, the warm Eocene, glacial cycles, abrupt climate changes, climate of the last thousand years, climate of the last century, and others. The course is centered around a list of research papers to be discussed in the class by the students and the instructors. Postdoctoral associates are also welcome to attend. Open to undergraduates by permission of instructors.

G&G 610b, Advanced Topics in Macroevolution. Elisabeth Vrba.

A seminar course for graduate students, and undergraduate juniors and seniors with a suitable prior background, in which we read and discuss Stephen Jay Gould's book *The Structure of Evolutionary Theory*. Each student is expected to write a term paper on a selected topic from the book. Meeting times and place are by arrangement. Permission of instructor is required.

G&G 611a, Advanced Stratigraphy. Leo Hickey.

The theory and practice of stratigraphy for those who have a basic grounding in the field. After several lectures, the course is then conducted as a series of topical seminars chosen by the instructor and the participants.

[G&G 615b, Fluid Flow and Chemical Reaction in Geologic Systems.]**G&G 617b, Leaf Architecture of the Flowering Plants. Leo Hickey.**

HTBA

An overview of the description and systematic distribution of the features of angiosperm leaves, with emphasis on their identification. Topics include the classification of leaf features, leaf ranking, and the use of leaf architecture in determining the identity and ecologic requirements of various angiosperm taxa with emphasis on the fossil record. Course is conducted as a series of lecture/laboratory sessions using cleared leaf material, herbarium specimens, and fossils. Readings to be assigned. Participants should have a working knowledge of plant taxonomy. Term paper representing independent research on some aspect of leaf architecture.

G&G 618a, Petrology of Light Stable Isotopes. Danny Rye.

The principles and applications of light stable isotopes to geological materials.

[G&G 620a^U, Plate Tectonics.]**G&G 621b, Geochemistry of Heavy and Radioactive Isotopes in Rock Systems.****Danny Rye.**

The principles and application of radioactive and radiogenic isotopes to geological materials.

G&G 631a, Vertebrate Paleontology: Phylogeny of Vertebrates. Jacques Gauthier.

HTBA

This seminar course offers a detailed look at current issues in the phylogeny, anatomy, and evolution of fossil and recent vertebrates. Lectures review the broad outline of vertebrate phylogeny and evolution. Lab section is required.

G&G 650b^U, Time-Dependent Deformation of Earth Materials.**Shun-ichiro Karato.**

TTh 9–10.15

Basic physics and chemistry of earth materials, with emphasis on kinetic and transport properties. Geochemical and geophysical processes in Earth's crust and mantle and their influence on the dynamics and evolution of this planet. Topics include plastic flow, diffusion, thermal conductivity, electrical conductivity, and chemical reaction.

[G&G 655a^U, Extraordinary Glimpses of Past Life.]**G&G 657a, Marine and Surficial Geochemistry. Karl Turekian.**

Geochemical processes at the Earth's surface, including the atmosphere, oceans, ice caps, and the upper layers of the crust, are investigated using radioactive, radiogenic, and light stable isotopes.

G&G 660a, Diagenesis, Weathering, and Geochemical Cycles. Robert Berner.

A theoretical approach to earth surface chemical processes; modeling of geochemical cycles.

G&G 666b, Statistical Thermodynamics for Astrophysics and Geophysics.**John Wettlaufer.**

TTh 2.30–3.45

Classical thermodynamics is derived from statistical thermodynamics. We then develop kinetics, transport theory, and reciprocity from the linear thermodynamics of irreversible processes. Emphasis is placed on phase transitions, including novel states of matter, nucleation theory, and the thermodynamics of atmospheres. We explore phenomena that are of direct relevance to problems in astrophysical settings, atmospheres, oceans, and the Earth's interior. No quantum mechanics is necessary as a prerequisite.

[G&G 675a, Advanced Structural Geology.]**G&G 690a and b, Directed Research in Geology and Geophysics.**

By arrangement with faculty.

G&G 691a or b, Independent Research.

Approval of director of graduate studies and adviser required.

In addition to the seminars noted below, others on special topics like evolution, invertebrate and vertebrate paleontology, statistical mechanics and spectroscopy, structural geology and tectonics, petrology, volcanology, and physics of oceans and atmospheres are offered according to student interest, by arrangement with departmental faculty. Seminars are often organized around the research interests of visiting faculty as well.

G&G 703a, Seminar in Systematics. Jacques Gauthier.

3 HTBA

[G&G 705b, Advanced Seminar in Evolutionary Paleontology.]

[G&G 707a, Advanced Topics in Macroecology and Macroevolution.]

G&G 740a or b, Sediment Seminar. Robert Berner.

G&G 742a or b, Seminar in Geophysical Fluid Dynamics. Ronald Smith.

**G&G 744a or b, Seminar in Mantle and Core Processes. Faculty [F],
David Bercovici [Sp].**

The seminar covers advanced topics concerning physical and chemical processes in the mantle and core of the Earth and planets. Specific topic and hour will be arranged in consultation with enrolled graduate students.

G&G 746a or b, Seminar in Global Change. Karl Turekian.

[G&G 753a, Seminar in Petrology.]

G&G 757b, Studies in Global Geoscience. David Evans.

2 HTBA

Reading seminar devoted to a specific geographic region of the Earth, selected as the destination of the departmental field trip for the current year. Topics of discussion include a broad range of geoscience disciplines, to be determined in part by the interests of participating students.

[G&G 762a or b, Seminar in Applications of Satellite Remote Sensing.]

G&G 767b, Seminar in Ice Physics. John Wettlaufer.

HTBA

We bring together the basic thermodynamics and statistical mechanics of crystal growth, surface phase transitions, metastability, and instability to explore the many faces of the surface of ice. These processes control the macroscopic growth shapes of ice crystals, underlie the enigma of the snowflake, and have implications in, inter alia, the atmosphere, the oceans, basic materials science, and astrophysics.

[G&G 777a, Early Life.]

Tutorial courses, offered by arrangement with individual faculty, are offered as follows:

G&G 800a or b, Tutorial in Paleobiology.

G&G 805a or b, Fossil Floras. Leo Hickey.

**G&G 810a or b, Tutorial in Structural Geology and Tectonics or Solid Earth
Geophysics.**

G&G 820a or b, Tutorial in Meteorology, Oceanography, or Fluid Dynamics.

G&G 830a or b, Tutorial in Geochemistry, Petrology, or Mineralogy.

G&G 840a or b, Tutorial in Sedimentology.

G&G 860a or b, Tutorial in Remote Sensing.

GERMANIC LANGUAGES AND LITERATURES

W. L. Harkness Hall, 432.0788

M.A., M.Phil., Ph.D.

Chair

Carol Jacobs

Director of Graduate Studies

Brigitte Peucker (308 WLH, brigitte.peucker@yale.edu)

Professors

Cyrus Hamlin, Carol Jacobs, Rainer Nägele (*Visiting* [Sp]), Brigitte Peucker, Henry Sussman (*Visiting* [F])

Assistant Professors

Elke Siegel, Kirk Wetters

Lecturer

William Whobrey

Affiliated Faculty

Seyla Benhabib (*Political Science; Philosophy*), Ute Frevert (*History*), Karsten Harries (*Philosophy*), James Kreines (*Philosophy*), Christine Mehring (*History of Art*), Steven Smith (*Political Science*), Katie Trumpener (*Comparative Literature; Film Studies*), Jay Winter (*History*)

Fields of Study

Fields include medieval literature, German literature and culture from the Reformation to the twenty-first century in Germany, Austria, and Switzerland; literary and cultural theory; film.

Special Admissions Requirement

All students must provide evidence of mastery of German upon application.

Requirements for the Ph.D. Degree

Students are required to demonstrate, besides proficiency in German, a reading knowledge of one other foreign language at the end of the fourth term of study. French is recommended, although occasionally, on consultation with the DGS, other relevant languages may be substituted. The faculty in German considers teaching to be essential to the professional preparation of graduate students. Students normally teach undergraduate language courses under supervision beginning in the third year of study for at least two years. An oral examination must be passed not later than the end of the sixth term of study, and a dissertation prospectus should be submitted soon thereafter, but not later than the beginning of the seventh term of study. All students will be asked to defend the prospectus in an informal discussion with the faculty. The defense will take place before

the prospectus is officially approved, usually in September of the seventh term. Students are admitted to candidacy for the Ph.D. upon completion of all pre-dissertation requirements, including the prospectus. After the submission of the prospectus, the student's time is devoted to the preparation of the dissertation. A dissertation committee will be set up for each student at work on the dissertation. It is expected that students will periodically pass their work along to members of their committee, so that faculty members in addition to the dissertation adviser can make suggestions well before the dissertation is submitted.

Two concentrations are available to students: Germanic Literature and German Studies.

Special Requirements for the Germanic Literature Concentration

During the first two years of study, students are required to take sixteen term courses, four of which may be taken outside the department.

Special Requirements for the German Studies Concentration

During the first two years of study, students are required to take sixteen term courses, seven of which may be taken outside the department. Students are asked to define an area of concentration upon entry, and will meet with appropriate advisers both from within and outside the department.

Joint Ph.D. Program

The Department of Germanic Languages and Literatures also offers, in conjunction with the Program in Film Studies, a joint Ph.D. in Germanic Languages and Literatures and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film Studies and to Germanic Languages and Literatures. All documentation within the application should include this information.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in Germanic Languages and Literatures are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program may qualify for the M.A. degree upon completion of a minimum of eight graduate term courses and the demonstration of reading knowledge in either Latin or French.

Master's Degree Program. For the terminal master's degree students must pass eight term courses, six of which must be in the department, and demonstrate a reading knowledge of French. A comprehensive written examination will be given at the end of the second term. For the quality requirement for the M.A. degree, see pages 443–44.

Program materials are available upon request to the Registrar, Department of Germanic Languages and Literatures, Yale University, PO Box 208210, New Haven CT 06520-8210; e-mail, german@yale.edu.

Courses

GMAN 610b, *The Nibelungenlied*. William Whobrey.

TTh 11.30–12.45

A reading of the *Nibelungenlied*, partly in the original Middle High German, with an emphasis on the manuscript tradition, other treatments of this heroic material, and its continuation in the *Klage*. Reception of the text to the present day is considered tangentially. Students should be able to read modern German and have some basic familiarity with Middle High German.

GMAN 611a, *Alternative Cultures in Communist Central and Eastern Europe*. Katerina Clark, Katie Trumpener.

M 7–9 P.M.

Exploring a range of texts — from film and media culture, literary and visual culture to youth culture and popular music — from across Communist (and post-Communist) Europe, this course examines a range of dissident cultures, subcultures, and countercultures. Topics to include the relationship between official and experimental modes of culture, transnational circuits of influence, the construction of subcultural worlds, and the range of dissident ideologies (nationalist, liberal, religious, and reform-Marxist). Also *CPLT 928a*, *FILM 824a*, *RUSS 746a*.

GMAN 626a, *Literature, Politics, Opinion*. Kirk Wetters.

M 3.30–5.20

This course focuses on political, philosophical, and literary determinations of the concept of opinion, focusing on (but not limited to) the last half of the eighteenth century. This period is crucial, however, insofar as modernity's two most decisive applications of the concept of opinion — “freedom of opinion” and “public opinion” — fall within the general time frame. Authors include Hobbes, Locke, Sterne, Hamann, Mendelssohn, Lessing, Lichtenberg, Wieland, Kant, Fichte, Goethe, Hölderlin, Arendt, Koselleck, Sennett, Habermas, and Derrida. Also *CPLT 533a*.

GMAN 632a, *Weimar Classicism*. Cyrus Hamlin.

TTh 11.30–12.45

Literature, culture, and thought in Germany during the decade (1794–1805) of the close friendship and collaboration between Johann Wolfgang von Goethe and Friedrich Schiller. This brief era, coinciding with the rise of Idealist philosophy and the school of Romanticism in Jena, is rightly viewed as a uniquely productive and creative high point of the German tradition. Works to be studied are Goethe's *Wilhelm Meister's Apprenticeship*; *Faust* (Part I); the epic *Hermann and Dorothea*; and selected ballads and elegies; Schiller's theoretical essays (*Lectures on the Aesthetic Education of Man*; *On Naïve and Sentimental Poetry*), and selected plays (*Wallenstein*; *Maria Stuart*; *The Maid of Orleans*; *Wilhelm Tell*). Attention is also given to the correspondence between the two writers.

GMAN 633a, *Weimar Cinema*. Brigitte Peucker.

Th 1.30–3.20, screenings w 7 P.M.

The German cinema, 1919–1930. Expressionist films and films of the New Objectivity. The pressures of technology, psychoanalysis, and the other arts on cinema; issues of spectatorship, visual pleasure, and distraction in the context of a national cinema. Readings by Kracauer, Benjamin, and others. Films by Murnau, Lang, Pabst, Brecht, von Sternberg, and others. Conducted in English, with readings in English. Also *FILM 762a^{II}*.

GMAN 634b, Language and Reason. Carol Jacobs.

W 1.30–3.20

An exploration of the relationship between language and reason in literary and philosophical texts. Concentration on the periods of the Enlightenment, Romanticism, and contemporary literature, in the context of the Platonic tradition. Through close readings of a wide range of theoretical and literary texts, we work through the complex interdependence of language and representation in relation to conceptualizations of reason. There are no prerequisites for this course. Students are expected to write papers that develop their own powers of interpretation and theorization rather than essays dependent for their ideas on research of secondary works. Our principal texts include works of Plato (one dialogue), Kant, Hamann, Herder, English Romantic poetry (Shelley and Wordsworth), Kleist, and Sebald. *Also CPLT 532b.*

GMAN 642b, Desiring Women: Greek Heroines in the German Intellectual Tradition. Elke Siegel.

M 1.30–3.20

Since the foundational myths of Western civilization, desire and death have been closely related in the depiction of women in aesthetic and theoretical discourse (e.g., the Sirens or Pandora). This seminar focuses on the reinterpretations of the three central tragic female figures—Antigone, Electra, and Medea—in the German intellectual tradition. Topics include Antigone's place in Hegel's discussion of the ethical, Electra as hysteric in turn-of-the-century Vienna, and the feminist and postcolonial rewriting of *Medea* by Christa Wolf. Readings and discussion in English. *Also CPLT 709b.*

GMAN 643a, Ideology, Revolution, and Religion in German Thought. Henry Sussman.

MW 1.30–2.15

This is a course that sets out to explore the cross-currents of conservatism and radicality in nineteenth- and early twentieth-century German literature and culture. All of its authors contribute innovatively and momentously to the enterprise of systems theory and systems critique: Nietzsche's critique in the *Genealogy of Morals* and the *Anti-Christ*; Marx from the writings of German idealism to *Das Kapital*; Freud in his vacillations between cultural criticism and the medical authority he sought for psychoanalysis; Brecht in recalibrating Western dramaturgy toward alienation, gesture, and shock. The course encompasses a wide array of options for questioning and undermining the systematic aspirations of the Western tradition.

GMAN 644a, Urban Phantasmagoria: Berlin, Vienna, and Paris. Henry Sussman.

T 1.30–3.20

Grounding itself in Walter Benjamin's *The Arcades* project, a print-medium Web site of the rise of modernity, malls, advertising, gambling, amusement park, and urban-cruising in nineteenth-century Paris, this course pursues these developments as they revolutionize the environment in the major German-speaking cities and as they are documented in literary and cultural criticism. *Also CPLT 592a.*

GMAN 663b, Theatrical Bodies: Brecht, Artaud, Müller, and the Modern Theater. Rainer Nägele.

W 1.30–3.20

An investigation of three major playwrights and theoreticians of the twentieth century. *Also CPLT 862b.*

GMAN 665b, Poetically Thinking: Hölderlin and Heidegger. Rainer Nägele.

Th 3.30–5.20

An investigation of the interrelation between poetry and philosophy in Hölderlin's late poetry and philosophy in Heidegger's readings of poetry.

GMAN 666b, The Aesthetics of Occupation: Arts and Politics of Everyday Life in Fascist-Occupied Europe. Whitney Humanities Center Seminar.
Katie Trumpener.

W 3.30–5.20, screenings W 7 P.M.

Examining a wide range of texts, literary (fiction, poetry, diaries) and visual (films, photographs, painting), this course examines the commonplace that, in countries that came under fascist domination, everyday life became resistance. How did artists' and diarists' sense of the quotidian under duress ground aesthetic strategies, ethical positions, and political visions? The course looks at critical responses to fascism in Germany and Italy, texts from countries under military occupation (Holland, France, Czechoslovakia, Poland, Hungary), and British counterfactual fictions imaging occupation. Special attention to children's experiences and memories, as to how postwar aesthetic developments (from neorealism to the New Waves) built on wartime experience. All readings and films in English. Seminar discussion augmented by speakers and film screenings. Readings by Anna Seghers, Wilhelm Reich, Christopher Isherwood, Viktor Klemperer, Anne Frank, Miklos Radnoti, Elio Vittorini, Jiri Weil, Imre Kertesz, Charlotte Salomon, Jorge Semprun, Rex Warner, Miron Bialoszweski, Harry Mulish, Josef Brodsky. Films by Veit Harlan, Rossellini, Humphrey Jennings, Bresson, Melville, Wajda, Resnais, Konrad Wolf, Huillet/Straub. Enrollment limited to fifteen. *Also CPLT 929b, FILM 765b^{II}.*

GMAN 900a,b, Directed Reading.

By arrangement with the faculty.

HISTORY

240 Hall of Graduate Studies, 432.1366

M.A., M.Phil., Ph.D.

Chair

Paul Freedman

Director of Graduate Studies

Joanne Freeman (236 HGS, 432.1361)

Professors

Jean-Christophe Agnew (*American Studies*), Abbas Amanat, Ivo Banac, David Blight, Paul Bushkovitch, Jon Butler, John Demos, Carlos Eire, Laura Engelstein, John Mack Faragher, Paul Freedman, Joanne Freeman, Ute Frevert, John Gaddis, Glenda Gilmore, Robert Gordon (*Law*), Timothy Guinnane (*Economics*), Valerie Hansen, Robert Harms, Jonathan Holloway, Paula Hyman, Matthew Jacobson, Gilbert Joseph, Donald Kagan, Michael Kammen (*Visiting*), Paul Kennedy, Daniel Kevles, Benedict Kiernan, Boris Kolonitskii (*Visiting* [Sp]), Bentley Layton (*Religious Studies*), Ivan Marcus, John Matthews (*Classics*), John Merriman, Joanne Meyerowitz, Steven Pincus, Stephen Pitti, Cynthia Russett, Lamin Sanneh (*Divinity*), Jean-Frédéric Schaub (*Visiting* [F]), Stuart Schwartz, Frank Snowden, Jonathan Spence, Harry Stout, Frank Turner, John Harley Warner (*History of Medicine & Science*), Anders Winroth, Jay Winter, Keith Wrightson

Associate Professors

Susan Lederer (*History of Medicine & Science*), Timothy Snyder, Steven Stoll

Assistant Professors

Michael Auslin, Jennifer Baszile, Bruno Cabanes, Seth Fein, Beverly Gage, Michael Gasper, Andrew Gregory (*Classics*), Lillian Guerra, Jennifer Klein, Mary Lui, Michael Mahoney, Carolyn Moehling, Ole Molvig, Carlos Noreña (*Classics*), Mridu Rai, Ronald Rittgers (*Divinity*), Naomi Rogers (*History of Medicine & Science*), Youval Rotman, Celia Schultz (*Classics*), Francesca Trevelatto, Kariann Yokota

Fields of Study

Fields include ancient, medieval, early modern, and modern Europe (including Britain, Russia, and Eastern Europe), United States, Latin America, Asia, Middle East, Africa, Jewish history; and diplomatic, environmental, ethnic, intellectual, labor, military, political, religious, social, and women's history.

Special Admissions Requirements

The department requires a short book review to accompany the application. It should cover the book that has most shaped the applicant's understanding of the kind of work he or she would like to do as a historian.

Special Requirements for the Ph.D. Degree

All students must pass examinations in at least two foreign languages, one by the end of the first year. Students are urged to do everything in their power to acquire adequate linguistic training before they enter Yale and should at a minimum be prepared to be examined in at least one language upon arrival. Typical language requirements for major subfields are as follows:

African: Either (1) French and German or Portuguese or Dutch-Afrikaans; or (2) French or German or Portuguese and Arabic; or (3) French or German or Portuguese or Dutch-Afrikaans and an African language approved by the department.

American: Two languages relevant to the student's research interests, or a high level of proficiency in one language; competence in statistics may substitute for a natural language under appropriate circumstances.

Ancient: French, German, Greek, and Latin.

Chinese: Chinese and French; additional languages like Japanese, Russian, or German may be necessary for certain dissertation topics.

East European: The language of the student's concentration plus two of the following: French, German, Russian, or an approved substitution.

Japanese: Japanese and French or German; Chinese may be necessary for some fields of study.

Latin American: Spanish, Portuguese, and French.

Medieval: French, German, and Latin.

Middle East: Arabic, Persian, or Turkish (or modern Hebrew, depending on area of research) and a major European research language (French, German, Russian, or an approved substitute).

Modern Western European (including British): French and German; substitutions are permitted as appropriate.

Russian: Russian plus French or German with other languages as required.

During the first two years of study, students normally take twelve term courses, at least eight of which shall be chosen from those offered by the department, and must achieve Honors in at least two courses in the first year, and Honors in at least four courses by the end of the second year, with a High Pass average overall. If a student does not meet this standard by the end of the first or second year, the relevant members of the department will consult and promptly advise the student whether the student will be allowed to register for the fall of the following academic year.

Three of the twelve courses must be research seminars in which the student produces an original research paper from primary sources. One of the second-year courses may be a tutorial resulting in a prospectus for the dissertation. In the third year, students are required to hold their prospectus colloquium with the proposed dissertation committee.

The prospectus colloquium offers the student an opportunity to discuss the dissertation prospectus with the faculty committee in order to gain the committee's advice on the research and writing of the dissertation and its approval for the project. The dissertation prospectus provides the basis of grant proposals for doing research away from Yale in the

fourth year. The prospectus colloquium and any further language requirements must be completed before the student takes his/her oral examination.

The oral examination will cover three chosen fields of concentration: a major field and two minor fields, one of which is comparative or theoretical, or on a continent different from the student's ordinary field of specialization. U.S. historians must offer a minor field that addresses historiography outside the United States. If these do not include one field dealing with premodern history, then a year's work in that earlier period must have been included among the twelve required courses. Completion of these requirements will qualify a student for admission to candidacy for the Ph.D., which must take place by the end of the third year of study.

During the third year of study, almost all students serve as teaching fellows in order to acquire crucial professional training. During their first term of teaching, students must attend several training sessions run by the department in conjunction with the Graduate Teaching Center.

Students usually complete the requirements for admission to candidacy in the sixth term, but it is also possible for students who have completed extensive graduate work prior to entering the Ph.D. program to petition for candidacy sooner. Students may petition for credit for previous graduate work only after successful completion of the first year.

In the fourth year, once students have advanced to candidacy, they may continue their studies while serving as teaching fellows or they may decide to pursue their research, either at Yale or elsewhere, using external funding.

In the fifth year, strongly preferably in the fall term, students are required to submit a chapter of the dissertation (not necessarily the first chapter) to the dissertation committee. This chapter will then be discussed with the student by members of the committee, preferably in a colloquium, to give the student additional advice and counsel on the progress of the dissertation. This conference is designed to be an extension of the conversation begun in the dissertation colloquium and is not intended as a defense: its aim is to give students early feedback on the research, argument, and style of the first writing accomplished on the dissertation.

Students are eligible to receive the University Dissertation Fellowship (UDF) provided that they have advanced to candidacy. Students may take the UDF in the fifth year, but they must take the fellowship no later than the sixth year. They should apply for the fellowship in the term prior to which they wish to receive it. Students may serve as teaching fellows when they are not on the UDF.

The department strongly recommends that the student apply for a UDF only after completing the first chapter conference, and that students on a UDF should have completed at least two dissertation chapters before starting the fellowship. Many students apply for jobs in the year in which they receive the UDF, and the department urges that students apply for academic positions only when they have two chapters ready to send out to potential employers.

In short, a student making timely progress should expect to finish at least one chapter by December of the fifth year, and to complete the dissertation in the sixth year, when the submission deadline for May graduation is March 15.

Registration in the seventh year is not required for students submitting their dissertations by the October deadline (which the majority of students do). If students are unable to make the October deadline, they can petition the Graduate School for extended registration in exceptional cases where unique personal circumstances or substantial difficulties in obtaining archival sources have prevented normal progress. The petition, delivered first to the History DGS, will explain the particular circumstances that have prevented completion of the dissertation within the normal timetable and offer a specific plan that describes how the dissertation will be completed in the seventh year. Half of the dissertation chapters should be complete and must be submitted with the petition.

Combined Ph.D. Programs

HISTORY AND AFRICAN AMERICAN STUDIES

The Department of History also offers, in conjunction with African American Studies, a combined Ph.D. in History and African American Studies. For further details, see African American Studies.

HISTORY AND RENAISSANCE STUDIES

The Department of History also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in History and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. Students who have completed all requirements for admission to candidacy for the Ph.D. may receive the M.Phil. degree. Additionally, students in History are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program may qualify for the M.A. degree upon completion of a minimum of six graduate term courses at Yale, of which two must have earned Honors grades and the other four courses must average High Pass overall. Students must also pass an examination in one foreign language. A student in the American Studies program who wishes to obtain an M.A. in History, rather than an M.A. in American Studies, must include in the courses completed at least two research seminars in the History department.

Master's Degree Program. For this terminal master's degree students must pass six term courses, four of which must be in History; substantial written work must be submitted in conjunction with at least two of these courses, and Honors grades are expected in two courses, with a High Pass average overall. All students in this program must pass an examination in one foreign language.

Program materials are available upon request from the Director of Graduate Studies, Department of History, Yale University, PO Box 208324, New Haven CT 06520-8324.

Courses

HIST 512b, Aristotle's *Athēnaion Politeia*. Donald Kagan.

TH 1.30–3.20

A study of the historical portion of Aristotle's *Constitution of the Athenians*. Also CLSS 885b.

HIST 516a^U, Thucydides and the Peloponnesian War. Donald Kagan.

T 2.30–4.20

A study of the great war between Athens and Sparta that transformed the world of the Greek city-states and the brilliant historian and political thinker who described it.

HIST 518b^U, The Spartan Hegemony. Donald Kagan.

T 1.30–3.20

A history of Greece during the period 404–362 B.C. The focus is on the relationship between domestic constitutions and politics and diplomacy and war.

HIST 525b, Topics in Roman History and Culture. John Matthews, William Metcalf.

F 4–6

A weekly program of research papers on various topics, given by faculty members, graduate students, and visitors to Yale, followed by formal and informal discussion. Graduate students may acquire a course credit by presenting a paper at the seminar or by writing a term paper on one of the topics chosen, together with regular participation and contributions to discussion. Suggestions for and offers of papers are welcome. Also CLSS 850b.

HIST 535a^U, History of Jewish Culture to the Reformation. Ivan Marcus.

TRH 11.30–12.45

Undergraduate lecture course open to graduate students by permission of instructor. Also JDST 761a^U, RLST 773a^U.

HIST 540a, Introduction to Research in Medieval History. Anders Winroth.

M 1.30–3.20

Introduction to often used sources, methods, and research tools for medieval European history. The theme in 2005 is interaction between the papacy and the rest of the church, focusing on papal letters.

HIST 541b, Jews in Christian and Muslim Lands from the Fourth to the Sixteenth Century. Ivan Marcus.

T 1.30–3.20

Research seminar that focuses on a comparison of the two medieval Jewish subcultures of Ashkenaz (northern Christian Europe) and Sefarad (mainly Muslim and Christian Spain). Issues in historiography and comparative methodology complement discussions about the symbols and reality of literary, political, and economic features of each society. Also RLST 776b.

HIST 542b, Law in Medieval Europe. Anders Winroth.

W 1.30–3.20

This seminar explores the creation in the twelfth and thirteenth centuries of a sophisticated system of law, the European Common Law (*ius commune*). All late medieval and much modern legislation is based on this legal system. The course focuses on its roots in the Roman law of Emperor Justinian and in ecclesiastical legislation. We also study the influence of the *ius commune* on national and local medieval law. The emphasis is on using law in historical research and in learning the technical skills necessary.

HIST 553a, Political History of Medieval Europe. Paul Freedman.

T 1.30–3.20

A reading and discussion course that studies the nature of political power in Europe between approximately 1000 and 1500. Particular attention is paid to the development of state institutions, dynastic and territorial rivalries, the European balance of power, and the interaction of church and state.

HIST 562b, Historiography of the German Reformation. Ronald Rittgers.

T 2.30–4.20

This seminar is designed to introduce students to critical skills of historical interpretation by way of examining current historiographical debates in Reformation scholarship. It is intended for Divinity students planning to pursue doctoral work in the history of Christianity and for doctoral students interested in the history of early modern Europe. The seminar is also open to students who are simply interested in the course content. In the spring of 2006 the seminar topic is the historiography of the German Reformation. *Also REL 738.*

HIST 563a, The Catholic Reformation. Carlos Eire.

Th 3.30–5.20

Reading and discussion of scholarship on the Catholic Reformation and of key primary texts written between 1500 and 1600. *Also RLST 677a.*

HIST 566b^u, History of Jewish Culture, 1500 to the Present. Paula Hyman.

TTh 10.30–11.20

A brief introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interaction of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. *Also JDST 781b^u, RLST 774b^u.*

HIST 582a, Barbarism and Civility in Early Modern Western Europe: Political and Cultural Issues. Jean-Frédéric Schaub.

T 3.30–5.20

The question of relations between civilization and barbarism in both global and European history offers a pathway toward a new interpretation of the process of western politicization. This course crosses three problematic approaches: gathering the consciousness of barbarism as a part of civilization in a wide range of texts to be analyzed in their context of writing and reception; looking into how several national historiographies have constructed or silenced the question; and building a comparative framework.

HIST 588a, European Commercial Expansion, 1500–1800. Francesca Trivellato.

M 7–8.50 P.M.

Although long-distance and even intercontinental trade has existed since antiquity, the European geographical and commercial expansion of the sixteenth century marked a sharp break in the extent to which people, goods, microbes, and ideas voluntarily or forcibly circulated across the world. Was this the beginning of today's globalization? When did Europe achieve commercial supremacy in different regions of the world? What accounts for the European success story? Readings include studies of specific aspects and regions of European international commerce, and some of the most influential interpretations of European economic development. The aim of the seminar is to introduce students to the history of early modern European overseas trade as well as to important debates in economic history.

HIST 590b, The Mediterranean: Histories and Representations.

Francesca Trivellato, Youval Rotman.

T 7–8.50 P.M.

The seminar examines the processes of historical change and continuity in the Mediterranean region from Late Antiquity to the early modern period as well as the analytical concept of “the

Mediterranean” as it has been forged and debated by historians in the twentieth century. The emphasis is on questions about the geographical, cultural, religious, economic, and political unity and fragmentation of the region, and the impact of idealized images of the Mediterranean on the writing of history.

HIST 606a, Britain: Modernity and Empire. Steven Pincus.

Th 1.30–3.20

This course begins by asking, Why should North Americans be interested in Early Modern Britain and the British Empire? Each class involves the discussion of a major work dealing with Early Modern Britain (1500–1850) or the British Empire and their relation to conceptions of modernity. Each session also introduces students to different kinds of sources relevant for the study of Early Modern Britain and the British Empire. Each seminar discusses research design and methods. The course is relevant not only to Early Modern historians, but also to students interested in the British Empire and Atlantic World, historical sociologists, historians of political thought, and students of English and comparative literature.

HIST 610b, Thinking about Revolutions in Comparative Perspective. Steven Pincus.

W 3.30–5.20

This course begins by discussing classic accounts of revolutions in the eighteenth and nineteenth centuries. Then we turn to theoretical debates from across the social sciences, and finally to unconventional historical case studies of revolutions. The course stresses differences between social and political revolutions, religious and secular revolutions, modern and pre-modern revolutions, and structuralist and culturalist approaches.

HIST 644a, Colonial/National Identities: Germany and France, 1800–1945.

Ute Frevert, John Merriman.

T 10–12

The seminar takes a fresh look at the booming literature on colonialism and its impact on the formation of national identities. It compares Germany and France during the nineteenth and early twentieth centuries and includes topics like colonial policy and wars as well as colonial fantasies and cultural imagination.

HIST 654b, War and Gender in Modern European History. Ute Frevert.

T 1.30–3.20

The seminar examines the various ways in which gender and organized military violence interact in modern European history. How do the changes in warfare affect men and women? And how do gender relations affect the way violence is organized and performed? The seminar covers the Napoleonic wars, colonial wars, WWI, and WWII, but also looks at military organization during times of peace.

HIST 667b, Issues in Early Russian History. Paul Bushkovitch.

Th 1.30–3.20

An examination of the main sources and historiography of a particular era or theme in Russian history to 1825. For spring 2006 the topic is state and society of eighteenth-century Russia in theory and practice.

HIST 674b, Austria-Hungary and Its Successors, 1867–1938. Timothy Snyder.

W 3.30–5.20

An examination of nationalism in practice, from the *Ausgleich* to the *Anschluss*. Topics include national movements in the late imperial period, national reforms within an imperial framework, the catalytic effects of the Great War, the imperfection of the Versailles order, and the collapse of national states. An attempt is made to consider nationalism at the micro-level of families and social groups rather than only at the macro-level of mass publics. Austro-German, Czech, Hungarian, Jewish, Polish, and Ukrainian examples.

HIST 675b, Nationalism in the Balkans. Ivo Banac.

T 1.30–3.20

Reading and discussion. Assessment of various trends in the national ideologies of Balkan peoples from the sixteenth-century proto-national ideas to post-Communist conflicts. Oral reports and one essay. No language requirements.

HIST 685a, Yugoslavia 1918–1991. Ivo Banac.

T 1.30–3.20

Reading and discussion. Main topics in the history of two Yugoslav states. Conflicts, ideologies, dissolution. Oral reports and one essay. No language requirements.

HIST 700a, Introduction to the Historiography of the United States.

John Mack Faragher.

TTh 10.30–12.20

Readings and discussion of scholarly work on U.S. history from the settlement era to the present. Members of the department visit the class on a rotating basis. *Also AMST 700a.*

HIST 703b, Research in Early National America. Joanne Freeman.

T 1.30–3.20

A research seminar focused on the early national period of American history, broadly defined. Early weeks familiarize students with sources from the period and discuss research and writing strategies. Students produce a publishable article founded on primary materials. *Also AMST 803b.*

HIST 711a, Research in African American History and Culture to Emancipation.

Jennifer Baszile.

Th 1.30–3.20

This research seminar explores the full range of African American experience through the era of Emancipation. The initial meetings examine central evidentiary and analytical challenges of research. The remainder of the course focuses on the conception, development, writing, and revision of article-length papers. *Also AFAM 819a.*

HIST 720b, Readings in Religion and American History, 1600–1990. Jon Butler.

M 9–11

This introductory graduate readings course assesses interrelationship between religion and American society from 1600 to 1990. Concentrates on religion's successes and failures in shaping American society from the Puritans to modern neo-conservative fundamentalism. Readings in primary and secondary sources; development of bibliographical skills. *Also AMST 705b, RLST 705b.*

HIST 722a, Research Seminar in Nineteenth-Century United States History.

David Blight.

W 1.30–3.20

Some class sessions focus on matters of craft: research techniques, styles of writing narrative and analysis; judging scholarly work; and philosophical dimensions of doing history in the early twenty-first century. Primary focus of course is for each student to complete his/her own major research paper. Students in any field of American history are welcome. *Also AFAM 757a, AMST 722a.*

HIST 725a, Research in United States Political History. Beverly Gage.

T 1.30–3.20

Research seminar in the political and social history of the United States since the Civil War. Secondary emphasis on public speaking and the craft of writing.

HIST 728a, Topics in American Cultural History: A Research Seminar.**Michael Kammen.**

T 4.30–6.20

A research seminar intended to produce publishable essays. The brief weekly readings also introduce major voices setting new standards or changing the paradigms and approaches for those who work in cultural history. Exposure to and discussion of significant cultural issues examined in their social context.

HIST 732b, American Nationalism and American Culture. Michael Kammen.

T 3.30–5.20

A reading and discussion seminar that explores a broad literature concerning various manifestations of nationalism in American thought and culture from the early republic through the Cold War. The topics range from Manifest Destiny to black nationalism. Emphasis on oral reports and discussion.

HIST 735a, Readings in Twentieth-Century United States History.**Glenda Gilmore.**

Th 1.30–3.20

Recent trends in American political history from the 1890s, with an emphasis on the social analysis of mass politics and reform. *Also AFAM 706a, AMST 714a.*

HIST 736b, Research in Twentieth-Century United States History.**Glenda Gilmore.**

T 10.30–12.20

Projects chosen from the post-Civil War period, with emphasis on twentieth-century social and political history, broadly defined. Research seminar. *Also AFAM 709b, AMST 709b.*

HIST 760b, American Legal History, 1880–1980. Robert Gordon.

TTh 11.10–12.25

Selected topics in the modern history of American law, legal thought, legal institutions, and the legal profession. Examination with an option (open to a limited number of students) to write a research paper based on primary sources. *Also LAW 21063.*

HIST 762b, Readings in Chicano/a History and the U.S.-Mexico Border Region.**Stephen Pitti.**

Th 1.30–3.20

Historical readings on Mexican Americans, on the U.S. Southwest, and on the Mexican North. Themes include gender, labor, migration, citizenship, community formation, transnationality, and politics. *Also AMST 762b.*

HIST 770b, Research on Gender and Sexuality. Joanne Meyerowitz.

W 1.30–3.20

Students conduct research in primary sources and write original monographic essays on the history of gender and sexuality. Readings include key theoretical works as well as journal articles that might serve as models for student research projects. *Also AMST 770b, WGSS 750b.*

HIST 772a, Theorizing the Racial Formation of the United States in the Early Twenty-First Century. Jonathan Holloway.

W 1.30–3.20

A designated core course for students in the joint Ph.D. program, also open to students in American Studies and History. The interdisciplinary seminar includes readings from the fields of legal studies, cultural studies, literary history, history, politics, and sociology. *Also AFAM 505a, AMST 643a.*

HIST 780b, Methods and Practices in U.S. Cultural History. Matthew Jacobson.

M 1.30–3.20

This reading-intensive seminar examines the cultural turn in the discipline of history over the past several decades, and the rise of cultural history as a subfield in its own right. What precisely is meant by terms like “culture,” “subculture,” “dominant culture,” “cultures of resistance,” and “cultural hegemony”? And where do such concepts get us in our investigations of U.S. history? What is their explanatory power? Readings sample a wide range of methods and philosophical approaches within the field, arranged across a variety of periods and thematic topics: nationalism, consumption, empire, class formation and labor, radicalism, gender arrangements, cultural production, and genre. Students produce a significant historiographical essay by term’s end, either treating the literature of a given topic or analyzing a particular cultural theorist (e.g., Gramsci, Hall, Spivak) and his/her influence on contemporary historiography. *Also AFAM 763b, AMST 731b.*

HIST 783b, Material Culture in Historical Research. Kariann Yokota.

W 10.30–12.20

Through readings and individual research this interdisciplinary graduate seminar examines how material culture can inform historical research. As a final project each person writes a cultural biography of an object of his/her choice. *Also AMST 732b.*

HIST 785b, American Colonization in Comparative Perspective. John Demos, Stuart Schwartz.

W 1.30–3.20

Reading and discussion on the Spanish, Portuguese, French, and British colonial systems in the Americas of the sixteenth to the eighteenth century. Main themes include first encounters with indigenous peoples, the settlement process, economic and social development, mentality and culture, and movements for independence. Comparison and contrast are emphasized throughout.

HIST 790a, Narrative and Other Histories. John Demos.

W 7–9

An exploration, through readings and discussion, of the recent “literary turn” in historical study. Readings include history, fiction, and some theory. In addition, a month-long “practicum” focuses on writings by course participants. *Also AMST 790a.*

HIST 795a, Market Cultures: Anthropological and Historical Approaches.

Jean-Christophe Agnew, Kathryn Dudley.

W 1.30–3.20

What is the relationship between economic markets and cultural systems? How has this relationship changed over time? Drawing on a mix of theory and case studies, this seminar explores the answers to these and related questions as anthropologists, sociologists, and historians have ventured them in recent years. Students have the opportunity to compare approaches, but special attention is paid to the conversations that have developed across the disciplines. Readings focus on but are not confined to the United States. Subjects include exchange forms and commodity flows; labor regimes and their transformation; consumption, selfhood, and citizenship; race/ethnicity, gender, and economic inequality; ritual and community; risk and failure; the corporation and institutional logics. *Also AMST 795a, ANTH 585a.*

HIST 799b, The American Century, 1941–1961. Jean-Christophe Agnew.

Th 10.30–12.20

An introduction to recent work in the intellectual and cultural history of the U.S. in the years between the New Deal and the New Frontier. Secondary readings highlight current directions in historiography and new models of inquiry as well as the range of research opportunities available, while class assignments and discussions focus for the most part on the different

ways in which the period and its documentary sources (including literature, film, and painting) can be interpreted and taught. The seminar aims to suggest the richness and coherence of this period as a subject for intellectual and cultural historians — especially for those wishing to pursue a research topic in this area — and as an occasion to explore and exemplify the possibility of interdisciplinary teaching. *Also AMST 799b.*

HIST 806a, Research Seminar on Colonial Brazil. Stuart Schwartz.

W 1.30–3.20

This course is designed to introduce graduate students to the sources and historiography of early Brazilian history. It includes reading and discussion of the classic chronicles and texts as well as the modern historiography. Some training in Portuguese paleography is also given and students are encouraged to use the digital resources of Project Resgate. A reading knowledge of Portuguese (or willingness of those who have Spanish to acquire it) is required. Students are required to write an article-length paper based on primary sources.

HIST 820b, Problems in Modern Mexican History: People, State, and Nation in Historical Motion. Gilbert Joseph.

F 1.30–3.20

Focusing on the relationship between forms of the state and grassroots political culture, the course examines prevailing trends and controversies in historical writing on Mexico, with special attention given to the Mexican Revolution and its legacies.

HIST 835b, The History of Zionism and Israeli Diplomacy. Michael Oren.

W 1.30–3.20

This seminar investigates a century of Zionist and Israeli diplomacy, from Theodore Herzl's attempt to secure Great Power backing for Zionism to contemporary Israeli negotiations with Western and Arab governments. Students examine original documents from the Balfour declaration to the Oslo Accords, and study the circumstances and personalities surrounding them. In each case students are asked to determine the specific objectives of the Zionist and Israeli leaders, and the degree to which these were, or were not, achieved.

HIST 837a, Becoming the Middle East. Abbas Amanat.

Th 1.30–3.20

An inquiry into the emergence of the modern Middle East from the heterogeneous peoples of Western Asia and North Africa in the nineteenth and twentieth centuries, with emphasis on Iran, Turkey, Egypt, Iraq, and Saudi Arabia. Topics include Western imperial strategies and Ottoman and Qajar responses, new readings of Islam and secularism, historical memories and national identities, dilemmas of modernity, nation-states' sovereignty, and popular revolutions.

HIST 838b, Histories of Publics and Public Discussion in the Arab World.

Michael Gasper.

Th 3.30–5.30

The course sets out to chart a history of publics, public discussion, and public spheres in the Arab world. Through a set of theoretical, literary, and historical readings we explore the ways that, through the eighteenth to the twentieth century, literate café culture, salons, and new media technologies (newspapers, radio, television, cassette tapes, CDs, etc.) became vibrant platforms of public deliberation and discussion in the Arab-speaking world. But we also investigate the notion that traditional practices such as professional storytelling and age-old institutions such as the Sufi *tariqa* (Brotherhood) were vehicles through which social issues were debated and political opposition was voiced in the pre-modern Arab world.

HIST 839a, Environmental History of Africa. Robert Harms.

W 1.30–3.20

An examination of the interaction between people and their environment in Africa, and the ways in which this interaction has affected or shaped the course of African history. *Also AFST 839a.*

HIST 845a, An Introduction to the Professional Study of Modern African History. Michael Mahoney.

M 1.30–3.20

A survey of key debates and readings in colonial and postcolonial African history, including South Africa. Themes include the state, gender, ideology, religion, peasantries, and urbanization. *Also AFST 845a.*

HIST 857b, Readings in the *Mencius*, the *Xunzi*, and the *Zhuangzi*. Ann-Ping Chin.

Th 3.30–5.20

Reading (in Chinese) these three Warring States texts as intellectual and political history, and as literature. *Also CHNS 835b.*

HIST 866a, China and the West, 1580–1950. Jonathan Spence.

W 3.30–5.20

This course explores the broad outlines of the many ways China interacted with the West, from the early Jesuits to the founding of the People's Republic. Topics to be covered include the sciences, the military, religion and philosophy, literature, narcotics, political structures, and law.

HIST 874b, Seminar in Korean History. Kyung Moon Hwang.

W 1.30–3.20

An intensive readings course covering recent major studies in Korean history. Students are required to submit regular papers offering a critical analysis of these works in the context of the ongoing historiographical debate and historical themes. Some advanced undergraduates may enroll with permission of instructor. *Also EAST 510b.*

HIST 894a, Making Colonial Subjects in British India. Mridu Rai.

W 3.30–5.20

This course investigates how British colonialism established itself in India through cultural technologies of rule. It explores how legal, political, and social categories such as those of race, caste, class, religion, and gender were deployed to make the Indians available for imperial control. It also examines how these categories may in turn have shaped anticolonial resistance.

HIST 924a, Bodies and Machines in Medicine and the Mind Sciences.

Susan Lanzoni.

T 3.30–5.20

This seminar examines the varied ways bodies and machines have been imagined and represented in the modern period in Europe and the United States, with examples from biology, medicine, psychiatry, psychology, and computer science. Using primary materials from a variety of scientific and cultural sources, including literature and film, topics include the organism in nineteenth-century biology and romanticism; standardized and mechanized bodies; prosthetics, body enhancements, and movement technologies; machine models of the mind and their critics; the cyborg as technological and cultural icon; and virtual bodies in cyberspace. *Also HSHM 626a^u.*

HIST 927b, The Making of the Modern Mind: History of Psychiatry and Psychology, 1800–2000. Susan Lanzoni.

TTh 11.30–12.20

We explore a range of scientific conceptions of the self that emerged from the rise of experimental psychology, the application of evolutionary models to the mind, and empiricist and behaviorist methods in psychology. Topics include studies of hysteria and trauma and Freud's delineation of the domain of the unconscious; and holistic visions of the self developed in neurology, existential psychiatry, and psychotherapy. This course examines these developments in the mind sciences across a variety of national contexts and relies on materials from psychological, philosophical, psychiatric, and aesthetic sources, including literature and film. *Also HSHM 627b^U.*

HIST 928a, Infection, Public Health, and the State. Frank Snowden.

Th 3.30–5.20

This course is a comparative examination of public health strategies adopted by western nations since 1800 with regard to high-impact infectious diseases — cholera, smallpox, tuberculosis, syphilis, malaria, polio, and HIV/AIDS. The course begins with “plague regulation” and then explores such alternative policies as vaccination, the sanatorium idea, the regulation of prostitution, health education, and the reporting and tracing of cases. Attention is also given to state planning to confront the threat of bioterrorism and to the present emergency in sub-Saharan Africa of malaria, TB, and HIV/AIDS. The class considers the strategies of the World Health Organization and of national governments to confront the crisis. Reading and discussion, or research seminar with permission of the instructor. There are no prerequisites, and no prior knowledge is assumed. *Also HSHM 732a.*

HIST 929b^U, The Cultural Grounding of Modern American Medicine.

John Harley Warner.

M 1.30–3.20

An exploration of the shaping of American medical culture, especially during the late nineteenth and early twentieth centuries, focusing on the ways that healers' identities were constructed, perceived, and contested. Themes include the moral, social, political, technical, and epistemological grounding of orthodox and alternative professional authority; the fashioning of identities for the medical marketplace and more private constructions of self, with attention to gender, ethnicity, race, religion, and region; and medicine and modernity. *Also AMST 881b^U, HSHM 632b^U.*

HIST 930a, Introduction to the History of Medicine and Public Health.

John Harley Warner.

M 1.30–3.20

An examination of the variety of approaches to the social and cultural history of medicine and public health, taking as a focus nineteenth- and twentieth-century America. Readings are drawn from recent literature in the field, sampling writings on health care, illness experiences, and medical cultures in Europe, the Americas, Africa, and Asia from antiquity to the twentieth century. Topics include the roles of gender, class, ethnicity, race, region, and religion in the experience of sickness and health care; the multiple meanings of science in medicine; the intersection of lay and professional understandings of the body; and the role of the marketplace in shaping professional identities and patient expectations. *Also HSHM 701a.*

HIST 931b, Introduction to the History of Science. Ole Molvig.

T 1.30–3.20

Study of secondary literature, recent and older, in the history of the physical and life sciences from the Renaissance to the early twentieth century. Students acquire familiarity with the development of science in general and of its major branches, including its content, instru-

ments, methods, and social-institutional settings, and an acquaintance with various approaches that historians have followed in interpreting these events. *Also HSHM 702b.*

HIST 937b^U, The Cultures of Western Medicine: A Historical Introduction.

John Harley Warner.

MW 10.30–11.20

A survey of medical thought, practice, institutions, and practitioners from classical antiquity through the present. Changing concepts of health and disease in Europe and America explored in their social, cultural, economic, scientific, technological, and ethical contexts. *Also HSHM 631b^U.*

HIST 938a^U, The Engineering and Ownership of Life. Daniel Kevles.

T 1.30–3.20

The development of biological knowledge and reproductive control in relation to intellectual property rights in living organisms. Topics include agrobusiness, medicine, biotechnology, and patent law. *Also HSHM 676a^U, LAW 20332.*

HIST 939a^U, Biology and Society in the Twentieth Century. Daniel Kevles.

MW 11.30–12.20

A history of the interplay of modern biology with its social, economic, legal, and cultural context. Lecture topics include eugenics and sterilization, the Scopes trial, contraception and abortion, the new reproductive technologies, medical genetics, the human genome project, and human cloning. A two-hour graduate discussion section emphasizes the development of genetics, molecular biology, and biotechnology. *Also AMST 882a^U, HSHM 677a^U.*

HIST 941b, Making the Modern Body. Susan Lederer.

W 1.30–3.20

An examination of the ways in which the human body in the twentieth century has become both a site for medical and surgical practices and a source of tissue and tools for research and industry. Topics include the body in biomedicine; the development and social impact of such technologies as cosmetic and plastic surgery, organ transplantation, assisted reproduction, and cloning; and intersections of gender, race, and nation in biomedicine. *Also HSHM 723b.*

HIST 943a, Health Politics, Body Politics. Naomi Rogers.

W 1.30–3.20

A reading seminar on struggles to control, pathologize, and normalize human bodies, with a particular focus on science, medicine, and the state, both in North America and in a broader global health context. Topics include colonialism and prostitution; repression and regulation of birth control; the teaching of sex education; the public celebration and denial of sexual differences; politics of sexually transmitted diseases, including HIV/AIDS; public health and legal efforts to define and restrict abortion; the pathologizing and identity politics of transgendered people; and the development and regulation of artificial insemination and other methods of reproductive technology. *Also HSHM 736a, WGSS 730a.*

HIST 947a, Experience, Emotion, and the History of Mind Sciences.

Susan Lanzoni.

T 9.30–11.20

How has scientific knowledge incorporated, defined, and calibrated aspects of everyday experience in the modern period? This course explores recent historiography that attends to forms of experience, including pathological and normal, rational and emotional, in the sciences of mind and medicine. We begin with theoretical orientations to questions of everyday experience by Joan Wallach Scott and Michel de Certeau. Selected topics include expression, physiognomy, and representation; imagination and subjectivity; science popularization; experimental and physiological models of emotion; gendered and class perspectives on patient experience; personhood and technology. *Also HSHM 735a.*

HIST 949a^U, Science, Technology, and Modernity. Ole Molvig.

W 3.30–5.20

The seminar explores the intersection of science, technology, and culture from the mid-nineteenth century to the mid-twentieth. Participants are encouraged to integrate a detailed understanding of technical and scientific developments with an informed reading of a variety of social, intellectual, and artistic responses to the challenges posed by modern science and technology. Graduate students complete additional readings and research in consultation with instructor. *Also HSHM 622a^U.*

HIST 950a^U, Women and Judaism. Paula Hyman.

M 1.30–3.20

An examination of the changing status and roles of women within Judaism and Jewish history. Topics include women in Jewish law; the social, domestic, and religious roles of women in the modern period; and the development of Jewish feminism. *Also JDST 787a^U, RLST 795a^U.*

HIST 951b^U, Memory, Memoirs, and Modern Jewish History. Paula Hyman.

T 1.30–3.20

An exploration of the representation of Jewish historical experience from the seventeenth to the twentieth century through a selection of memoirs. Focus on the construction of identity, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. *Also JDST 784b^U, RLST 762b^U.*

HIST 965a, Agrarian Societies: Culture, Society, History, and Development.

Steven Stoll, James Scott, Michael Dove.

M 1.30–5.20

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from anthropology, economics, history, political science, and environmental studies are used to develop a meaning-centered historically grounded account of the transformations of rural society. Team taught. *Also ANTH 541a, F&ES 753a, PLSC 779a.*

HIST 968a, The Political Economy of Nature. Steven Stoll.

W 10.30–12

This seminar examines the various ways that capitalist societies have apportioned resources and conceived of nature, progress, and wealth. It is a topical survey of classical political economy, intended to reveal the influence of these ideas in a wide variety of times and places—eighteenth-century England, nineteenth-century North America, and twentieth-century Africa. Students propose and write an original work of historical scholarship on some problem related to the subject of the course. *Also F&ES 568a.*

HIST 975a, Cold War International History. John Gaddis.

T 1.30–3.20

Examines major issues and sources for the “new” Cold War history. Readings and discussion, with short analytical essays.

HIST 978a, The Theory and History of Toleration. Timothy Snyder,

Daniel Markovits.

W 10–12

This course addresses the philosophical problems posed by political toleration in conjunction with several expressions that political toleration has received in historical practice. The philosophical component considers the merits of contemporary arguments in favor of toleration, set against the worrisome possibility that some degree of intolerance may be rationally required. The historical component presents examples of toleration (and intolerance) and investigates the relationship between toleration and other historically potent ideologies, for

example nationalism. Finally, the course joins these two themes together, considering to what extent the contemporary philosophical approach to toleration is itself historically contingent and the consequences that each contingency has for the approach's philosophical merit. *Also LAW 21414.*

HIST 979a^U, Holocaust in Historical Perspective. Paula Hyman.

MW 10.30–11.20, 1 HTBA

A survey of the major historical issues raised by the Holocaust, including the roots of Nazism; different theoretical perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. *Also JDST 788a^U, RLST 768a^U.*

HIST 980a, Genocide: History and Theory. Benedict Kiernan.

W 3.30–5.20

Comparative research and analysis of genocidal occurrences from ancient times to the present; theories and case studies; interregional, interdisciplinary perspective. Readings and discussion, guest speakers, research paper.

HIST 981a, The Body in Modern Warfare (Nineteenth to Twenty-First Century).

Bruno Cabanes.

Th 3.30–5.20

A study of modern warfare as a body experience. The seminar covers a long period, from the 1850s to the Iraq War. We consider the question of gender, the impact of violence on bodies and spirits of both soldiers and civilians, the experience of mass death and the mourning process, the veterans' homecomings — especially for those severely wounded or mutilated by war.

HIST 982b, The Aftermath of War in the Twentieth Century: Historical Perspectives on Demobilization, Return, and Trauma. Bruno Cabanes.

Th 3.30–5.20

The aftermath of war has been largely neglected by military historians. Yet this period is essential from a number of perspectives, including the reconstruction of identities and the reintegration of soldiers, the construction of wartime and postwar memories, and the development of individual and collective trauma. In this seminar we examine the sources relevant to the period of the aftermath of war (literary works, medical and psychiatric texts, architecture and commemorative sculpture, and so on) and consider the contribution of the social sciences to its study.

HIST 983b, International Development in Historical Perspective.

Michael Mahoney.

M 3.30–5.20

An introduction to global political economy, from the rise and fall of Keynesianism and state interventionism to the rise of the neo-liberal Washington consensus. Other issues include dependency theory, gender and development, and development in action. *Also AFST 783b.*

HIST 985a, Studies in Grand Strategy, Part II. John Gaddis, Paul Kennedy.

M 3.30–5.20

Part II of the two-term linked seminar offered during the calendar year 2005. Research seminar. *Also PLSC 715a.*

HIST 985b, Studies in Grand Strategy, Part I. John Gaddis, Paul Kennedy.

M 1.30–3.20

This two-term course begins in January with readings in classical works from Sun Tzu to Clausewitz to Kissinger. Students identify principles of strategy and examine the extent to which these were or were not applied in historical case studies from the Peloponnesian War

to the post-Cold War period. During the summer, students undertake research projects or internships designed to apply resulting insights to a detailed analysis of a particular strategic problem or aspect of strategy. Written reports are presented and critically examined early in the fall term. Students must take both terms, fulfill the summer research/internship, and attend additional lectures to be scheduled throughout the spring and fall terms. Admission is by competitive application only; forms are available at International Security Studies. *Also PLSC 715b.*

HIST 995a/b, Prospectus Tutorial. Faculty.

HIST 998a/b, Directed Readings. Faculty.

Offered by permission of instructor and DGS to meet special requirements not covered by regular courses.

HIST 999a/b, Directed Research. Faculty.

Offered by permission of instructor and DGS to meet special requirements.

HISTORY OF ART

56 High, 432.2668

M.A., M.Phil., Ph.D.

Chair

Edward Cooke, Jr. (102A OAG, 432.2670, edward.cooke@yale.edu)

Director of Graduate Studies

Alexander Nemerov (203 OAG, 432.8442, alexander.nemerov@yale.edu)

Professors

Brian Allen (*Adjunct*), Timothy Barringer, Judith Colton, Edward Cooke, Jr., David Joselit, Diana Kleiner, Amy Meyers (*Adjunct*), Mary Miller, Robert Nelson, Alexander Nemerov, Jock Reynolds (*Adjunct*), Vincent Scully (*Emeritus*), Robert Thompson, Christopher Wood, Mimi Hall Yiengpruksawan

Associate Professors

Jonathan D. Katz (*Adjunct*), Noa Steimatsky

Assistant Professors

Anne Dunlop, Björn Ewald, Milette Gaifman, Sandy Isenstadt, Kellie Jones, Christine Mehring, Lillian Lanying Tseng

Lecturers

Lynne Cooke, Theresa Fairbanks, Karen Foster, Pamela Franks, Jennifer Gross, Sean Keller, Morna O'Neill

Fields of Study

Fields include Greek and Roman; Medieval and Byzantine; Renaissance; Baroque; eighteenth-, nineteenth-, and twentieth-century European; Modern Architecture; African; African American; American; British; Pre-Columbian; Chinese; Japanese; and film.

Special Requirements for the Ph.D. Degree

Students in the history of art must pass examinations in German or French, and one other language pertinent to their field of study (which may be French or German). One examination must be passed during the first year of study, the other not later than the beginning of the third term. German is required for students in Western art. Students of Chinese art must qualify in Chinese, Japanese, and either German or French, and they have an extra year in which to do so. During the first two and a half years of study, students normally take thirteen term courses. Normally by January 20 of the second year, students submit a qualifying paper that should demonstrate the candidate's ability successfully to complete a Ph.D. dissertation in art history. During the fall term of the third year, students are expected to take the qualifying examination. Candidates must demonstrate knowledge of their field and related areas, as well as a good grounding in method and bibliography. By the end of the second term of the third year, students are expected

to have established a dissertation topic. A prospectus outlining the topic must be approved by a committee at a colloquium by the end of the third year. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation requirements, including the prospectus and qualifying examination. Admission to candidacy must take place by the end of the third year.

The faculty considers teaching to be an important part of the professional preparation of graduate students. Students are required to do four terms of teaching. This requirement is fulfilled in the second and third year. They receive a total of one course credit as teaching fellows when they lead a discussion section. In lieu of teaching for one or two terms, students may also serve as a research assistant at either the Yale University Art Gallery or the British Art Center. Application for these R.A. positions is competitive.

Combined Ph.D. Programs

HISTORY OF ART AND AFRICAN AMERICAN STUDIES

The History of Art department offers, in conjunction with the Program in African American Studies, a combined Ph.D. in History of Art and African American Studies. Students in the combined-degree program will take three core courses in African American Studies as part of the required twelve courses and are subject to the language requirement for the Ph.D. in History of Art. The dissertation prospectus and the dissertation itself must be approved by both History of Art and African American Studies. For further details, see African American Studies.

HISTORY OF ART AND FILM STUDIES

The Department of History of Art offers, in conjunction with Film Studies, a combined Ph.D. in the History of Art and Film Studies. Students are required to meet all departmental requirements, but many courses may count toward completing both degrees at the discretion of the directors of graduate studies in History of Art and Film Studies. For further details see Film Studies.

HISTORY OF ART AND RENAISSANCE STUDIES

The Department of History of Art also offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in the History of Art and Renaissance Studies. For further details, see Renaissance Studies.

The Center for the Study of American Art and Material Culture

The Center for the Study of American Art and Material Culture provides a programmatic link among the Yale faculty, museum professionals, and graduate students who maintain a scholarly interest in the study, analysis, and interpretation of American art and material culture. It brings together colleagues from a variety of disciplines — from History of Art and American Studies to Anthropology, Archaeological Studies, and Geology and Geophysics — and from some of Yale's remarkable museum collections from the Art Gallery and Peabody Museum to Beinecke Library. Center activities will focus upon one particular theme each year and will include hosting one or more visiting American Art and Mate-

rial Culture Fellows to teach a course each term and interact with Yale colleagues; weekly lunch meetings in which a member makes a short presentation centered on an artifact or group of artifacts followed by lively discussion about methodology, interpretation, and context, and an annual three-day Yale–Smithsonian Seminar on Material Culture.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in the History of Art are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). This degree is awarded after the satisfactory completion of one year of course work (six term courses) and after evidence of proficiency in one required foreign language. The student normally petitions for the degree at the time of registration in the fall of the second year.

Program materials are available upon request to the Director of Graduate Studies, Department of the History of Art, Yale University, 56 High Street, PO Box 208272, New Haven CT 06520-8272.

Courses

HSAR 500a, Introduction to the Study of Art History. Christopher Wood.

w 3.30–5.20

How have cultures figured the historicity of art to themselves? How are ideas about representation, virtuality, visibility, ritual, and performance registered in art historical paradigms? How has art-writing interacted with art-making? What is the genealogy of the modern academic discipline of art history? How are art history, art criticism, and philosophy of art differentiated? What are the affinities and tensions between art history and other fields of thought and research? These questions are approached through readings and discussion. This is a foundational course for all graduate students in History of Art.

HSAR 504b, Aspects of Connoisseurship and Conservation. Theresa Fairbanks.

th 1.30–3.20

A survey of the techniques and materials employed in Western painting, sculpture, and graphic arts from antiquity to the present. Modern examination techniques analyzed as tools for connoisseurship, dating, and authentication, including how age, damage, and restoration change works of art. General concepts of preservation and conservation investigated.

HSAR 506a or b, The Teaching of the History of Art.

By arrangement with faculty. History of Art graduate students only.

HSAR 512a or b, Directed Research.

By arrangement with faculty.

HSAR 514a or b, Curatorial Training.

By arrangement with faculty.

HSAR 560a, The Naturalistic and the Non-Naturalistic in Greek Art.

Milette Gaifman.

w 2–4

The emergence of naturalism is known as the one great artistic achievement of Classical Greece. However, Greek art explored a variety of forms of artistic representation, including semi-iconic forms or archaizing types. In this course we consider this variety in Greek art and

address topics such as the so-called Greek revolution; the non-naturalistic forms in Greek art such as herms, Dionysiac poles with masks, or *xoana*; and the areas of Greek art that probe the boundaries between the naturalistic and the non-naturalistic.

HSAR 561b, The Aesthetics of the Divine Image in Greek Art. Milette Gaifman.

W 1.30–3.20

A seminar on problems related to artistic representation of Greek gods. Topics include the nature and problems of Greek anthropomorphism, the variety of contexts of divine images (particularly cultic/non-cultic), distinctions between cult statues and votives, relationship between artistic representation and epiphanic experience, types of representations in pictorial imagery. The course treats both material evidence and ancient texts related to the Greek perception of images of gods (e.g., Homer, Plato).

HSAR 577b, Roman Imperial Art. Björn Ewald.

Th 7–8.50 P.M.

A course on Roman Imperial art, comprising the period from Augustus to Constantine (late first century B.C. to fourth century A.D.). The focus is on the so-called historical reliefs that once adorned or still adorn public buildings (like triumphal arches) and monuments (like the Ara Pacis). They are part of an elaborate visual system of official art that served to praise imperial virtues and to imprint the imperial accomplishments on the “collective memory” of Roman society. *Also* ARCG 779b, CLSS 844b.

HSAR 582a, EClavdia: Women in Ancient Rome. Diana Kleiner.

T 1.30–3.20

The contributions of Roman women to one of the greatest cities — and one of the greatest empires — in world history. Lost stories of real-life Roman women recovered from public and residential buildings, portraits, paintings, and other works of Roman art and architecture. *Also* CLSS 873a.

HSAR 585a, Iconography of Christian Art. Jaime Lara.

TTh 1.30–2.50

Regardless of what anyone may personally think or believe about him, Jesus of Nazareth has been the dominant figure in the history of Western culture for almost twenty centuries. His image dominates Western art, and it is not sameness but kaleidoscopic variety that is its most conspicuous feature. Indeed, for most of those twenty centuries there has been little or no concern to represent him as a Jewish male of first-century Roman Palestine. Each successive epoch has “created” him anew in accordance with its own character. This course explores, in image and in word, what it was that each epoch found in Jesus and brought to its visual portrayal of him. No religious affiliation or belief on the part of the student is presumed or required. Qualified upper-level undergraduates may be admitted with permission of the instructor. *Also* REL 835a.

HSAR 586b, The House of the Lord: Twenty Centuries of Church Architecture.

Jaime Lara.

TTh 9–10.20

This course is an historical survey of the sacred spaces of the Catholic, Protestant, and Eastern Orthodox traditions. The emphasis is on the iconography of architecture and on the way in which these buildings have functioned for changing worship needs over the course of centuries. The course begins with the Jewish structures of the tent, temple, and synagogue, and then moves to Christian house-churches, basilicas, monasteries, cathedrals, and parishes in Europe and the Americas. Guest architects speak and the class visits several local houses of worship. The last part of the course deals with twenty-first-century worship spaces designed for contemporary liturgy. Students may do a final research paper or a practical design project with plan, renderings, and model. *Also* REL 847b.

HSAR 593b, The Bayeux Tapestry and the Anglo-Norman World. Howard Bloch.

W 3.30–5.20

A study of the Bayeux Tapestry in the context of the Conquest and the Anglo-Norman world. Topics include origin, formal description, fabrication, Nordic and continental homologies; relation of inscription to image, of borders to central panels, of decoration to narration; representations of the protagonists, of the events, of the everyday, of military, nautical, architectural, social, political, religious, and natural worlds; mixing of Viking, Celtic, Saxon, and Gallic cultures; literary and chronicle accounts. Basic text, the Bayeux Tapestry Digital Edition CD, 2003. In English. Also *CPLT 732b*, *FREN 741b*.

HSAR 594a, Byzantine Art and Ritual. Robert Nelson.

T 1.30–3.20

Much of Byzantine art was made for liturgical use, and much of imperial art was designed to be seen during court ceremonies. This course considers recent literature on ritual theory and introduces Byzantine rites of various sorts. Students prepare research papers on the performance meanings and contexts for illuminated manuscripts, ritual objects, church frescoes and mosaics, and court costumes and palace structures.

HSAR 596b, Medieval Visuality. Robert Nelson.

M 1.30–3.20

This course explores less the science than the discourse and the physical manifestations of vision during the Middle Ages. It studies what people thought about the action of seeing and how medieval notions of vision inform socially significant practices of vision. Central to the course is the evidence of the visual environment. How does considering visibility help us to understand the ways and means that medieval art and architecture were effective agents of devotion and political power? Case studies are introduced from all areas of the Middle Ages, and seminar members are encouraged to investigate areas of particular interest to them.

HSAR 629a, The Quattrocento. Anne Dunlop.

W 1.30–3.20

An examination of art and art theory in fifteenth-century Italy, with some discussion of developments in France. The course is organized around the production of individual artists as a way into larger questions and problems. Some classes take place in Yale collections.

HSAR 649a, Art and the British Empire, 1700–1945. Timothy Barringer.

W 1.30–3.20

The seminar examines aspects of the diverse visual culture of the British Empire, utilizing recent developments in critical theory and imperial history. Special emphasis on representation of colonial landscape and the body of the colonial subject, empire and material culture; the display of colonial objects' Orientalism in art, imperial pageantry, and invented traditions.

HSAR 693b, Aging Moderns: The Making and Conservation of Modern Art.

Christine Mehring.

T 1.30–3.20

At the beginning of the twenty-first century we are becoming increasingly aware that what has long been referred to as modern art—as new, as avant-garde, as contemporary—is aging. Most of the materials and techniques used by modern artists were unprecedented, often experimental in nature, ranging from oil paint in tubes to synthetic paints, from Plexiglas to polyester resin, from ready-made bottle racks to chocolate. As a consequence, historians, curators, and conservators of modern art are confronted with numerous as yet unanswered practical and philosophical questions concerning the preservation of this work for future generations. Was this work meant to be preserved in the first place? If not, do we allow it to decay and disappear? How do we replace materials we can no longer obtain? If the display of a work causes its deterioration, should we lock it up for no one to see?

HSAR 696b, Issues in Performance Art. Kellie Jones.

W 1.30–3.20

Wedged between the rudiments of theater and the gestures of visual art, performance art came to prominence at the end of the twentieth century. The course concentrates on artists and practices after 1960. However, we also consider the roots of this form in the first part of the twentieth century as well as in earlier periods. Central to our investigations are discussions surrounding performance as catalytic process, as temporal art, and issues of the body as form. Feminist performance art is the focus for this term. *Also AFAM 768b.*

HSAR 707a, Hot Art/Cold War. Jonathan D. Katz.

M 7–9 P.M.

This course uses feminist, queer, and other social historical approaches to analyze the culture of the Cold War period. Heavily art historical, it considers some film, music, and dance of the period. A central concern is the transition from Abstract Expressionism to post-Abstract Expressionism, which is also a transition from a largely heterosexual artistic culture to a largely queer one. In the midst of perhaps the most reactionary chapter in American history, we examine how it came to pass that marginalized, even demonized, social groups came to represent America to itself. *Also WGSS 747a.*

HSAR 708a, The Sculpture Issue: Summer 1967 and On. Lynne Cooke.

F 10.30–12.30, 2.30–4.30

This course looks very closely at issues and debates that surround the notion of sculpture in New York in the period c. 1967–73. It begins by focusing on the summer 1967 issue of *Artforum* magazine which was devoted to sculpture and contained key articles by Robert Morris, Sol LeWitt, Michael Fried, Robert Smithson, among others. In particular, it explores the contributions made to this shifting discourse by artists whose practices included the roles of writer and curator, and artists whose practices evolved from the creation of autonomous art works to works which responded to site and installation protocols. By scrutinizing closely certain texts, exhibitions, and curatorial models plus the contribution of new media used for aesthetic and documentary ends, the course re-examines key debates and artistic strategies that produced a momentous paradigm shift. Donald Judd, Richard Serra, Robert Morris, Robert Smithson, Michael Heizer, Bruce Naumann, and Sol LeWitt are among the artists whose work is under review. Meets every other week.

HSAR 715a, Cinematic Landscapes in Postwar Europe. Noa Steimatsky.

T 11.30–3

This seminar traces a trajectory of postwar European film production that privileges actual locations, the landscape of the everyday, as arenas where realist and modernist discourses converge. Focus on the work of Antonioni, Rossellini, Bresson, Godard, Straub-Huller, and Akerman, among others. Discussion of the periodizing of film history; new articulations of cinematic space and temporality, the tracing of action and affect; the restoration of identity in the quotidian landscape. *Also FILM 811a.*

HSAR 725a, An Introduction to American Material Culture. Edward Cooke, Jr.

W 1.30–3.20

The field of material culture has drawn from a number of different disciplines and scholarly traditions. Through readings and applications of methodologies ranging from structuralism and semiotics to Marxist criticism and cultural studies, this seminar provides a solid foundation for the interpretation of artifacts. *Also AMST 735a, ARCG 725a.*

HSAR 734b, American Art in the Democratic Age, 1830–1860. Alexander Nemerov.

Th 1.30–3.20

How did democracy and capitalism affect American visual culture of the mid-nineteenth century? How did artists portray the market revolution and the place of art within it? What was

the relation between American art of that period and kitsch? Is there a poetic complexity to kitsch, or is it truly a nullity? Considering questions like these, we reassess the cultural significance of painters such as William Sidney Mount and sculptors such as Hiram Powers. Period writers such as Hawthorne and Melville provide some guidance.

HSAR 746a, Mexican Art of the Sixteenth Century. Mary Miller, Jaime Lara.

M 1.30–3.20

Works from both Aztec and Christian traditions are explored, with special attention to the patronage by Franciscans, Augustinians, and Dominicans of indigenous artists. The seminar considers the monumental building programs of the religious, as well as manuscripts, paintings, and sculpture. Issues of survival, resistance, acceptance, and syncretism are all examined. *Also REL 846a.*

HSAR 806b, Zen in the Fifties. Mimi Yiengpruksawan

Th 1.30–3.20

Critical examination of American Zen as a modality in North American visual practice in the 1950s and 1960s, with emphasis on the political and ideological dynamic posed by an Asian Japanese intervention in modernist theory.

HISTORY OF MEDICINE AND SCIENCE

201 Hall of Graduate Studies, 432.1356

M.A., M.Phil., Ph.D.

Chair

Daniel Kevles

Director of Graduate Studies

John Harley Warner (L-132 Sterling Hall of Medicine, 785.4338)

Faculty

Daniel Kevles (*History*), Susan Lanzoni (*Visiting, History of Medicine*), Susan Lederer (*History of Medicine*), Ole Molvig (*History*), David Musto (*Child Study Center*), Naomi Rogers (*Women's & Gender Studies; History of Medicine*), Frank Snowden (*History*), William Summers (*Molecular Biophysics & Biochemistry*), Frank Turner (*History*), John Harley Warner (*History of Medicine*)

Affiliated Faculty

Asger Aaboe (*Emeritus, History of Science*), Cynthia Connolly (*Nursing*), Joseph Fruton (*Emeritus, Biochemistry*), Robert Gordon (*Geology & Geophysics; Applied Mechanics*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Ann Hanson (*Classics*), Bettyann Kevles (*History*), Jennifer Klein (*History*), Martin Klein (*Emeritus, Physics*), Joanne Meyerowitz (*History*), Cynthia Russett (*History*), Gordon Shepherd (*Neuroscience*), Rebecca Tannenbaum (*History*)

Fields of Study

All subjects and periods in the history of medicine and history of science. Special fields represented include American science and medicine; Asian science and medicine; Arabic science and medicine; disease, therapeutics, psychiatry, drug abuse, and public health; physics; science and national security; science and law, science and religion, life sciences, human genetics, eugenics, molecular biology, biotechnology, microbiology, intellectual property, gender, race, and science/medicine; bioethics and medical research.

Special Admissions Requirements

Applicants should have a strong undergraduate background in history and in a science relevant to the direction of their graduate interests. These requirements will be applied with flexibility, and outstanding performance in any field pertinent to the program will be taken into consideration.

Special Requirements for the Ph.D. Degree

Students are required to pass reading proficiency requirements in French and German; a student intending to concentrate in a field or period that requires another foreign language, ancient or modern, may, with approval, substitute that language for either French or German.

Students will ordinarily take twelve term courses during the first two years. All students will normally take the two-term core seminar sequence HSHM 701a/702b or equivalents, four additional graduate seminars in history of science or medicine, and at least one graduate course in a field of history outside of science or medicine. The remaining courses can be taken in history of medicine or science, history, science, or any other field of demonstrated special relevance to the student's scholarly objectives. Two of the twelve courses must be graduate research seminars in the History of Medicine and Science.

Students who enter having previously completed graduate work may obtain some credit toward the completion of the total course requirement, the amount being contingent on the extent and nature of the previous work and its fit with their intended course of study at Yale.

All students are expected, prior to entering on their dissertation work, to develop a broad general knowledge of the discipline. This knowledge may be acquired through a combination of course work taken at Yale or elsewhere, regular participation in the Program colloquia and workshops, and preparation for the qualifying oral examination.

Students will normally spend the summer following their second year preparing for the oral Qualifying Examination, which will be taken in the third year, preferably during the first half of it.

The Qualifying Examination will cover four areas of chosen concentration:

- 1 & 2. two fields in the history of science and/or history of medicine;
3. a field in an area of history outside of medicine and/or science;
4. a field of special interest, the content and boundaries to be established with the adviser for the field. The student may elect to do a second field in history outside of history of science or medicine; or a field in one of the sciences; or a field in a subject such as bioethics, health policy, public health, medical anthropology, medical sociology, science and law, science and national security, science and religion, science and culture, biotechnology, gender, science and medicine; race, science and medicine, or cultural studies.

During their first year, all students will be advised by the director of graduate studies. Students are encouraged to discuss their interests and program of study with other members of the faculty. At the beginning of the second year, each student is to obtain an adviser who will provide guidance in selecting courses and preparing for the Qualifying Examination. The adviser may also offer help with the development of ideas for the dissertation, but students are free to choose someone else as the dissertation supervisor when the time comes to do so.

Students are encouraged to begin thinking about their dissertation topics during the second year. They are required to prepare a Dissertation Prospectus as soon as possible following the Qualifying Examination and to defend the Prospectus orally before being admitted to full candidacy for the doctoral degree.

Teaching is an important part of the professional preparation of graduate students in History of Medicine and Science. Students will teach, usually in the third and fourth years of study. Students are also encouraged to participate in the programs to develop teaching skills offered by the Graduate School.

M.D./Ph.D. and J.D./Ph.D. Joint Degree Programs

Students may pursue a doctorate in History of Medicine and Science jointly with a degree in Medicine or Law. Standard graduate financial support is provided for the doctoral phase of work toward such a joint degree. Candidates for the joint degree in Law must apply for admission to both the Law School and the Graduate School. Information about the joint degree program with Medicine can be obtained from the Web site of the Yale Medical Scientist Training Program Office in the School of Medicine (<http://info.med.yale.edu/mdphd/phd/index.html>) and from the Web site of the History of Medicine and Science (www.med.yale.edu/histmed).

Master's Degrees

M.Phil. and M.A. (en route to the Ph.D.). See Graduate School requirements, pages 442–44.

Master's Degree Program

The terminal M.A. program is designed particularly for those who plan to combine teaching or scholarship in these fields with a professional career in medicine or science. Students who enroll in the terminal master's degree program leading to the M.A. are expected to complete six term courses during two terms of study and submit an acceptable master's paper. Course work must include the graduate seminar HSHM 701a/702b and one additional graduate seminar in history of medicine or science. The remaining courses are to be chosen in consultation with the director of graduate studies.

For more information about the Program and admission to the Graduate School, see www.med.yale.edu/histmed/ and www.yale.edu/graduateschool/admissions/; or write to Barbara McKay (barbara.mckay@yale.edu).

Courses

HSHM 622a^u, Science, Technology, and Modernity. Ole Molvig.

w 3:30–5:20

The seminar explores the intersections of science, technology, and culture from the mid-nineteenth century to the mid-twentieth. Participants are encouraged to integrate a detailed understanding of technical and scientific developments with an informed reading of a variety of social, intellectual, and artistic responses to the challenges posed by modern science and technology. Graduate students complete additional readings and research in consultation with instructor. *Also HIST 949a^u.*

[HSHM 623b^u, History of the Modern Sciences in Society.]

[HSHM 624b^u, Science, Feminism, and Modernity.]

[HSHM 625a^u, Women and Medicine in America from the Colonial Era to the Present.]

HSHM 626a^U, Bodies and Machines in Medicine and the Mind Sciences.**Susan Lanzoni.**

T 3.30–5.20

This seminar examines the varied ways bodies and machines have been imagined and represented in the modern period in Europe and the United States, with examples from biology, medicine, psychiatry, psychology, and computer science. Using primary materials from a variety of scientific and cultural sources, including literature and film, topics include the organism in nineteenth-century biology and romanticism; standardized and mechanized bodies; prosthetics, body enhancements, and movement technologies; machine models of the mind and their critics; the cyborg as technological and cultural icon; and virtual bodies in cyberspace. *Also HIST 924a.*

HSHM 627b^U, The Making of the Modern Mind: History of Psychiatry and**Psychology, 1800–2000. Susan Lanzoni.**

TTh 11.30–12.20

We explore a range of scientific conceptions of the self that emerged from the rise of experimental psychology, the application of evolutionary models to the mind, and empiricist and behaviorist methods in psychology. Topics include studies of hysteria and trauma and Freud's delineation of the domain of the unconscious; and holistic visions of the self developed in neurology, existential psychiatry, and psychotherapy. This course examines these developments in the mind sciences across a variety of national contexts and relies on materials from psychological, philosophical, psychiatric, and aesthetic sources, including literature and film. *Also HIST 927b.*

HSHM 631b^U, The Cultures of Western Medicine: A Historical Introduction.**John Harley Warner.**

MW 10.30–11.20

A survey of medical thought, practice, institutions, and practitioners from classical antiquity through the present. Changing concepts of health and disease in Europe and America explored in their social, cultural, economic, scientific, technological, and ethical contexts. *Also HIST 937b^U.*

HSHM 632b^U, The Cultural Grounding of Modern American Medicine.**John Harley Warner.**

M 1.30–3.20

An exploration of the shaping of American medical culture, especially during the late nineteenth and early twentieth centuries, focusing on the ways that healers' identities were constructed, perceived, and contested. Themes include the moral, social, political, technical, and epistemological grounding of orthodox and alternative professional authority; the fashioning of identities for the medical marketplace and more private constructions of self, with attention to gender, ethnicity, race, religion, and region; and medicine and modernity. *Also AMST 881b^U, HIST 929b^U.*

[HSHM 635a^U, Science, Arms, and the State.]**[HSHM 636a^U, Technology and Society from the Industrial Revolution.]****[HSHM 637a^U, Race and Medicine in America, 1800–2000.]****HSHM 676a^U, The Engineering and Ownership of Life. Daniel Kevles.**

T 1.30–3.20

The development of biological knowledge and reproductive control in relation to intellectual property rights in living organisms. Topics include agribusiness, medicine, biotechnology, and patent law. *Also HIST 938a^U, LAW 2032.*

HSHM 677a^U, Biology and Society in the Twentieth Century. Daniel Kevles.

MW 11.30–12.20

A history of the interplay of modern biology with its social, economic, legal, and cultural context. Lecture topics include eugenics and sterilization, the Scopes trial, contraception and abortion, the new reproductive technologies, medical genetics, the human genome project, and human cloning. A two-hour graduate discussion section emphasizes the development of genetics, molecular biology, and biotechnology. *Also AMST 882a^U, HIST 939a^U.*

HSHM 678a^U, Alcohol and Other Drugs in American Culture. David Musto.

TR 10.30–11.20

The interrelation of alcohol and other drugs since the establishment of the nation. Considerations of scientific, religious, legal, literary, gender, and minority aspects.

HSHM 701a, Introduction to the History of Medicine and Public Health.**John Harley Warner.**

M 1.30–3.20

An examination of the variety of approaches to the social and cultural history of medicine and public health. Readings are drawn from recent literature in the field, sampling writings on health care, illness experiences, and medical cultures in Europe, the Americas, Africa, and Asia from antiquity to the twentieth century. Topics include the role of gender, class, ethnicity, race, region, and religion in the experience of health care and sickness; the intersection of lay and professional understandings of the body; and the role of the marketplace in shaping professional identities and patient expectations. *Also HIST 930a.*

HSHM 702b, Introduction to the History of Science. Ole Molvig.

T 1.30–3.20

Study of secondary literature, recent and older, in the history of the physical and life sciences from the Renaissance to the early twentieth century. Students acquire familiarity with the development of science in general and of its major branches, including its content, instruments and methods, and social-institutional settings, and an acquaintance with various approaches that historians have followed in interpreting these events. *Also HIST 931b.*

[HSHM 718, Performance, Identity, and the Making of American Medicine.]**HSHM 723b, Making the Modern Body. Susan Lederer.**

W 1.30–3.20

An examination of the ways in which the human body in the twentieth century has become both a site for medical and surgical practices and a source of tissue and tools for research and industry. Topics include the body in biomedicine; the development and social impact of such technologies as cosmetic and plastic surgery, organ transplantation, assisted reproduction, and cloning; and the intersections of gender, race, and nation in biomedicine. *Also HIST 941b.*

[HSHM 725a, History of Disease and Public Health in Western Societies.]**[HSHM 726b, Medicine, Public Health, and Colonialism, 1750–1950.]****HSHM 732a, Infection, Public Health, and the State. Frank Snowden.**

Th 3.30–5.20

This course is a comparative examination of public health strategies adopted by Western nations since 1800 with regard to high-impact infectious diseases — cholera, smallpox, tuberculosis, syphilis, malaria, polio, and HIV/AIDS. The course begins with “plague regulations” and then explores such alternative policies as vaccination, the sanatorium, the sanitation idea, the regulation of prostitution, health education, and the reporting and tracing of cases. Attention is also given to state planning to confront the threat of bioterrorism and to the present emergency in sub-Saharan Africa of malaria, TB, and HIV/AIDS. The class considers the

strategies of the World Health Organization and of national governments to confront the crisis. This is a reading and discussion class, but it can be taken as a research seminar with the permission of the instructor. There are no prerequisites, and no prior knowledge is assumed. *Also HIST 928a.*

[HSHM 733a, The Grounding of Modern Medicine.]

[HSHM 734a, Readings in the History of Psychology, Psychiatry, and Psychotherapy.]

HSHM 735a, Experience, Emotion, and the History of Mind Sciences.

Susan Lanzoni.

T 9.30 – 11.20

How has scientific knowledge incorporated, defined, and calibrated aspects of everyday experience in the modern period? This course explores recent historiography that attends to forms of experience, including the pathological and normal, rational and emotional, in the sciences of mind and medicine. We begin with theoretical orientations to questions of everyday experience by Joan Wallach Scott and Michel de Certeau. Selected topics include expression, physiognomy, and representation; imagination and subjectivity; science popularization; experimental and physiological models of emotion; gendered and class perspectives on patient experience; personhood and technology. *Also HIST 947a.*

HSHM 736a, Health Politics, Body Politics. Naomi Rogers.

W 1.30 – 3.20

A reading seminar on struggles to control, pathologize, and normalize human bodies, with a particular focus on science, medicine, and the state, both in North America and in a broader global health context. Topics include colonialism and prostitution; repression and regulation of birth control; the teaching of sex education; the public celebration and denial of sexual difference; politics of sexually transmitted diseases, including HIV/AIDS; public health and legal efforts to define and restrict abortion; the pathologizing and identity politics of transgendered people; and the development and regulation of artificial insemination and other methods of reproductive technology. *Also HIST 943a, WGSS 730a.*

[HSHM 785a, Science and Technology in American Society.]

[HSHM 912a, Reading Seminar in the History of Disease and Public Health in America.]

[HSHM 913b, Reading Seminar in the History of Life Sciences.]

HSHM 914a or b, Research Tutorial I.

By arrangement with faculty.

HSHM 915a or b, Research Tutorial II.

By arrangement with faculty.

[HSHM 919b, Research Seminar in the History of Medicine and Science.]

HSHM 920a or b, Independent Reading.

By arrangement with faculty.

HSHM 930a or b, Independent Research.

By arrangement with faculty.

IMMUNOBIOLOGY

The Anlyan Center (TAC) S531, 785.3857
Ph.D. (M.S., M.Phil. en route)

Chair

Richard Flavell

Director of Graduate Studies

Al Bothwell (TAC 641, 785.3857, alfred.bothwell@yale.edu)

Director of Graduate Admissions

David Schatz (TAC S625, 737.2255, david.schatz@yale.edu)

Professors

Jeffrey Bender (*Internal Medicine*), Alfred Bothwell, Kim Bottomly, Joseph Craft (*Internal Medicine*), Peter Cresswell, Richard Flavell, Sankar Ghosh, Paula Kavathas (*Laboratory Medicine*), Ruslan Medzhitov, Ira Mellman (*Cell Biology*), Jordan Pober, Nancy Ruddle (*Epidemiology & Public Health*), David Schatz, Robert Tigelaar (*Dermatology*)

Associate Professors

Fadi Lakkis (*Nephrology*), Mark Shlomchik (*Laboratory Medicine*), Warren Shlomchik (*Internal Medicine*)

Assistant Professors

Tian Chi, Akiko Iwasaki, Susan Kaech

Fields of Study

The graduate program in Immunobiology is designed to prepare students for independent careers in research and teaching in Immunology or related disciplines. Training and research focus on the molecular, cellular, and genetic underpinnings of immune system function and development, and on host-pathogen interactions. Specific areas of interest include: B- and T-cell development, activation and effector functions; the role of cytokines in immunoregulation; intracellular signaling and the control of transcription in lymphocytes; antigen processing and presentation; immunoglobulin and T-cell receptor gene rearrangement; B-cell memory; the immunobiology of vascular endothelial cells; innate immunity; and B- and T-cell tolerance. Mechanisms of autoimmunity and immunodeficiency are a major interest, and a number of important human diseases are under study, including diabetes, systemic lupus erythematosus, multiple sclerosis, AIDS, and a variety of other infectious diseases.

The program emphasizes interdisciplinary training and collaborative and interactive research, an approach based on the idea that solving difficult problems requires the integration of individuals with common goals but differing expertise. Students enter the Immunobiology graduate program after completing their first year in the Biological and Biomedical Sciences (BBS) graduate program. Students from any of the tracks of BBS may enter the program. Hence, Immunobiology has close ties with other graduate programs in the biological sciences at Yale.

Students are encouraged to supplement core courses in molecular and cellular immunology with additional courses selected from the wide range available in cell biology, molecular biology, developmental biology, biochemistry, genetics, pharmacology, molecular medicine, neurobiology, and bioinformatics. Research seminars and informal interactions with other graduate students, postdoctoral fellows, and faculty also form an important part of graduate education. Three laboratory rotations provide first-year students with a variety of research opportunities available at Yale. First-year students are considered BBS (Biological and Biomedical Science) students. The “BBS” has more than 200 faculty participants to whom students have full access.

Special Admissions Requirements

Applicants should have strong previous research experience and a strong academic background in biology, chemistry, and genetics with course work in physics and mathematics preferred. Submission of the GRE General Test is required. Submission of the Subject Test in Biology or Biochemistry is preferred.

To enter the Ph.D. program, students apply to an interest-based track within the inter-departmental graduate program in the Biological and Biomedical Sciences (see pages 71–73).

Special Requirements for the Ph.D. Degree

Students are required to take seven courses for a grade in the Yale Graduate School.

Required graded courses for first- and second-year students are:

IBIO 530a, Biology of the Immune System

IBIO 531b, Advanced Immunology.

Two Immunobiology seminar courses are also required for second-year students and beyond. They are listed under the following numbers:

IBIO 536, IBIO 537, IBIO 538, IBIO 539.

To accommodate the growth of the graduate program, we have expanded the number of Immunology seminar courses offered from one course per year to three courses every two years.

An Immunobiology seminar course may be taken for audit if the student has previously taken seven graded courses and has already completed an Immunobiology seminar for a grade.

All first- and second-year students must take:

IBIO 600a, Introduction to Research, *taught every fall, credit-only course*

IBIO 601b, Fundamentals of Research, *taught every other spring, credit-only course.*

Additional courses are determined based on the individual needs of the student, and include courses in biochemistry, cell biology, genetics, molecular biology of prokaryotes, molecular biology of eukaryotes, animal viruses, the structure of nucleic acids and proteins, microbiology, and disease mechanisms. Students choose courses after consulting an advisory committee made up of faculty from the Section of Immunobiology, as well as the director of graduate studies.

Honors:

The Graduate School uses grades of Honors, High Pass, or Fail. Students are required to earn a grade of Honors in at least two courses in the first two years, and are expected to maintain a High Pass average. There is no foreign language requirement.

Teaching:

Students are required to serve as TA (teaching assistant) for two terms before the end of their sixth term.

Early in their fourth term, students make a thirty-minute presentation to the section of their proposed research and initial results. Thereafter, they meet with their prospectus committee, which assigns four or five broad areas of biology and immunology that are of particular relevance to the proposed research and on which the student will be examined in the prospectus exam. During the next several months, students prepare a formal research proposal (in NIH grant format) concerning the proposed thesis research and study for the exam. The exam is oral, and covers all aspects of immunology generally, with a focus on the assigned areas mentioned above. The student is also questioned on aspects of the thesis proposal. Requirements for admission to candidacy, which usually takes place after six terms of residence, are: (1) completion of course requirements and teaching requirements; (2) completion of the prospectus examination; and (3) certification of the student's research abilities by vote of the faculty upon recommendation from the student's thesis committee.

Progress in thesis research in the third and later years is monitored carefully by the student's thesis committee (composed of the adviser and three or four other faculty). All students are required to have two meetings with their thesis committee annually, to provide an update on progress and an opportunity for the committee to provide feedback and suggestions.

M.D./Ph.D. Students Majoring in Immunobiology

Required: seven courses for a grade.

Out of the seven courses the following are mandatory:

1. IBIO 530a, Biology of the Immune System
2. IBIO 531b, Advanced Immunology
3. Two Immunobiology seminar courses: IBIO 536a, 537a, 538a, 539a (Seminars can be audited if a student has grades in seven other courses)

Also required:

Two grades of Honors. Yale University graduate courses taken for a grade at the School of Medicine may be counted toward the Honors fulfillment and the seven total required courses. Verification must be provided to the DGS.

One semester of teaching. Previously taught courses in the School of Medicine may count toward this requirement. To request credit for previous teaching experience, a note from the course director describing the teaching experience (duration of the teaching experience, frequency of class meetings, number of students taught, materials covered, dates, and for whom) should be provided to the Immunobiology DGS.

M.D./Ph.D. students are not required to take IBIO 600a, Introduction to Research, but may if they wish.

IBIO 601b, Fundamentals of Research [Ethics]. A note from the DGS of the M.D./Ph.D. program must be forwarded to the Immunobiology DGS stating that the student has taken IBIO 601b, Fundamentals of Research, or its equivalent in the School of Medicine. *Include dates, titles, and faculty.* If the student has not taken 601b or the equivalent, then registration in this class is required.

Biannual committee meetings. Each student is required by the Immunobiology section to have a committee meeting every six months. Departmental Research in Progress talks can count. The committee supervisor will then prepare a letter to the DGS summarizing the student's progress.

Master's Degrees

M.S. (en route to the Ph.D.). Students who complete at least one year of resident graduate study at Yale with the quality of work judged satisfactory by the Section of Immunobiology faculty may petition for the award of the M.S. degree. At the present time "satisfactory" is defined as having completed five graduate courses with an average grade of High Pass. Students must petition through the Registrar's Office of the Graduate School.

M.Phil. (en route to the Ph.D.). Following successful completion of the prospectus examination, the student will be entitled to the M.Phil. degree. Once all course work and departmental requirements have been met, the student will advance to candidacy and be A.B.D. ("all but dissertation"). At that point the student will normally focus on research and the writing of the dissertation.

The Web site at <http://info.med.yale.edu/bbs/> offers complete information on the BBS, Biological and Biomedical Sciences Program, and the more than 200 participating faculty.

Courses

IBIO 530a, Biology of the Immune System. Kim Bottomly and staff.

MWF 9.30–10.20

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens; autoimmunity. *Also MCDB 530a^{II}.*

IBIO 531b, Advanced Immunology. Ruslan Medzhitov and staff.

The historical development and central paradigms of key areas in immunology. The course attempts to develop a clear understanding of how these paradigms were established experimentally. Landmark studies are discussed to determine how the conclusions were obtained and why they were important at the time they were done. Lecture and discussion format; readings of primary research papers and review articles. Prerequisite: IBIO 530a or equivalent. Enrollment limited to fifteen.

IBIO 537b, Advanced Immunology Seminar: Transplantation. Warren Shlomchik.

HTBA

IBIO 600a, Introduction to Research. Al Bothwell and staff.

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Introduction to the research interests of the faculty. Required for all first-year Immunology students. Pass/fail.

IBIO 601b, Fundamentals of Research. Al Bothwell and staff.

Required for all first- and second-year Immunology students. Pass/fail.

IBIO 603, Teaching in the Science Education Outreach Program (SEOP).

Paula Kavathas.

Students teach seventh-graders in the New Haven schools as part of the Science Education Outreach Program (SEOP). In addition, they are required to take the course Science Teaching 101, which is offered by the McDougal Graduate Teaching Center. Additional possibilities include working with students on Science Fair projects, being a Science Fair judge, or developing a new project. Dates and times to be determined. Please contact the course director, Paula Kavathas, at 785.6223. *Also GENE 603a and b.*

INTERNATIONAL AFFAIRS COUNCIL

Yale Center for International and Area Studies
210 Luce Hall, 34 Hillhouse, 432.3418

M.A. in International Relations

Graduate Certificate of Concentration in Development Studies

Graduate Certificate of Concentration in Security Studies

Chair

John Gaddis (*History*)

Associate Chair and Director of Graduate Studies

Cheryl Doss (*Economics*) (223 Luce Hall, 432.9395, cheryl.doss@yale.edu)

Professors

Abbas Amanat (*History*), Jack Balkin (*Law*), Ivo Banac (*History*), Michele Barry (*Medicine*), Beatrice Bartlett (*History*), Seyla Benhabib (*Political Science*), Frank Bia (*Medicine*), Paul Bracken (*Management*), Gary Brewer (*Forestry & Environmental Studies; SOM*), William Burch, Jr. (*Forestry & Environmental Studies*), Paul Bushkovitch (*History*), David Cameron (*Political Science*), Amy Chua (*Law*), Deborah Davis (*Sociology*), Michael Dove (*Forestry & Environmental Studies; Anthropology*), Eduardo Engel (*Economics*), Laura Engelstein (*History*), J. Joseph Errington (*Anthropology*), Daniel Esty (*Forestry & Environmental Studies; Law*), Robert Evenson (*Economics*), Owen Fiss (*Law*), William Foltz (*Political Science*), Paul Freedman (*History*), Ute Frevert (*History*), John Gaddis (*History*), Pinelopi Goldberg (*Economics*), Timothy Guinnane (*Economics*), Koichi Hamada (*Economics*), Thomas Hansen (*Anthropology*), Valerie Hansen (*History*), Robert Harms (*History*), Paula Hyman (*History*), Gilbert Joseph (*History*), Donald Kagan (*History*), Stathis Kalyvas (*Political Science*), Stephen Kellert (*Forestry & Environmental Studies*), William Kelly (*Anthropology*), Paul Kennedy (*History*), Daniel Kevles (*History*), Benedict Kiernan (*History*), Harold Koh (*Law*), Anthony Kronman (*Law*), Theodore Marmor (*Management*), Enrique Mayer (*Anthropology*), Robert Mendelsohn (*Forestry & Environmental Studies*), John Merriman (*History*), Michael Merson (*Epidemiology & Public Health*), William Nordhaus (*Economics*), Sharon Oster (*Management*), Merton Peck (*Economics*), Gustav Ranis (*Economics*), W. Michael Reisman (*Law*), John Roemer (*Political Science*), Susan Rose-Ackerman (*Political Science; Law*), Frances McCall Rosenbluth (*Political Science*), K. Geert Rouwenhorst (*Management*), Bruce Russett (*Political Science*), Lamin Sanneh (*Divinity; History*), Peter Schuck (*Law*), T. Paul Schultz (*Economics*), Stuart Schwartz (*History*), James Scott (*Political Science*), Martin Shubik (*Management*), Helen Siu (*Anthropology*), Stephen Skowronek (*Political Science*), Frank Snowden (*History*), Jonathan Spence (*History*), T. N. Srinivasan (*Economics*), Peter Swenson (*Political Science*), Ivan Szelenyi (*Sociology*), Frank Turner (*History*), Christopher Udry (*Economics*), Michael Wallerstein (*Political Science*), John Wargo (*Forestry & Environmental Studies*), Jay Winter (*History*), Derek Yach (*Epidemiology & Public Health*)

Associate Professors

Jose Cheibub (*Political Science*), Marian Chertow (*Forestry & Environmental Studies*), Nora Groce (*Epidemiology & Public Health*), Oona Hathaway (*Law*), Lawrence King (*Sociology*), Linda-Anne Rebhun (*Anthropology*), Nicholas Sambanis (*Political Science*), Steven Stoll (*History*), James Vreeland (*Political Science*)

Assistant Professors

Michael Auslin (*History*), Jennifer Bair (*Sociology*), Brian Cowan (*History*), Keith Darden (*Political Science*), Seth Fein (*History*), Beverly Gage (*History*), Michael Gasper (*History*), Galina Hale (*Economics*), Kari Hartwig (*Epidemiology & Public Health*), Nathaniel Keohane (*Management*), Kaveh Khoshnood (*Epidemiology & Public Health*), Pierre Landry (*Political Science*), Richard Lindsey (*Management*), Nikolay Marinov (*Political Science*), Ellen Lust-Okar (*Political Science*), Michael Mahoney (*History*), Rohini Pande (*Economics*), Mridu Rai (*History*), Rose Razaghian (*Political Science*), Vivek Sharma (*Political Science*), Hong Wang (*Epidemiology & Public Health*)

Lecturers

Michael Boozer (*Economics*), Theodore Bromund (*History*), Giancarlo Corsetti (*Economics*), Cheryl Doss (*Economics*), Debbie Humphries (*Epidemiology & Public Health*), Kimberly Kagan (*International Affairs; History*), Beth Daponte Osborne (*Management*), Nancy Ruther (*Political Science*), James Sutterlin (*Political Science*)

Adjunct & Visiting Professors

Loch Johnson (*International Affairs; History*), William Odom (*Adjunct, Political Science*), Barry O'Neal (*Economics*), Patricia Pessar (*Adjunct, Anthropology; American Studies*)

Fields of Study

The two-year program is designed to combine breadth of knowledge of the basic disciplines of international relations with depth of specialization in a particular academic discipline, geographic area, specialized functional issue, and/or professional field. It is designed primarily for students seeking an M.A. degree before beginning a career in international affairs but also supports students interested in going on for a Ph.D. degree in economics, history, or political science. Joint degrees, as well as concentrations within the M.A. program, are offered with the School of Management, the Law School, the School of Forestry & Environmental Studies, and the Department of Epidemiology and Public Health.

Special Admissions Requirements

Applicants must take the GRE General Test; students whose native language is not English must pass the Test of English as a Foreign Language (TOEFL) with a minimum score of 610 on the paper-based test or 253 on the computer-based test. Entering students must have taken introductory courses in microeconomics and macroeconomics prior to matriculation.

Special Requirements for the Master's Degree

The substantive core consists of seven graduate-level courses: two history courses (one regional and one comparative international); two in political science (one in world or comparative politics and one in international relations); two graduate-level courses in economics (one economic analysis and one international economics); and the workshop in international relations (see course description below for INRL 700a, required in the first term). Each term, a list of courses meeting these requirements is available from the IR registrar.

Beyond the core courses, each student must identify a coherent set of courses and demonstrate their academic integrity as a proposed concentration for approval by the director of graduate studies. The concentrations require a minimum of eight courses in the fields selected. Some of the courses are cross-listed in two or more departments. Students are able to develop concentrations based on a topical, regional, or disciplinary focus, or a combination of a topical and regional focus.

M.A. candidates are required to achieve an average grade of High Pass in graduate courses plus a minimum of two grades of Honors in term courses, one of which will normally be achieved during the first year. For each grade of Pass, there must be an additional grade of Honors. In addition, students must demonstrate their research skills. Students must submit a proposal by the fourth week of a term in which they intend to complete a substantial research paper as part of a course or as an independent project. The DGS must approve it as meeting the requirements at the end of the term.

POLITICAL ECONOMY OF TRADE, DEVELOPMENT, OR BUSINESS

Within a broad field of political economy, students generally specialize in one of the professional arenas of trade, international business, or international development by taking eight courses beyond the core. They must take three to five additional courses in economics and politics directly related to their professional specialization and at least one of these courses must be in quantitative methods in the first term to prepare for advanced course work. Students specializing in trade or business must complete their concentration by taking an additional three to five relevant courses in law, management, finance, health resource administration, and/or environmental and natural resources policy. Students focused on development should complete their concentration with three to five relevant additional courses in anthropology, sociology, public health, management, and/or environmental and natural resources policy.

INTERNATIONAL SECURITY

A specialization in international security is available in conjunction with International Security Studies (ISS). Concentrations in security studies are usually based on courses in history, political science, law, and management. Concentrations of security studies are often combined with a focus on a world region. Students may draw on resources available through United Nations Studies at Yale. Other courses can be selected in consultation with the director of graduate studies of the IR program.

WORLD REGIONS

It is also possible to undertake concentrations with emphasis on a single geographic region by electing additional courses relating to a specific area. YCIAS area studies councils, including African Studies, European Studies, Latin American and Iberian Studies, and Middle East Studies, offer graduate certificates in their areas of study. The South Asian, Southeast Asia, and East Asian Studies councils also provide a wealth of research, teaching, and enrichment activities without formal certificates. M.A. degrees in African Studies, East Asian Studies, and European and Russian Studies are available through these YCIAS councils.

NATURAL RESOURCE MANAGEMENT AND ENVIRONMENTAL POLICY

A concentration in natural resource management and environmental studies requires a student to meet two basic objectives. First, to develop core knowledge in the natural sciences that are relevant to natural resource management and the environment. Second, to understand the social, economic, and political setting through which natural resources are utilized. To achieve the first objective, a student will normally complete, while at Yale, a minimum of four natural science courses concerning the problems of managing air, water, or land, or plant or animal resources. To achieve the second objective, a student will normally complete four courses at Yale that deal with the economic, political, or social aspects of natural resource management and the environment. In addition, a student concentrating in natural resources also may enroll in the summer technical training modules in plant identification, vegetation measurement, and land measurement. The School of Forestry & Environmental Studies teaches these immediately prior to the beginning of the fall term. Students in the IR program who wish to concentrate in F&ES should design an individualized program with a faculty member in the school in conjunction with the DGS of the IR Program.

LAW AND HUMAN RIGHTS

For those concentrating in international law, four term courses are required in the Law School. In addition, a student must select four additional courses outside the Law School related to issues of international law and human rights.

PUBLIC HEALTH

Students wishing to concentrate in public health should take between four and six courses in the Department of Epidemiology and Public Health. These should include basic courses in health services administration and epidemiology as well as specialized courses in international health and environmental health. Students in the International Relations program who wish to concentrate in public health should design an individualized program with a faculty member in that department in conjunction with the DGS of the IR Program.

ACADEMIC DISCIPLINES

For those who wish to concentrate in a single discipline like history, economics, or political science, an additional six courses in the chosen field beyond the core requirement are required. In economics and political science, at least one of these courses must be in quantitative methods, taken in the first term to set the stage for more advanced course work. In history, courses must include at least one research seminar, two in modern history, including diplomacy and international relations, and two in modern history of an area or country outside North America and Europe. In political science, courses must include one additional course beyond the core in international relations, in comparative politics or a region or country, and in political economy. In economics, the concentration must include at least one term course in the economics of a world region, in development economics, and in international economics.

OTHER

Other individually developed concentrations are possible provided they are well conceived, intellectually coherent, and relevant to the student's career direction. In all instances, approval must be obtained from the director of graduate studies.

Language Requirements

Three years of college-level language study or its equivalent in language mastery is required to graduate. This competence must be demonstrated through successful completion of course work or by passing a proficiency examination. For international students whose native language is not English, the language requirement may be fulfilled by demonstrated competence in English. Students pursuing joint-degree programs must fulfill all language requirements before beginning the program because of the compressed schedule for other course work. Students may study language as part of their Yale program; a maximum of two of the sixteen course credits for the two-year program may be in languages.

Special Requirements for the Joint-Degree Programs

Joint-degree candidates must fulfill all of the requirements of both programs in which they are enrolled. Joint-degree students must fulfill the requirements of both programs before receiving either degree. Joint-degree candidates are required to fulfill the core and concentration requirements of the International Relations program. An overlap of two courses is allowed between core and concentration, and a maximum of an additional two courses may be credited toward both degrees. Joint-degree students must take at least twelve graduate-level courses in Arts and Sciences departments or in professional schools other than the one granting the joint degree. Under no circumstances will students be allowed an IR concentration in the functional area in which they will be receiving a joint degree.

Applicants to the joint-degree programs must apply separately, by the appropriate deadline, to the Graduate School for the International Relations program and to the professional school involved. Decisions on admissions and fellowship support are made independently by each school. Students are encouraged to apply to both programs simultaneously. They may also apply during their first year at Yale to the second program for a joint degree. If accepted into the new program, they must receive approval for credit allocation upon registration from both degree programs.

Graduate Certificate of Concentration in Development Studies

The graduate certificate of concentration in Development Studies provides recognition that a graduate or professional student at Yale has completed interdisciplinary study and integrative research to address fundamental and applied economic, political, social, and cultural issues facing developing countries.

The Certificate in Development Studies may be pursued in conjunction with graduate degree programs in the Graduate School of Arts and Sciences and the professional schools to allow students to develop and demonstrate their competence in this interdisciplinary field. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on the successful completion of the candidate's Yale University degree program. The Development Studies faculty adviser may set a limit on the number of applicants accepted for this program in any given year.

The certificate courses and research should be planned, in consultation with the Development Studies faculty adviser, to clearly demonstrate fulfillment of the goals of the Development Studies Certificate. Certificate candidates should declare their intention to pursue the certificate early in their degree program, and must do so no later than their penultimate term of enrollment.

Candidates for the certificate will receive preference, after students enrolled in the Council's degree programs, for International Affairs Council travel and research funds that are awarded through annual competitions.

REQUIREMENTS

1. Six courses in the area of Development Studies:

Each year, the Development Studies faculty adviser will provide a list of courses that will count toward the six-course requirements. These courses will draw primarily on Graduate School offerings in economics, political science, history, anthropology, and sociology and courses at the professional schools, including Law, Management, Forestry & Environmental Studies, and Epidemiology and Public Health. Candidates may petition the faculty adviser to have other relevant courses count.

Up to two courses may be directed readings/independent study courses.

Up to two courses from the student's home department may count toward the certificate.

2. Language proficiency:

Students must demonstrate proficiency in one relevant language other than English. This would involve the equivalent of two years of study at Yale with a

passing grade. The language should be either a major world language relevant to development studies or the language of the region on which the candidate is focusing.

3. Economics proficiency:

Students must demonstrate proficiency in the basic concepts of economic analysis, either by demonstrating substantial prior course work in economics or by taking a graduate- or professional-level economics course at Yale. Such a course may count toward the certificate with the approval of the faculty adviser.

4. Research requirement:

In the context of one of the courses, candidates must write a substantial research paper. The paper must demonstrate the ability to use interdisciplinary resources in development studies, including, where appropriate, primary sources, field research, data analysis, and non-English sources. An M.A. thesis may, on the determination of the faculty adviser, be used to fulfill this requirement.

Candidates must seek approval from the faculty adviser for the research paper no later than the fourth week of the term in which they plan to complete it. The final paper will be read by two faculty members (one of whom may be the faculty member teaching the class), who must both approve it as meeting the research requirement.

If the paper is of sufficient quality, the faculty adviser may submit it for publication in the IAC Development Studies Working Paper Series.

Graduate Certificate of Concentration in Security Studies

The graduate certificate of concentration in Security Studies provides recognition that a graduate or professional student at Yale has completed interdisciplinary study and integrative research to address fundamental and applied economic, political, social, and cultural issues facing developing countries.

The Certificate in Security Studies may be pursued in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools to allow students to develop and demonstrate their competence in this interdisciplinary field. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on successful completion of the candidate's Yale University degree program. The Security Studies faculty adviser may set a limit on the number of applicants accepted for this program in any given year.

The certificate courses and research should be planned, in consultation with the Security Studies faculty adviser, to clearly demonstrate fulfillment of the goals of the Security Studies Certificate. Certificate candidates should declare their intention to pursue the certificate early in their degree program, and must do so no later than their penultimate term of enrollment.

Candidates for the certificate will receive preference, after students enrolled in the Council's degree programs, for International Affairs Council travel and research funds that are awarded through annual competitions.

REQUIREMENTS**1. Six courses in the area of International Security:**

Each year the Security Studies faculty adviser will provide a list of courses that will count toward this six-course requirement. These courses will draw primarily on Graduate School offerings in anthropology, economics, history, political science, and sociology and courses at the professional schools, including Forestry & Environmental Studies, Law, Management, and Epidemiology and Public Health. Candidates may petition the faculty adviser to have other relevant courses counted.

One of these six courses must have a core focus on International Security issues. The Security Studies faculty adviser will provide a list of courses each year that meet this requirement.

Up to two courses may be directed readings or independent study courses.

Up to two courses from the candidate's home department or program may count toward the certificate.

Up to three courses may focus on a particular region.

2. Language proficiency:

Candidates must demonstrate proficiency in one relevant language other than English. This would involve the equivalent of two years of study at Yale with a passing grade. The language should be either a major world language relevant to security studies or the language of the region on which the candidate is focusing.

3. Research requirement:

In the context of one of the courses, candidates must write a substantial research paper. The paper must demonstrate the ability to use interdisciplinary resources in security studies, including, where appropriate, primary sources, field research, data analysis, and non-English sources. An M.A. thesis may, on the determination of the faculty adviser, be used to meet this requirement.

Candidates must seek approval from the faculty adviser for the research paper no later than the fourth week of the term in which they plan to complete it. The final paper will be read by two faculty members (one of whom may be the faculty member teaching the class), who must both approve it as meeting the research requirement.

If the paper is of sufficient quality, the faculty adviser may submit it for publication in the IAC Security Studies Working Paper Series.

Program materials are available upon request to International Relations, Yale University, PO Box 208206, New Haven CT 06520-8206.

Courses

INRL 545b, The Dynamics of Russian Politics. William Odom.

T 1.30–3.20

Consideration of the question “Whither Russia?” with emphasis on comparative analytic concepts. Issues of political stability, constitutionalism, and institutions for political participation and governing examined in light of contemporary events and of the Soviet legacy. *Also PLSC 744b^u.*

INRL 548a^u, Intelligence and National Security. Loch Johnson.

T 1.30–3.20

Advanced examination of the United States’ intelligence agencies and activities, focusing on how the U.S. acquires information about world affairs, and how it attempts clandestinely to influence events abroad. Through a mixture of theory, empirical research, ethical discussions, and case studies, the course addresses such questions as: What are the reasons for the vast U.S. intelligence apparatus? What perceived threats does it target? How is funding distributed among the fifteen agencies that make up the so-called intelligence community? Why do intelligence failures, like 9/11, occur? To what extent is intelligence “politicized” and why? What is covert action and how does it differ from secret military operations? What ethical questions are raised by America’s use of intelligence operations? What reforms have emerged from the 9/11 and Iraqi WMD inquiries carried out from 2002 to 2005? How are America’s intelligence agencies held accountable, and how effective is the system of checks-and-balances in this secret world?

INRL 549b, The European Union’s Contemporary Challenges. Peter Oliver.

Each year, this course addresses a different set of issues facing the EU. Recent issues have included trade policy, regulation policy, building European monetary power, international trade policy and the WTO, and science, precaution, and policy making. The course is taught by the EU fellow visiting YCIAS. *Also E&RS 652b.*

INRL 550b, An American Empire? Kimberly Kagan.

T 1.30–3.20

This course explores how policy intellectuals have described American power in the international system since the end of the Cold War. In particular, it considers whether the United States should be called an empire and whether it can be compared to past empires. Throughout the course, we consider how historical paradigms can best inform the policy debate. Some readings address the idea of empire in American foreign policy before and during the Cold War. Most readings address the events and thinking of the post-Cold War era.

INRL 555a, Theories in International Relations. Nikolay Marinov.

M 3.30–5.20

This course provides an introduction to the major concepts and theories in the field of International Relations. By the end of the course, students should be familiar with some of the major debates in the field, and be comfortable using IR concepts and theories to understand and explain events in international politics. The course is a reading-intensive seminar, and the weekly meetings are structured around student-led presentations and discussions of the assigned readings for the week. The student presentations should provide a brief overview of the main arguments of the readings and raise questions for group discussion. All students should prepare to participate in the group discussion by preparing discussion notes, which are turned in at the end of each session of class. There are approximately 150–200 pages of required reading per week. *Also PLSC 685a.*

INRL 560a, Economic Analysis. Cheryl Doss.

MW 9–10.15

Introduces IR students to more advanced concepts in economics. Course emphasizes reading and evaluating the economic content of articles on a wide range of topics including consumer behavior, firm behavior, comparisons of welfare, labor markets, capital markets, and cost-benefit analysis. These articles represent research from both developed and developing economies. Prerequisite: Principles of Microeconomics. *Also ECON 544a.*

INRL 561b, International Economic Analysis. Cheryl Doss.

MW 9–10.15

A continuation of 560a. Extends the use of economic analysis to international economic issues including international trade, growth and development, and international finance. In addition, emphasis is placed on quantitative tools and analysis of data to address international economic issues and evaluate policies. The second half of the course focuses on readings of current issues and debates on international economic issues including relationships among trade liberalization, poverty and inequality, economic growth, and globalization. *Also ECON 708b.*

INRL 562b, Science, Arms, and the State. Peter Westwick.

HTBA

Examines the history of efforts to integrate scientific research, military technologies, and national security policy, with particular focus on chemical, nuclear, and biological weapons in the twentieth century. Topics include consequences of weapons development for the scientific community and civilian economy; effects on international relations; public attitudes toward weapons of mass destruction; and political movements to control such weapons.

INRL 563b, Themes in the History of American Foreign Policy. Andrew Preston.

Th 1.30–3.20

This seminar examines the historical roots and context of many of the salient themes in American foreign policy today. Topics include, among others, the influence of Wilsonianism, democracy promotion, race, trade and economics, national security, religion, realism, military power, and nationalism/exceptionalism. Some previous background in the history of American foreign relations is recommended, but not required.

INRL 564a, International Trade Negotiations: NAFTA and Beyond.**Maxwell Cameron.**

M 1.30–3.20

In this course theories of international cooperation and bargaining are applied to the North American Free Trade Agreement (NAFTA) and Free Trade Agreement of the Americas (FTAA) negotiations. We begin with an examination of theories of international cooperation and bargaining and integrate them in a two-level game framework. This framework is used to reconstruct and explain the NAFTA negotiation process including the decision to negotiate, the process of getting to the negotiation table, the major watersheds in the negotiation, the end game and side deal negotiations, and the aftermath. Special emphasis is given to the impact of domestic structures (democratic-parliamentary in Canada, democratic-presidential in the U.S., and semi-authoritarian-presidential in Mexico) on the NAFTA negotiation process and outcomes. The lessons learned are applied to current FTAA negotiations. The course is designed for students interested in both the theory and the practice of negotiation. Case studies, role playing, and simulations are used to learn concepts and principles from theories of cooperation and bargaining and to develop their negotiation skills. Students develop a strong substantive knowledge of trade policy. Teamwork and participation are important in this seminar.

INRL 700a, International Affairs: Core Issues and Approaches. Ted Bromund.

Th 1.30–3.20

Study of core concepts in the international system, including religion, sovereignty, war, finance, and human rights, through readings that present continuities, changes, and contrasting points of view about the system and its structure. Focus on the development of research, writing, and speaking skills. For first-year IR students.

INRL 730a^U, The United Nations and the Maintenance of International Security.

Bruce Russett, James Sutterlin.

W 1.30–3.20

Consideration of the role of the U.N. in preventive diplomacy, using force for peacekeeping, peace enforcement, and peace building, with consideration of the evolution of the U.N. and its role in a post-Cold War international system. For IR students and IS undergraduates only.

INRL 750b, Challenges in International Relations: Policy and Practice.

Ted Bromund.

F 1.30–3.20

The Yale-Stimson Seminar explores issues in three policy areas relevant to international-affairs professionals through case study analysis, simulation, readings, and discussions with visiting practitioners. Recent themes have included homeland security, demography and the environment, and development. Course emphasizes problem solving, negotiation, presentation, and organizational skills needed by professionals entering the field. Open to all graduate and professional students. Admission is by application only.

INRL 900a or b, Directed Reading.

By arrangement with faculty.

INTERNATIONAL AND DEVELOPMENT ECONOMICS

Economic Growth Center

27 Hillhouse, 432.3610

M.A.

Director

Michael Boozer

The Department of Economics offers a one-year program of study in International and Development Economics, leading to the Master of Arts degree. IDE students are often from developing countries, but in each cohort a small number of students come from the U.S. and Europe. Students in the program have worked in central banks, foreign ministries, planning agencies, and other public and private agencies concerned with international economics and development, although many enter the program directly from their undergraduate school. We do not exclude any candidate on the basis of their country of origin or experience.

Some students entering the program are required to complete the summer program in English and Mathematics for Economists offered by Yale University. This requirement may be waived for applicants demonstrating exceptional training in economic analysis and a good command of English. The GREs and the Test of English as a Foreign Language (TOEFL) examination are also required.

IDE students are often recommended by their employing agencies or institutions and financed by their employers during the study leave. Yale fellowship funds are not available for the IDE Program, and we require certification of the necessary funding prior to enrollment.

The course program requires the completion of eight term courses, five of which make up the core elements of the IDE program and these are required; the remaining three are electives. These required courses are designed to provide a rigorous understanding of the economic theory necessary for economic policy analysis.

An option of a second year of nondegree elective study is available to qualified students.

A joint program option for study with the School of Forestry & Environmental Studies is also available. Application to the School of Forestry must be made simultaneously with the application to the IDE program. Admission to this joint program is determined by the participating professional school and must be obtained prior to beginning the program. Joint-degree students earn the Master of Arts degree in IDE and the Master of Environmental Studies degree.

Program materials are available upon request to Louise Danishevsky, Senior Administrative Assistant, International and Development Economics Program, Yale University, PO Box 208269, New Haven CT 06520-8269; e-mail, ide@yale.edu.

INVESTIGATIVE MEDICINE

Department of Medicine

Edward S. Harkness Building (ESH), basement 18–20, 785.6842

Ph.D.

Director of Graduate Studies

Joseph Craft (invmed@info.med.yale.edu)

Deputy Director

Eugene Shapiro

Professors

Karen Anderson (*Pharmacology*), Henry Binder (*Internal Medicine*), Joseph Craft (*Internal Medicine*), Thomas Gill (*Internal Medicine*), Fred Gorelick (*Internal Medicine*), Thomas Kosten (*Psychiatry*), Harlan Krumholz (*Internal Medicine*), Eugene Shapiro (*Pediatrics*), Gerald Shulman (*Internal Medicine*), Mary Tinetti (*Internal Medicine*)

Affiliated Professors

Gary Cline (*Internal Medicine*), Sidney Bogardus (*Internal Medicine*), James Dziura (*Internal Medicine; Pediatrics*), David Fiellin (*Internal Medicine*), William Philbrick (*Internal Medicine*)

Fields of Study

The Investigative Medicine Program offers a special training pathway for highly select physicians in clinical departments who are interested in careers in clinical research. The program is designed to develop a broad knowledge base, analytical skills, creative thinking, and the hands-on experience demanded of clinical researchers devoted to disease-oriented and patient-oriented investigation. The program provides the student with individualized experience encompassing formal course work and practical experience, under the supervision and mentorship of a senior faculty member.

Students will enter the program with a broad range of experience and interests. Students can undertake thesis work in a variety of disciplines. These include:

1. Evaluating risk factors and interventions for disease using modern concepts in quantitative methods and clinical study design.
2. Investigating the biochemical, physiologic, and genetic bases of disease in the setting of a Clinical Research Center.
3. Exploring the molecular basis of a disease from the laboratory standpoint.

Special Admissions Requirements

The Investigative Medicine program is designed for students with an M.D. or D.O. degree who have completed two or more years of postgraduate clinical training.

Prospective students who are already in a residency or subspecialty clinical fellowship program at Yale may apply to the Investigative Medicine program anytime during the first two years of that training (approximate). Application to the program may be made

concurrently with application for residency or subspecialty training in a clinical department at the Yale School of Medicine. Special arrangements will be made for a deferred acceptance by the Graduate School.

The most important criteria for selection into the program are the commitment to rigorous training in clinical investigation and evidence of high academic achievement in undergraduate and medical school courses, and on scores from the USMLE.

Special Requirements for the Ph.D. Degree

The minimum overall course requirements for the doctorate program are nine (9) courses. Full-time course work will extend for twelve months, starting in July. The majority of the course requirements are to be completed by the end of the first year of study. Electives are often taken in the second year, with the expectation that they be completed by the end of the second year. To be eligible to take the comprehensive qualifying examination, students must achieve the grade of Honors in two courses (one course if a full-year course), have a minimum grade average of High Pass, and have completed a minimum of seven courses. When requirements are met (typically by December 31 of the second year), students submit their thesis proposal and undertake the comprehensive qualifying examination. In order to be admitted to candidacy, students must pass both the written and oral comprehensive qualifying examinations and submit a thesis prospectus which has been approved by their qualifying committee. The remaining degree requirements include completion of a dissertation project, the writing of the dissertation, and its oral defense. It is expected that most students will complete the program in three to five years. There is no foreign language requirement. The required curriculum for each program of study is as follows:

Course Requirements for Laboratory Based Patient-Oriented Research

1. IMED 620 Translational Research and Molecular Tools
2. IMED 625 Principles of Clinical Research
3. IMED 630 Ethical and Practical Issues in Clinical Investigation
4. IMED 635 Directed Reading in Investigative Medicine
5. IMED 645 Introduction to Biostatistics
6. IMED 651 Seminars in Clinical Investigation (spring)
7. CBIO 601 Molecular and Cellular Basis of Human Disease (spring and fall)
8. Elective
9. Elective

Course Requirements for Clinically Based Patient-Oriented Research

1. IMED 620 Translational Research and Molecular Tools
2. IMED 630 Practical and Ethical Issues in Clinical Investigation
3. IMED 635 Directed Reading in Investigative Medicine
4. IMED 650 Seminars in Clinical Investigation (fall)
5. IMED 660 Methods in Clinical Research (summer)
6. IMED 661 Methods in Clinical Research (fall)
7. IMED 662 Methods in Clinical Research (spring)
8. Elective
9. Elective

Courses

IMED 620a, Translational Research and Molecular Tools. Karen Anderson.

MTWThF 2–5

Structure-Based Drug Design: In this section, students learn the underlying principles in structure-based drug design. Lectures are supplemented with computer laboratory sessions devoted to practical learning of basic principles in protein structure determination, analysis, and relationship to molecular drug design. Clinically relevant examples of this approach are considered. **Genomics:** In this section, students are exposed to a variety of essential molecular approaches from theoretical background to experimental design and clinical applications. Subjects include bioinformatics resources and databases, sequence homology searching and alignment, evolutionary relationships, gene and protein prediction, sequence analysis tools, microarray platforms and informatics, PCR-related techniques and primer design, SNP analysis, and inhibitory RNA methods. Lectures are supplemented by computer laboratory sessions to reinforce ideas and to provide practical experience. Consent of instructor required. Two weeks, August 1–5 and August 15–August 19.

IMED 625a, Principles of Clinical Research. Eugene Shapiro.

MTWThF 2–4

The purpose of this intensive two-week course is to provide an overview of the objectives, research strategies, and methods of conducting patient-oriented research. Topics include competing objectives of clinical research, principles of observational studies, principles of clinical trials, principles of meta-analysis, interpretation of diagnostic tests, prognostic studies, causal inference, methods for qualitative research, and decision analysis. Sessions generally combine a lecture on the topic with discussion of articles that are distributed in advance of the sessions. Consent of instructor required. Two weeks, July 18–29.

IMED 630a, Ethical and Practical Issues in Clinical Investigation. Henry Binder.

T 3:30–5

This term-long course addresses topics that are central to the conduct of clinical investigation, including ethics of clinical investigation, scientific fraud, technology transfer, and interfacing with the pharmaceutical industry. Practical sessions include scientific presentations and teaching, NIH peer review process, journal peer review process, and career development models of academia. This course provides guidelines and a framework for the clinical investigator to obtain funding for, conduct, and present a clinical study. Consent of instructor required.

IMED 635a or b, Directed Reading in Investigative Medicine. Joseph Craft.

An independent study course for first-year students in the Investigative Medicine program. Topics are chosen by the student, and reading lists are provided by faculty for weekly meetings to discuss articles. Twelve sessions are required; dates/times by arrangement. Consent of instructor required.

IMED 645a, Introduction to Biostatistics. Eugene Shapiro.

MTWThF 8:30–11:30

This course provides an introduction to statistical concepts and techniques commonly encountered in medical research. Previous course work in statistics or experience with statistical packages is not a requirement. Topics to be discussed include study design, probability, comparing sample means and proportions, survival analysis, and sample size/power calculations. The computer lab incorporates lecture content into practical application by introducing the statistical software package SPSS to describe and analyze data. Two weeks, July 11–22.

IMED 650a, Seminars in Clinical Investigation, Part I. Eugene Shapiro.

W 2–4

In this term-long seminar course a range of topics are covered in the format of an interactive seminar. Topics including detailed evaluation of study designs (cohort studies, case-control

studies, and clinical trials), development and validation of indices, review of approaches to methodology and issues related to implementation of the methodology (assuring quality of the data, qualitative research methods, estimation of sample size and statistical power), and introduction to finding sources to fund grant proposals. The format for most of the seminars consists of a didactic presentation followed by intensive discussion of research articles and research protocols. Students lead the discussion in the critical analysis and evaluation of the articles. Attendance and active participation are required. Consent of instructor required.

IMED 651b, Seminars in Clinical Investigation, Part II. Eugene Shapiro.

w 2–4

In this term-long course, students gain intensive, practical experience in evaluating and preparing grants, including introduction to NIH study section format. The course gives new clinical investigators the essential tools to design and to initiate their own proposals for obtaining grants to do research and to develop their own careers. The course is limited to students who plan to submit grant proposals (usually for either a K-23 or a K-08 grant). Attendance and active participation are required. Consent of instructor required.

IMED 660a, Methods in Clinical Research, Part I. Eugene Shapiro.

IMED 661a, Methods in Clinical Research, Part II. Eugene Shapiro.

IMED 662b, Methods in Clinical Research, Part III. Eugene Shapiro.

This yearlong course, presented by the Robert Wood Johnson Clinical Scholars Program, presents in depth the methodologies used in patient-oriented research, including methods in biostatistics, clinical epidemiology, health services research, community-based research, and health policy. Consent of instructor required.

[IMED 670b, Current Methods in Clinical Investigation: Isotope Tracers of Metabolism and Disease.]

ITALIAN LANGUAGE AND LITERATURE

82–90 Wall Street, 432.0595

M.A., M.Phil., Ph.D.

Chair

Giuseppe Mazzotta

Director of Graduate Studies

Millicent Marcus (82–90 Wall, Rm 426, 432.0599, millicent.marcus@yale.edu)

Professors

Millicent Marcus, Giuseppe Mazzotta

Associate Professor

Olivia Holmes (*on leave*)

Assistant Professors

Francesca Cadel, Kristin Phillips-Court, Arielle Saiber (*Visiting*)

Senior Lector and Language Program Director

Risa Sodi

Visiting faculty from other universities are regularly invited to teach courses in the department.

Fields of Study

The Italian department brings together several disciplines for the study of the Italian language and its literature. Although the primary emphasis is on a knowledge of the subject throughout the major historical periods, the department welcomes applicants who seek to integrate their interests in Italian with wider methodological concerns and discourses, such as history, rhetoric and critical theories, comparison with other literatures, the figurative arts, religious and philosophical studies, medieval, Renaissance, and modern studies, and the contemporary state of Italian writing. Interdepartmental work is therefore encouraged and students are accordingly given considerable freedom in planning individual courses of study, once they have acquired a broad general knowledge of the field through course work and supplementary independent study.

Special Admissions Requirements

The department recognizes that good preparation in Italian literature is unusual at the college level and so suggests that applicants begin as soon as possible to acquire a broad general knowledge of the field through outside reading. At the end of the first and second years, students' progress is analyzed in an evaluative colloquium. Applicants who have had little or no experience in Italy are generally urged to do some work abroad during the course of their graduate program. For all students of Italian, a reading knowledge of Latin is essential. This may be acquired during the course of the first year, but applicants

are reminded that it is difficult to schedule beginning language courses in addition to a normal graduate program. Students are advised to acquire proficiency in the languages required for the doctoral program before matriculation.

Special Requirements for the Ph.D. Degree

Candidates must demonstrate a reading knowledge of a second Romance language, Latin, and a non-Romance language (German recommended). The Latin examination must be passed, usually before the beginning of the third term of study, and all language requirements must be fulfilled before the Ph.D. qualifying examination. Students are required to take two years of course work (as a rule sixteen courses), including two graduate-level term courses outside the Italian department. After consultation with the DGS, students who join the graduate program with an M.A. in hand may have up to four courses waived. The comprehensive qualifying examination must take place during the third year of residence. It is designed to demonstrate the student's mastery of the language and acquaintance with the literature. The examination, which is both written and oral, will be devised in consultation with members of the department. In the term following the qualifying examination, the student will discuss, in a session with the departmental faculty, a prospectus describing the subject and aims of the dissertation. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation requirements, including the prospectus. Admission to candidacy normally occurs by the end of the sixth term.

Teaching is considered to be an important component of the doctoral program in Italian. Students will be appointed as teaching fellows in the third and fourth years of study. Guidance in teaching is provided by the faculty of the department and specifically by the director of language instruction.

Combined Ph.D. Programs

ITALIAN AND FILM STUDIES

The Department of Italian also offers, in conjunction with the Program in Film Studies, a joint Ph.D. in Italian and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film Studies and to Italian. All documentation within the application should include this information.

ITALIAN AND RENAISSANCE STUDIES

The Department of Italian also offers, in conjunction with the Renaissance Studies Program, a combined Ph.D. in Italian and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

Only candidates for the Ph.D. degree will be admitted to the program, but the department will, upon request, offer the M.A. and the M.Phil. degrees to students who have completed the general Graduate School requirements for those degrees (see pages

442–44). Additionally, students in Italian are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

Program materials are available upon request to the Director of Graduate Studies, Italian Language and Literature, Yale University, PO Box 208311, New Haven CT 06520-8311.

Courses

ITAL 553a, The Medieval Canon, According to Borges. María Rosa Menocal.

T 1.30–3.20

This course tackles the question of how we conceive of the medieval canon and its relationship to the rest of literary history if we make Jorge Luis Borges our guide. Readings of Borges include selected works of both fiction and nonfiction. The course also functions as a meditation on the nature of literary history, and an introduction to a series of the varied medieval works from that literary universe assumed and constructed by Borges; e.g., everything from the Cordoban poetry he read in the histories of Asín Palacios to the *Conde Lucanor* (parts of which he “rewrote”), and much between and beyond, including the *Divine Comedy* and the *Thousand and One Nights*. Also CPLT 620a, SPAN 550a.

ITAL 590b, Literature into Cinema in Italy. Millicent Marcus.

W 3.30–5.20

This course undertakes a series of twelve case studies of films adapted from literary works, identifying the challenges that specific texts present to filmmakers in their attempts to transform verbal fictions into mass media spectacles. Also CPLT 916b, FILM 830b.

ITAL 633a, Topics in the *Divine Comedy*. Giuseppe Mazzotta.

T 3.30–5.20

The course chiefly explores Dante’s representation of vices and virtues in relation to politics and questions of knowledge (especially in the early lyrics, *Vita nuova*, *Inferno*, *Purgatorio*, and *Monarchia*). The discussion of the relevant texts and cantos is duly placed within a pertinent context of medieval encyclopedias.

ITAL 650a, The Space of Fantastic in Italian Literature. Arielle Saiber.

M 3.30–5.20

This course explores the terrain of the literary fantastic, that is, the role space plays in the unfolding of eerie, distorted, and uncertain phenomena in a literary text. The readings are organized around spaces small and large — bedrooms, free-standing houses, gardens, forests, cities, the seaside, deserts, the sky, outer space, and cyberspace. Primary texts (short stories, novels, and theater) include works by Boccaccio, Straparola, Leopardi, Bontempelli, Buzzati, Landolfi, Calvino, and others, as well as extensive critical theory.

ITAL 700b, The New Map of the World: Vico’s Poetic Philosophy.

Giuseppe Mazzotta.

T 3.30–5.20

Examination of Vico’s thought globally and in the historical context of the late Renaissance and the Baroque. Starting with Vico’s *Autobiography*, working to his University Inaugural Oration, *On the Study of Methods of Our Time*, the seminar delves into his juridical-political texts and submits the second *New Science* (1744) to a detailed analysis. Some attention is given to Vico’s poetic production and the *encomia* he wrote. The overarching idea of the seminar is the definition of Vico’s new discourse for the modern age. To this end, discussion deals prominently with issues such as Baroque encyclopedic representations, the heroic imagination, the senses of “discovery,” the redefinition of “science,” the reversal of neo-Aristotelian and neo-Platonic poetics, the crisis of the Renaissance, and the role of the myth. Also CPLT 706b.

ITAL 747b, Generación del '27. Noël Valis.

M 1.30–3.20

This course examines the theory and art of vanguard writing. Selected poetry of Guillén, Salinas, Lorca, Cernuda, Alberti, and others, along with Ortega y Gasset's influential *Deshumanización del arte*, are read. Also SPAN 747b.

ITAL 764a, El barroco de Indias. Rolena Adorno.

Th 1.30–3.20

We explore the Baroque in colonial Spanish America in its literary and artistic practices at the time and through the theories that have come to characterize it today. We consider how the Spanish American Baroque is related to its European counterparts and how it differs from them. Principal readings include Góngora, Quevedo, and Calderón de la Barca, as well as Carlos de Sigüenza y Góngora, Sor Juana Inés de la Cruz, Bernardo de Balbuena, Juan del Valle y Caviedes, and Juan de Espinosa Medrano. The visual dimensions of viceregal art and literature orient our work thematically, and writings by Picón-Salas, Lezama Lima, Paz, Sarduy, and González Echevarría, among others, offer theoretical and critical assessments by which to evaluate the content and place of the Baroque in Latin American literary and cultural tradition. Also SPAN 765a.

ITAL 780a, The Twentieth-Century Novel. Millicent Marcus.

W 2.30–4.20

No literary form is better suited to gauging the convulsive changes wrought by Italy's entrance into modernity than the novel. Infinitely permeable to the forces of historical circumstance, the novel counters these external forces with its own version of the evolving Italian subject in all its personal richness and complexity. We study the evolution of this literary genre throughout the course of the twentieth century and, in the process, adopt a variety of approaches, including, but not limited to, semiotics, psychoanalysis, narratology, gender, ideological criticism, and "la questione della lingua."

JUDAIC STUDIES

451 College, 432.0843

Chair

Ivan Marcus

Professors

Moshe Bar Asher (*Visiting, Near Eastern Languages & Civilizations*), Robert Brody (*Visiting, Religious Studies*), Steven Fraade (*Religious Studies*), Gad Freudenthal (*Visiting, History; History of Medicine & Science*), Mark Gelber (*Visiting, German Studies*), Benjamin Harshav (*Comparative Literature*), Christine Hayes (*Religious Studies*), Paula Hyman (*History; Religious Studies*), Ivan Marcus (*History; Religious Studies*), Renee Melammed (*Visiting, History*)

Lecturers

Mara Benjamin (*Religious Studies*), David Lambert (*Religious Studies*), Uri Melammed (*Visiting, Near Eastern Languages & Civilizations*)

Lectors

Siam Bhayro (*Near Eastern Languages & Civilizations*), Ayala Dvoretzky (*Near Eastern Languages & Civilizations*)

Judaic Studies is an interdisciplinary and interdepartmental field drawing upon the study of languages, history, literature, religion, and culture of the Jews. Jewish society, texts, ideologies, and institutions are studied in comparative perspective in the context of the history and culture of the nations among whom Jews have lived and created throughout the ages and across the continents.

Graduate-level programs are available through the following departments: *History* (Medieval and Modern Jewish History), *Religious Studies* (Ancient Judaism, Medieval and Modern Jewish History), *Near Eastern Languages and Civilizations* (Northwest Semitic, Hebrew Language and Literature), *Comparative Literature* (Hebrew and Comparative Literature). Applications are made to a specific department and programs of study are governed by the degree requirements of that department.

Other resources include the Judaica collection of Sterling Memorial Library and its Judaica Bibliographer, the Fortunoff Archive for Holocaust Testimonies, the biweekly faculty/graduate student Judaic Studies Seminar, several lecture series, postdoctoral fellowships, and graduate fellowships in Judaic Studies.

Program materials are available on request to the director of graduate studies of the department of intended specialization, or to the Chairperson, Judaic Studies Program, Yale University, PO Box 208287, New Haven CT 06520-8287.

Courses

JDST 761a^U, History of Jewish Culture to the Reformation. Ivan Marcus.

TTH 11.30–12.45

A broad introduction to the history of Jewish culture from its beginnings until the late Middle Ages, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Judaism, Christianity, and Islam. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. *Also HIST 535a^U, RLST 773a^U.*

JDST 781b^U, History of Jewish Culture, 1500 to the Present. Paula Hyman.

TTH 10.30–11.20

A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interactions of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. *Also HIST 566b^U, RLST 774b^U.*

BIBLICAL PERIOD

JDST 701a^U, Introduction to the Old Testament (Hebrew Bible). Robert Wilson.

MW 10.30–11.20

The Old Testament (Hebrew Bible) as an expression of the religious life and thought of ancient Israel, and a foundational document of Western civilization. A wide range of methodologies, including source criticism and the historical-critical school, tradition criticism, redaction criticism, and literary and canonical approaches to the study and interpretation of the Bible. Special emphasis on the Bible against the backdrop of its historical and cultural setting in the ancient Near East.

CLASSICAL PERIOD

JDST 721b^U, Introduction to Judaism in the Ancient World: From Temple to Talmud. Steven Fraade.

TTH 1–2.15

The emergence of classical Judaism in its historical setting. Jews and Hellenization; varieties of early Judaism; apocalyptic and postapocalyptic responses to suffering and catastrophe; worship and atonement without cult; interpretations of scriptures; religious imagination; law and life; the rabbi; faith in reason; Sabbath and festivals; history and its redemption. No prior background in Jewish history assumed.

JDST 728b^U, Midrash Seminar: Mekilta Neziqin. Steven Fraade.

TH 9.30–11.20

Close study of the earliest rabbinic commentary to the Book of Exodus. We focus on the commentary to the laws of Exodus 21–22, mainly civil and criminal. The course introduces students to the language and methods of rabbinic scriptural interpretation, with particular attention to the interplay of legal interpretation, semantics, rhetoric, and religious ideology. We also consider the relation of midrashic legal commentary to other, intersecting forms of early rabbinic legal discourse. Prerequisite: reading knowledge of Hebrew. *Also RLST 751b^U.*

JDST 730b^U, The Earliest Rabbinic Literature. Robert Brody.

MW 2.30–3.45

An introduction to the major genres of the earliest rabbinic literature produced in Palestine from the late first to the mid-third century C.E. Primary sources dealing with diverse topics in family law are analyzed in English translation. No language prerequisite. *Also RLST 765b^U.*

JDST 731a, Liturgy in Jewish Late Antiquity. Robert Brody.

M 10.30–12.30

An investigation of central topics in the liturgical history of the Geonic period (mid-sixth to mid-eleventh century C.E.). Special attention to the competition between Jewish centers in Palestine and Babylonia for cultural hegemony. Prerequisite: reading proficiency in Hebrew. *Also RLST 763a.*

JDST 756b, The Required Second Temple Judaism Seminar. David Lambert.

W 1.30–3.20

We consider the benefits of broadly tracing the origin and development of key Western religious concepts from the Hebrew Bible into ancient Judaism and early Christianity. Examination of multiple epochs can serve as a control in the analysis of the religious worldview of particular cultures and help overcome the interpretive difficulty of understanding the pre-history of concepts that have since become commonplace in formative religion. Class time is split between the instructor's presentation of his own research into the history of the concept of repentance and student presentations around topics pertinent to their individual research interests. *Also RLST 756b.*

MEDIEVAL AND RENAISSANCE PERIODS**JDST 763a^u, Medieval Jews, Christians, and Muslims Imagining Each Other.****Ivan Marcus.**

T 1.30–3.20

How members of Jewish, Christian, and Muslim communities thought of and interacted with members of the other two cultures during the Middle Ages. Topics include the cultural grids and expectations each imposed on the other; the rhetoric of otherness such as humans or devils, purity or impurity, and animal imagery; and models of religious community and power in dealing with the other when confronted with cultural differences.

JDST 764b^u, Jews in Muslim Lands from the Seventh to the Sixteenth Century.**Ivan Marcus.**

TTh 11.30–12.45

Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; the Jews in the Ottoman Empire. *Also RLST 777b^u.*

JDST 775a^u, Iberian Jews and Conversos. Renee Melammed.

MW 2.30–3.45

An examination of developments in Spanish history that led to the forced conversions of 1391, the establishment of the Inquisition, the expulsion of the Jews from Spain in 1492, and the forced conversion of Portuguese Jews in 1497. Consideration of the alternatives that faced exiles, and especially conversos, mainly in Western Europe seeking an identity outside Iberia.

JDST 776b^u, Women in Premodern Jewish Society. Renee Melammed.

M 1.30–3.20

Examination of the lives of premodern Jewish women through an analysis of primary sources. Focus on the lives of women in Islamic society as revealed in documents from the Cairo Geniza (950–1250). Comparison of Jewish women's lives in Ashkenaz, Spain, and the Middle East, with special attention to Inquisition archives.

JDST 777au, Jewish Science and Medicine in Medieval Islamic Context.**Gad Freudenthal.**

TTh 11.30–12.45

Examination of the historical and social processes involved in the controversial introduction into medieval Jewish cultures of science as a legitimate source of knowledge and authority beginning in the Islamic world and spreading throughout Europe. Attention to scientific ideas both appropriated and contributed by medieval Jewish scholars.

MODERN PERIOD**JDST 685a^u, Readings in Hebrew Poetry. Benjamin Harshav.**

W 1.30–3.20

Modernism in Hebrew poetry: close readings of the poetry of Yehuda Amichai. Prerequisite: a high level of reading Hebrew texts in poetry as criticism.

JDST 784b^u, Memory, Memoirs, and Modern Jewish History. Paula Hyman.

W 1.30–3.20

An exploration of the representation of Jewish historical experience from the seventeenth to the twentieth century through a selection of memoirs. Focus on the construction of identity, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. *Also HIST 951b^u, RLST 762b^u.*

JDST 787a^u, Women and Judaism. Paula Hyman.

M 1.30–3.20

An exploration of the roles and representation of Jewish women in the modern period. Special attention to the role of gender in Judaism; the social, cultural, and political activity of women; and the development and impact of feminism. *Also HIST 950a^u, RLST 795a^u.*

JDST 788a^u, Holocaust in Historical Perspective. Paula Hyman.

MW 10.30–11.20, 1 HTBA

A survey of the major issues raised by the Holocaust, including the roots of Nazism; different theoretic perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. *Also HIST 979a, RLST 768a^u.*

JDST 795b^u, Cultural Zionism in German Jewish Literature. Mark Gelber.

MW 2.30–3.45

Exploration of the complex relationship between modern secular Jewish literature written in German within the framework of cultural Zionism and the Germanic-Austrian cultural milieu of Vienna and Berlin from 1880 to the Holocaust. Topics include the construction of a modern Jewish national identity and culture in Central Europe; canon formation; race; gender; and unlikely literary, aesthetic, and cultural partnerships.

ADVANCED HEBREW AND JUDAIC LANGUAGES**JDST 680a^u, Mishnaic Hebrew Grammar. Moshe Bar-Asher.**

TTh 2.30–3.45

Introduction to the orthography, phonology, and morphology of Mishnaic Hebrew, the Hebrew employed in rabbinic texts of the first two centuries C.E. Prerequisite: two years of biblical or modern Hebrew. *Also HEBR 513a^u.*

JDST 690^u, Introduction to Judeo-Arabic. Uri Melammed.

TTh 9–10.15

Introduction to the grammar and lexicography of classical Judeo-Arabic in its different dialects from the tenth century to the sixteenth. Examination of texts from various fields of Jewish studies. Prerequisite: knowledge of classical Arabic or fluency in modern Judeo-Arabic. *Also ARBC 514^u.*

COUNCIL ON LATIN AMERICAN AND IBERIAN STUDIES

Yale Center for International and Area Studies

Luce Hall, 34 Hillhouse, 432-3422

www.yale.edu/las

Graduate Certificate of Concentration in Latin American Studies

Chair

Enrique Mayer (*Anthropology*)

Professors

Rolena Adorno (*Spanish & Portuguese*), Mark Ashton (*Forestry & Environmental Studies*), Michele Barry (*Medicine*), Frank Bia (*Medicine*), Arturo Bris (*School of Management*), Richard Burger (*Anthropology*), Hazel Carby (*African American Studies; American Studies*), Carlos Eire (*History*), Eduardo Engel (*Economics*), Owen Fiss (*Law*), Paul Freedman (*History*), Roberto González Echevarría (*Spanish & Portuguese*), K. David Jackson (*Spanish & Portuguese*), Gilbert Joseph (*History*), Ilona Kickbusch (*Epidemiology & Public Health*), Enrique Mayer (*Anthropology*), Robert Mendelsohn (*Forestry & Environmental Studies*), Mary Miller (*History of Art*), Florencia Montagnini (*Forestry & Environmental Studies*), Stephen Pitti (*History*), Michael Reisman (*Law*), T. Paul Schultz (*Economics*), Stuart Schwartz (*History*), James Scott (*Political Science*), Susan Stokes (*Political Science*), Robert Thompson (*History of Art*), Noël Valis (*Spanish & Portuguese*)

Associate Professors

Richard Bribiescas (*Anthropology*), José Cheibub (*Political Science*), Mary Habeck (*History*), Jaime Lara (*Divinity*), Patricia Pessar (*Adjunct, American Studies*), Linda-Anne Rebhun (*Anthropology*), Lidia Santos (*Spanish & Portuguese*)

Assistant Professors

Elizabeth Amann (*Spanish & Portuguese*), Jennifer Bair (*Sociology*), Jennifer Baszile (*History*), Marcello Canuto (*Anthropology*), Seth Fein (*History*), Lillian Guerra (*History*), Kellie Jones (*History of Art*), Jill Lane (*Theater & American Studies*), Óscar Martín (*Spanish & Portuguese*), Fernando Rosenberg (*Spanish & Portuguese*), Michael Veal (*Music*), Elisabeth Wood (*Political Science*)

Lecturer

Nancy Ruther (*Political Science*)

Professors Emeritus

Emilia Viotti da Costa (*History*), Josefina Ludmer (*Spanish & Portuguese*), Juan Linz (*Political Science, Sociology*), Gustav Ranis (*Economics*).

César Rodríguez, *Curator, Latin American Collection, Sterling Memorial Library*

Although there is no advanced degree in Latin American and Iberian Studies at Yale, graduate and professional students may draw upon resources of many departments in order to make Latin America and/or Iberia their field of concentration while working

toward their respective degrees in conventional disciplines. In addition, a graduate program in International Relations offers an M.A. degree centered on political science and economics with possibilities for a Latin American emphasis, and the Department of History and the Council on Archaeological Studies offer M.A. degree programs that allow a Latin American concentration.

Students may also pursue the Graduate Certificate of Concentration in Latin American Studies in conjunction with graduate-degree programs in the Graduate School of Arts and Sciences and the professional schools. Admission is contingent upon the candidate's acceptance into a Yale graduate-degree program. To complete the certificate, candidates must demonstrate expertise in the area through their major graduate or professional field, as well as show command of the diverse interdisciplinary, geographic, and cultural-linguistic approaches associated with expertise in the area of concentration. Award of the certificate, beyond fulfilling the relevant requirements, is contingent upon the successful completion of the candidate's Yale University degree program. For general guidelines, see the YCIAS section of this bulletin (under Research Institutes) or inquire directly at the Council on Latin American and Iberian Studies.

Specific Requirements for the Graduate Certificate of Concentration

1. Language proficiency: Spanish and Portuguese. The equivalent of two years of study of one language and one year of the other.
2. Course work: six graduate courses in at least two different disciplines. No more than four courses may count in any one discipline.
3. Geographical and disciplinary coverage: at least two countries and two languages must be included in the course work or thesis.
4. Research: a major graduate course research paper, dissertation prospectus, dissertation or thesis that demonstrates ability to use field resources, ideally in one or more languages of the region.

In all cases, the Graduate Certificate Advisor of the Council on Latin American and Iberian Studies can assist the graduate student in designing a balanced and coordinated curriculum.

The council supplements the graduate curriculum with programs including a lecture series, special seminars, and conferences that bring visiting speakers to campus. The council also serves as a communications and information center for a vast variety of enriching events in Latin American studies sponsored by other departments, schools, and independent groups at Yale, and as the link between Yale and Latin American centers at other universities, and between Yale and educational programs in Latin America and Iberia.

The Latin American Collection of the University library has approximately 480,000 printed volumes, plus newspapers and microfilms, CD-ROMs, films, sound recordings, maps, and musical scores. The library's Latin American Manuscript Collection is one of the finest in the United States for unpublished documents for the study of Latin American history. Having the oldest among the major Latin American collections in the United States, Yale offers research opportunities unavailable elsewhere.

The Yale library's Iberian collections comprise several hundred thousand volumes as well as newspapers, microfilms, electronic publications, films, maps, and musical scores. The collections are particularly strong in literature and history. Works collected include all languages and literatures of the peninsula, including Catalan, Gallegan, Basque, and Bable. The Yale libraries also have substantial collections of publications and research materials from Spain and Portugal, relating to most disciplines in the humanities and social sciences.

Program materials are available upon request to the director of graduate studies of the department of intended specialization. Inquiries about the Graduate Certificate of Concentration in Latin American Studies should be addressed to the Council on Latin American and Iberian Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; e-mail, latin.america@yale.edu.

LINGUISTICS

370 Temple, Rm 204, 432.2450

M.A., M.Phil., Ph.D.

Chair

Louis Goldstein [F]

Stephen Anderson (*Acting* [Sp])

Directors of Graduate Studies

Stanley Insler (*Acting* [F])(323 HGS, 432.2455, stanley.insler@yale.edu)

Laurence Horn [Sp] (370 Temple St., Rm 208, 432.2457, laurence.horn@yale.edu)

Professors

Stephen Anderson, Paul Bloom, Carol Fowler (*Adjunct*), Roberta Frank, Louis Goldstein (*on leave* [Sp]), Laurence Horn (*on leave* [F]), Stanley Insler, Frank Keil, Hugh Stimson

Associate Professors

Ioana Chitoran (*Visiting*), Dianne Jonas

Assistant Professors

Maria Babyonyshev, Darya Kavitskaya (*on leave*), Maria Piñango, Charles Yang

Director, African Language Program

Ann Biersteker

Director, Center for Language Study

Nina Garrett

Supporting Faculty in Other Departments

J. Joseph Errington (*Anthropology*), William Hallo (*Near Eastern Languages & Civilizations*)

Fields of Study

Fields include linguistic theory (phonology, morphology, syntax, semantics, pragmatics), experimental phonetics, brain and language, language and cognition, historical linguistics, and African linguistics.

Special Requirements for the Ph.D. Degree

Language Requirements: Students must demonstrate knowledge of two research languages, either by passing a translation examination in the language, or by presenting a piece of research which relies in significant part on sources in the foreign language. A one-term language description course, a field methods course, or a course in the structure of a non-Indo-European language is also required. (See www.yale.edu/linguist/phd_requirements.html for additional details.)

Course Requirements: Sixteen term courses at the graduate level. Required courses in syntax, phonology, phonetics, morphology, semantics, and historical linguistics will be taken during the first two years. Remaining course work during the first two years in residence will be selected so as to prepare the student in some substantial subfield of linguistics. After the first two years, students are required to enroll in at least one seminar course each term until they advance to candidacy.

Program Requirements: At the end of the second year, each student will submit a portfolio of work demonstrating the ability to conduct linguistic research, including satisfactory performance on an examination in some subfield of linguistics, and three samples of work, one each in the areas of syntax, phonology, and historical linguistics. By the end of the third year, the student should have presented, to the department or at a conference, two substantial research papers of publishable quality in different areas of linguistics. By the end of the seventh semester, students should have defended a dissertation prospectus.

Dissertation Requirements: Students are expected to complete their dissertations by the end of the sixth year. An open dissertation defense is required after submission.

Teaching Fellow and Research Assistantship Requirements: Teaching experience is regarded as an integral part of the graduate training program in Linguistics. All students are required to serve as Teaching Fellows for a minimum of two terms, usually in the third or fourth years of study. Two additional terms of assistantship are also required, either in the form of additional participation in the Teaching Fellow Program, through participation in externally supported, supervised research (e.g., NSF Fellowship), or by serving as an assistant on a research project. Research assistantships are provided by the Linguistics faculty (e.g., from research grants) and by various Yale and Yale-affiliated units. Before accepting a research assistantship in fulfillment of the academic requirement, students must receive approval from the director of graduate studies. To be approved, an assistantship must meet the following criteria: (1) It must be under the supervision of a departmental faculty member or faculty at an affiliated unit, such as the Haskins Laboratories or the Yale School of Medicine. (2) It must provide research experiences that complement the student's academic plan of study. (3) It must provide at least 10 hours of experience per week. If a research assistantship is accepted in fulfillment of the department's academic requirement and if the assistantship provides a stipend less than the standard departmental stipend, a University Fellowship will be provided to bring the combined stipends up to the standard departmental stipend.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the Ph.D.). Students in the doctoral program who successfully complete the examinations and work samples required by the end of the second year of graduate study (see above) may petition for the M.A. degree.

Program materials are available upon request to the Department of Linguistics, Yale University, PO Box 208366, New Haven CT 06520-8366.

*Courses***LING 510b^u, Introduction to Linguistics. Ioana Chitoran.**

MWF 10.30–11.20

The goals and methods of linguistics. Basic concepts in phonology, morphology, syntax, and semantics. Techniques of linguistic analysis and construction of linguistic models. Trends in modern linguistics. The relations of linguistics to psychology, logic, and other disciplines.

LING 512b^u, Historical Linguistics. Dianne Jonas.

TTh 11.30–12.45

Types of change that a language undergoes in the course of time: sound change, analogy, syntactic and semantic change, borrowing. Techniques for recovering earlier linguistic stages: philology, internal reconstruction, the comparative method. Language change and linguistic theory. The role of language contact in language change.

[LING 513a^u, Introduction to Indo-European Linguistics.]

[LING 515^u, Elementary Sanskrit I.]

[LING 516b^u, Hittite.]

LING 517a^u, Language and Mind. Maria Piñango.

TTh 1–2.15

Knowledge of language as a component of the mind: mental grammars, the nature and subdivisions of linguistic knowledge in connection to the brain. The logical problem of language acquisition. The “universal grammar hypothesis,” according to which all humans have an innate ability to acquire language. The connection between language acquisition and general cognitive abilities. Representation of language in the brain. Use of linguistic knowledge in speaking: processing. Comparison between human spoken natural language and other systems (signed languages; nonhuman communication).

LING 520a^u, General Phonetics. Louis Goldstein.

MW 2.30–3.45

Investigation of possible ways of describing the speech sounds of human languages. Tools to be developed: acoustics and physiology of speech; computer synthesis of speech; practical exercises in producing and transcribing sounds.

[LING 530b^u, Evolution of Language.]

LING 532a^u, Introduction to Phonological Analysis. Ioana Chitoran.

MW 1–2.15

The structure of sound systems in particular languages. Phonemic and morphophonemic analysis, distinctive-feature theory, formulation of rules, and problems of rule interpretation. Emphasis on problem solving.

LING 535b^u, Phonological Theory II. Stephen Anderson.

TTh 1–2.15

Topics in the architecture of a theory of sound structure. Levels of representation; classical phonological rules and their interaction. Ordering paradoxes; cyclicity and Lexical Phonology. Motivations for replacing a system of rules with a system of constraints. Optimality theory: constraint types and their interactions. Correspondence theory. Opacity and stratal OT. Prerequisite: LING 532a or permission of instructor.

[LING 541b^u, Language and Computation.]

[LING 546b^u, Language, Sex, and Gender.]

LING 553a^u, Syntax I. Dianne Jonas.

MW 11.30–12.45

An introduction to the syntax (sentence structure) of natural language. Introduction to generative syntactic theory and key theoretical concepts. Syntactic description and argumentation. Topics include phrase structure, transformations, and the role of the lexicon.

LING 563b^u, Language Acquisition. Maria Babyonyshev.

MW 2.30–3.45

Language learnability, acquisition of the lexicon. Development of syntactic knowledge. Parameter-setting model of language acquisition and maturation. Experimental methods in developmental psycholinguistics.

LING 580b^u, Morphology. Maria Piñango.

MW 1–2.15

The theory of word structure within a formal grammar. Relation to other areas of grammar (syntax, phonology); basic units of word structure; types of morphology (inflection, derivation, compounding). Prerequisites: LING 532a and LING 553a, or permission of instructor.

[LING 582a^u, Introduction to Old Norse.]**LING 592b, Historical Syntax. Dianne Jonas.**

T 7–8.50 P.M.

An introduction to the study of historical syntax. Focus on syntactic change in English by comparing aspects of the syntax of Old English, Middle English, and Early Modern English. Emphasis on the study of word order change, changes in verb syntax, and the loss of inflectional morphology. A review of relevant topics in the syntax of Old Icelandic and Modern Icelandic is provided for comparison. Prerequisite: LING 153a.

LING 593a^u, Historical Morphology. Stephen Anderson.

M 1.30–3.20

An introduction to the study of historical change in natural language word formation systems (inflection, derivation, and compounding). Theoretical principles governing morphological change, as well as descriptive studies of particular cases. Examples are taken from a variety of Indo-European and non-Indo-European languages. Prerequisites: LING 112 and LING 180 or permission of instructor.

LING 602b^u, Comparative Old Germanic. Stanley Insler.

Th 3.30–5.20

An examination and comparison of the oldest continental Germanic languages: Gothic, Old Saxon, and Old High German. Discussion of the grammatical differences and sample readings from Wulfila's Bible translation, Heiland, and Hildebrandlied. Prerequisite: course in Old English or Old Norse or modern German, or permission of instructor.

[LING 603b^u, Comparative Scandinavian Syntax.]**[LING 621b^u, The Relation of Speech to Language.]****LING 622b^u, Topics in Phonetics: The Phonetics-Phonology Interface.**

Ioana Chitoran.

T 9.30–11.20

Recent developments in phonological theory have brought to the forefront the issue of the relationship between phonology and phonetics, and of the nature of phonological versus phonetic representations. This course surveys the various lines of investigation into this issue: from more traditional approaches of using evidence from experimental phonetics to shed light

on phonological phenomena, to proposals for unified phonetics-phonology models. We discuss the consequences of the different lines of research for the issue of phonetic determinism in phonology. Prerequisite: LING 132a or permission of instructor.

[LING 624a^u, Formal Foundations of Linguistic Theories.]

LING 625, Second-Year Sanskrit. Stanley Insler.

W 1.30–3.20

Introduction to the hymns and language of the *Rigveda*. Concentration on a study of the language of this text as an ancient but developing system whose growth reaches its high point in the later Vedic texts. Extensive discussion of the techniques of composition of the individual hymns through internal comparison.

LING 631b^u, Neurolinguistics. Maria Piñango.

F 1.30–3.20

The role of linguistic theory in understanding language-brain relations. The role of neuro-linguistic evidence (aphasia, neuroimaging) in understanding language knowledge.

INDC 642a, Old Iranian. Stanley Insler.

T 1.30–3.20

Grammatical and historical survey of Avestan and Old Persian, with philological analyses of texts (description).

[LING 642a^u, Topics in Phonology: Phonetic and Phonological Components of Syllable Weight.]

LING 642b^u, Topics in Phonology: Scandinavian Phonology. Stephen Anderson.

M 1.30–3.20

The phonology of the North Germanic languages of Scandinavia: Old Norse and its dialects, modern Icelandic, Faroese, Norwegian, Danish, and Swedish. Comparative and historical considerations in the development and present structure of the languages. Brief summary of the phonology of Finnish, and of Finland Swedish. Prerequisites: LING 132a and LING 135b (may be taken concurrently).

LING 643a^u, Topics in Phonology: Phonology and Phonetics of Caucasian Languages. Ioana Chitoran.

Th 3.30–5.20

A survey of the sound systems and main phonological and phonotactic structures of the non-Indo-European languages of the Caucasus, from a diachronic and synchronic perspective. The course focuses primarily on Georgian, Mingrelian, Laz (South Caucasian branch), and Kabardian (NW Caucasian). Some of the lesser-studied languages of the area are also covered. Prerequisite: LING 132a or permission of instructor.

[LING 647b^u, Structure of Swahili.]

LING 648b^u, Structure of Tamil. Elayaperumal Annamalai.

MW 2.30–3.45

The course on the structure of Tamil is divided into selected grammatical topics such as constituent structure, argument dropping, nominal predicates, non-nominative subjects, relative clauses, non-nominative predicates, finiteness, complex predicates, and co-reference. The analytical problems these raise for questions of typology and theory are discussed. Prerequisite: LING 153a or permission of instructor.

LING 654b^u, Syntax II. Maria Babyonyshev.

MW 11–12.45

Recent developments in syntactic theory: government and binding, principles and parameters, and minimalist frameworks. In-depth examination of the basic modules of grammar

(lexicon, X-bar theory, Theta-theory, case theory, movement theory). Comparison and critical evaluation of specific syntactic analyses.

LING 660a^U, Topics in Syntax: The Syntax-Semantics Interface. Maria Piñango.

F 1.30–3.20

Exploration of the psychological reality of specific proposals regarding how syntactic structure and semantic structure come together (e.g., how meaning is derived from sentence organization). These proposals are examined through an experimental psycholinguistic (real-time parsing) and neurolinguistic (lesion studies and neuroimaging) perspective. Specific phenomena to be evaluated include anaphora resolution, control, and argument and event structure. Prerequisites: LING 532a and LING 553a, or permission of instructor.

LING 661a^U, Topics in Syntax: Minimalism. Dianne Jonas.

T 7–8.50

Introduction to minimalist syntax and comparison with earlier theories. Topics include grammatical operations, clause structure, and close study of recent minimalist analyses. Prerequisites: two courses in syntax or permission of instructor.

LING 662a, Topics in Syntax: Specific Language Impairment. Maria Babyonyshev.

An exploration of the nature of Specific Language Impairment (SLI), a developmental linguistic disorder with a genetic basis, from a linguistic perspective. Topics include precise characterization of the impairment, distinct subtypes of SLI, cross-linguistic variation in SLI, changes in the symptoms of SLI over time, and recent theoretical models of the impairment. Prerequisite: one course in syntax or permission of instructor.

LING 663b^U, Semantics. Laurence Horn.

TTh 2.30–3.45

Truth-conditional and lexical semantics. Survey of propositional, predicate, and modal logic. Compositional theories of sense and reference. Opacity, intentionality, and belief contexts; entailment and presupposition. The relations between semantics and pragmatics, and between semantics and syntax. Special topic: negative polarity.

[LING 690b^U, Negation and Polarity.]

[LING 720b^U, Basics of Digital Signal Processing and Speech Acoustics.]

LING 760b, Seminar in Information Structure. Laurence Horn.

W 1.30–3.20

Approaches to the description of information packaging at sentence and discourse levels. The articulation of focus, topic/comment, theme/rheme, and given/new information. (In)definiteness at the syntax/semantics/discourse interface and its explication in terms of assumed familiarity, givenness, and centering theory. Functional motivation for grammatical structures, rules, and constraints. The compatibility of formal and functional approaches to linguistic structure. Permission of instructor required.

[LING 777b, Current Research in Phonetics.]

LING 790a, Research Methods in Linguistics. Maria Babyonyshev.

W 3.30–5.20

This course provides an introduction to research methods in linguistics. Observational and experimental approaches to research in the field. Topics include collection and organization of linguistic data, basic field methods, use of language corpora and databases. Introduction to research in language acquisition and language change. This is a required course for first-year graduate students.

LING 830a or b, Directed Research in Linguistics.

By arrangement with faculty.

LING 831a or b, Directed Research in Phonetics.

By arrangement with faculty.

LING 840a or b, Directed Research in Phonology.

By arrangement with faculty.

LING 850a or b, Directed Research in Grammar.

By arrangement with faculty.

LING 860a or b, Directed Research in Semantics.

By arrangement with faculty.

The following courses are also of particular value to students in Linguistics:

ANTH 513a, Language, Culture, and Ideology. J. Joseph Errington.

ANTH 533a, Bilingualism in Social Context. J. Joseph Errington.

ANTH 632b, Politics of Language. J. Joseph Errington.

ENGL 500a, Old English. Fred Robinson.

ENGL 500b, *Beowulf*. Roberta Frank.

PHIL 567^ua, Mathematical Logic. Sun-Joo Shin.

PHIL 632a^u, Persistence and Possibility. Michael Della Rocca.

PHIL 633a^u, Theories of Truth. James Woodbridge.

PHIL 702b, Epistemology. Troy Cross, Keith DeRose.

MANAGEMENT

135 Prospect, 432.3955

M.A., M.Phil., Ph.D.

Director of Graduate Studies

Subrata Sen (55 Hillhouse, Rm 306, 432.6028, subrata.sen@yale.edu)

Professors

Rick Antle, Nicholas Barberis, Paul Bracken, Garry Brewer, Zhiwu Chen, Judith Chevalier, Ravi Dhar, Jonathan Feinstein, William Goetzmann, Jonathan Ingersoll, Edward Kaplan, Owen Lamont, Lode Li, Paul MacAvoy, Theodore Marmor, Barry Nalebuff, Sharon Oster, Benjamin Polak, Douglas Rae, K. Geert Rouwenhorst, Fiona Scott-Morton, Martin Shubik, Matthew Spiegel, Shyam Sunder, Arthur Swersey, Jacob Thomas, Victor Vroom, Dick Wittink

Associate Professors

Arturo Bris, Jonathan Koppell, Nathan Novemsky, Peter Schott, Sandra Spataro, K. Sudhir

Participating Faculty from the School of Management

Keith Chen, James Choi, Lauren Cohen, Martijn Cremers, Erica Dawson, Stanley Garstka, Alessandro Gavazza, Roger Ibbotson, Nathaniel Keohane, Erin Mansur, B. Cade Massey, Dina Mayzlin, Brian Mittendorf, Ganapathi Narayanamoorthy, Rodney Parker, Antti Petajisto, Jiwoong Shin, Heather Tookes, Hongjun Yan, X. Frank Zhang

Fields of Study

Current fields include Accounting, Financial Economics, and Marketing. Other applied management fields may be added in subsequent years.

Special Admissions Requirements

The GRE General Test or the GMAT Test is required by the Graduate School. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

Admission to candidacy will be based on the requirements of the Graduate School (see pages 439–40), among which are the submission of a prospectus, duly approved by the faculty. Students must maintain a satisfactory grade record in the first year to remain in the program. Students shall, in addition, fulfill the requirements stated below. The process of admission to candidacy will include a faculty review of the student's entire academic record once all requirements have been successfully completed, and must be concluded by the end of the third year.

Core requirements: Two core courses are required of each student, General Economic Theory: Microeconomics, and Policy Modeling. During the first two years in the program, each student is required to complete a two-course sequence in empirical methods and a two-course sequence in one of the social sciences. Both of these sequences are usually taken during the first year. In addition, each student must prepare an original paper during his or her first summer and submit it to the faculty at the beginning of the third term in residence. Further, a second-year research paper must be submitted to the faculty by November 1 of the fifth term in residence.

In-depth requirement: The in-depth requirement consists of five courses selected by the student with the consent of the area faculty and the DGS. This in-depth study is designed to focus on a particular research paradigm and to prepare the student for the dissertation. In addition, a qualifying examination prepared by the area faculty must be passed. Currently offered in-depth areas are Accounting, Financial Economics, and Marketing.

Breadth requirement: The breadth requirement consists of two courses that are outside of the student's depth area. At least one of these courses must be from an *applied* area of management different from the student's own depth area. Breadth courses are selected by the student with the consent of the area faculty and the DGS.

Course requirement: Each student must complete a total of sixteen courses, achieving a grade of Honors in at least two courses, and a High Pass average in the other fourteen courses.

Teaching: Teaching is considered to be an important part of the doctoral program in Management. The program expects students to serve as teaching fellows, beginning in the spring term of the first year and continuing through the fourth year of study.

Master's Degrees

M.Phil. A student who is admitted to candidacy will be eligible to receive the M.Phil. upon the recommendation of the program's faculty and the approval of the Graduate School.
M.A. (en route to the Ph.D.). A student who completes the sixteen required courses with a High Pass average and the first-year paper will be eligible for the M.A. degree upon the recommendation of the program's faculty and the approval of the Graduate School.

Program materials are available upon request to the Director of Graduate Studies, Management, Yale University, PO Box 208200, New Haven CT 06520-8200. For information on the M.B.A. degree, please contact the admissions office at the School of Management.

Courses

MGMT 701a and 704b, Seminar in Accounting Research II and IV. Brian Mittendorf, Shyam Sunder.

F 1-4

This course examines research into accounting institutions. Topics are generally drawn from areas of income measurement, managerial evaluation, industry structure and regulation in the accounting industry, informational efficiency of public markets, and asset valuation models under incomplete markets.

MGMT 710a, Mathematical Models for Management. Susana Mondschein.

MW 10–11.20

Students learn how to formulate and solve optimization problems. Topics covered include linear and integer programming, non-linear optimization, dynamic programming, and queueing theory. Many real problems from various areas in manufacturing and service operations are covered throughout the course.

MGMT 740a, Financial Economics I. Zhiwu Chen.

T 2.30–5.30

Current issues in theoretical financial economics addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area. *Also ECON 670a.*

MGMT 741b, Financial Economics II. Jonathan Ingersoll.

Current issues in theoretical financial economics addressed through the study of current papers. Focuses on the development of the problem-solving skills essential for research in this area. *Also ECON 671b.*

MGMT 742a, Corporate Finance and Market Microstructure. Matthew Spiegel.

MW 2.30–4

This course covers recent journal articles in the area of corporate finance and market microstructure. Topics from corporate finance include optimal debt levels, bankruptcy, security design, initial public offers, and mergers and acquisitions. The market microstructure half of the course covers inventory models, trading with asymmetric information in the presence of strategic and competitive traders, the social welfare impact of informed trading, bid-ask spreads, information disclosure, and the optimal design of a stock exchange.

MGMT 751b, Seminar in Marketing II. Dina Mayzlin.

T 4.10–7.10

Current issues in marketing related to product planning, pricing, advertising, promotion, sales force management, channels of distribution, and marketing strategy are addressed through the study of state-of-the-art papers.

MGMT 752a and b, Marketing Workshop. Nathan Novemsky.

F 11.30–1

MGMT 754a, Behavioral Decision Making II. Ravi Dhar, Nathan Novemsky.

T 4.10–7.10

This seminar examines research on the psychology of decision making focusing on judgment. Although the normative issue of how decisions should be made is relevant, the descriptive issue of how decisions are made is the main focus of the course. Topics of discussion include judgment heuristics and biases, confidence and calibration, issues of well-being including predictions and experiences, regret and counterfactuals, and other topics. The goal of the seminar is threefold: to foster a critical appreciation of existing knowledge in behavioral decision theory, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that knowledge. Students generally enroll from a variety of disciplines, including cognitive and social psychology, behavioral economics, finance, marketing, political science, medicine and public health. *Also PSYC 554a.*

MGMT 780a and b, Ph.D. Student Research Workshop. Subrata Sen.

M 4.10–5.10

MGMT 781a and b, Accounting/Finance Workshop. Martijn Crèmers.

F 11.30–1

MGMT 782a and b, Doctoral Student Pre-Workshop Seminar. Subrata Sen.

F 10.20 – 11.20

MGMT 791a or b, Independent Reading and Research.

By arrangement with individual faculty.

MGMT 792a or b, Predissertation Research.

By arrangement with individual faculty.

MATHEMATICS

10 Hillhouse, 432.4172
M.S., M.Phil., Ph.D.

Chair

Andrew Casson

Director of Graduate Studies

Mikhail Kapranov

Professors

Donald Brown (*Economics*), Andrew Casson, Ronald Coifman, Michael Frame (*Adjunct*), Igor Frenkel, Howard Garland, Roger Howe, Peter Jones, Ravindran Kannan (*Computer Science*), Mikhail Kapranov, Alexander Lubotzky (*Adjunct*), Gregory Margulis, Yair Minsky, Vincent Moncrief (*Physics*), Steven Orszag, David Pollard (*Statistics*), Vladimir Rokhlin (*Computer Science*), David Sattinger (*Adjunct*), Gregg Zuckerman

Gibbs Assistant Professors

Baris Coskunuzer, Tsachik Gelander, Philip Gressman, Paul Hacking, Yosi Keller, Daniel Krashen, Matvei Libine, Alina Marian, Jose Rodrigo, Kevin Wortman

Fields of Study

Fields include real analysis, complex analysis, functional analysis, classical and modern harmonic analysis; linear and nonlinear partial differential equations; dynamical systems and ergodic theory; kleinian groups, low dimensional topology and geometry; finite and infinite groups; finite and infinite dimensional Lie algebras, Lie groups, and discrete subgroups; representation theory; automorphic forms, L-functions; algebraic number theory and algebraic geometry; mathematical physics, relativity; numerical analysis; combinatorics and discrete mathematics.

Special Requirements for the Ph.D. Degree

All students are required to: (1) complete eight term courses at the graduate level, at least two with Honors grades; (2) demonstrate a reading knowledge of two of the following languages: French, German, or Russian; (3) pass qualifying examinations on their general mathematical knowledge; (4) submit a dissertation prospectus; (5) participate in the instruction of undergraduates; (6) be in residence for at least three years; and (7) complete a dissertation that clearly advances understanding of the subject it considers. The normal time for completion of the Ph.D. program is four years. Requirement (1) normally includes basic courses in algebra, analysis, and topology; these should be taken during the first year. The first language examination must be completed by the beginning of the third year of study, the second no later than the end of that year. A sequence of three qualifying examinations (algebra and number theory, real and complex analysis, topology) is offered each term, at intervals of about one month. All qualifying examinations

must be taken by the end of the third term. The thesis is expected to be independent work, done under the guidance of an adviser. This adviser should be contacted not long after the student passes the qualifying examinations. A student is admitted to candidacy after completing requirements (1)–(6) and obtaining an adviser.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see pages 438–39).

Master's Degrees

M.Phil. In addition to the Graduate School requirements (see page 442), a student must undertake a reading program of at least two terms' duration in a specific significant area of mathematics under the supervision of a faculty adviser and demonstrate a command of the material studied during the reading period at a level sufficient for teaching and research.

M.S. (en route to the Ph.D.). A student must complete six term courses with at least one Honors grade, pass one language examination, perform adequately on the general qualifying examination, and be in residence at least one year.

Master's Degree Program. Students may also be admitted to a terminal master's degree program that has the same requirements as the M.S. en route to the Ph.D., except that a sophisticated computer language may be substituted for French, German, or Russian in fulfillment of the language requirement. Full-time students must complete the program in two years, part-time students in three years. No financial aid is available.

Program materials are available upon request to the Director of Graduate Studies, Mathematics Department, Yale University, PO Box 208283, New Haven CT 06520-8283.

Courses

MATH 500a^U, Modern Algebra. Gregg Zuckerman.

MW 2.45–4

MATH 501b^U, Modern Algebra II. Mikhail Kapranov.

TTh 2.30–3.45

MATH 515b^U, Intermediate Complex Analysis. Philip Gressman.

MW 2.30–3.45

MATH 520a^U, Measure Theory and Integration. Gregory Margulis.

TTh 1–2.15

MATH 525b^U, Introduction to Functional Analysis. Douglas Lind.

TTh 1–2.15

MATH 544a, Introduction to Algebraic Topology. Baris Coskunuzer.

HTBA

[**MATH 545b, Introduction to Algebraic Topology II.**]

MECHANICAL ENGINEERING

Dunham Laboratory, 432.4250

M.Eng., M.S., M.Phil., Ph.D.

Chair

Marshall Long

Professors

David Bercovici, Ira Bernstein (*Emeritus*), Boa-Teh Chu (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, Robert Gordon, Shun-Ichiro Karato, Amable Liñan-Martinez (*Adjunct*), Marshall Long, Manohar Panjabi, Daniel Rosner, Ronald Smith, Mitchell Smooke, Katepalli Sreenivasan (*Adjunct*), George Veronis, Peter Wegener (*Emeritus*), Forman Williams (*Adjunct*)

Associate Professors

Jacek Cholewicki, Udo Schwarz, David Wu

Assistant Professors

Jerzy Blawdziewicz, Eric Dufresne, David LaVan, Corey O'Hern, Ainissa Ramirez

Lecturers

Beth Anne Bennett, Kailasnath Purushothaman, Glenn Weston-Murphy

FIELDS OF STUDY

Mechanics of Fluids: Dynamics and stability of drops and bubbles; dynamics of thin liquid films; macroscopic and particle-scale dynamics of emulsions, foams, and colloidal suspensions; electrospray theory and characterization; combustion and flames; computational methods for fluid dynamics and reacting flows; laser diagnostics of reacting and nonreacting flows.

Mechanics of Solids/Material Science: Mechanisms of deformation, mass transport, and nucleation within material systems through experimental, analytic, and computational studies; mechanical testing of small-scale structures; characterization of microscale inhomogeneities in plastic flow; impact loading of materials; diffusion of dopants within semiconductor films; evolution of surface roughness during plastic deformation; ion implantation-induced disorder in crystalline films; incorporation of microstructural information into constitutive laws; electromigration in metallic interconnects; transient nucleation in multicomponent systems; jamming in particulate systems such as glasses, colloids, granular materials; materials science of thin films; phase transformations; MEMS materials; atomic-scale investigations of surfaces, surface interactions, and surface properties (nanomechanics); nanotribology (atomic mechanisms of friction); and nanoelasticity.

For admissions and degree requirements, and for course listings, see Engineering and Applied Science.

MEDIEVAL STUDIES

53 Wall, Rm 310, 432.0672

M.A., M.Phil., Ph.D.

Chair and Director of Graduate Studies

TBA

Professors

R. Howard Bloch, Gerhard Böwering, Carlos Eire, Margot Fassler, Roberta Frank, Paul Freedman, Harvey Goldblatt, Beatrice Gruendler, Dimitri Gutas, Valerie Hansen, Bentley Layton, Ivan Marcus, Dale Martin, John Matthews, Giuseppe Mazzotta, María Rosa Menocal, Robert Nelson, Lee Patterson, Denys Turner, Anders Winroth

Associate Professors

Matthew Giancarlo, Dianne Jonas, Jaime Lara

Assistant Professors

Jessica Brantley, Mark Burde, Olivia Holmes, Nicole Rice, Ronald Rittgers, Youval Rotman

Lecturers

Adel Allouche, Robert Babcock, Marcia Colish, Walter Goffart, Barbara Shailor, William Whobrey

Fields of Study

Fields in this interdisciplinary program include history, history of art, history of music, religious studies, languages and literatures, linguistics, and philosophy.

Special Admissions Requirements

The General Test of the GRE is required. A writing sample of ten to twenty pages should be included with the application.

Special Requirements for the Ph.D. Degree

Languages required are Latin, French, and German. Proficiency in Latin is tested with an examination administered and evaluated by the department during the first term. Proficiency in French and German is demonstrated by passing the departmental examinations and should be achieved by the third term. Students will design their programs in close contact with the director of graduate studies. During the first two years students take fourteen term courses and must receive an Honors grade in at least four term courses the first year. Students take an oral examination, usually in the fifth term, on a set of three topics worked out in consultation with the director of graduate studies. Then, having nurtured a topic of particular interest, the student submits a dissertation prospectus that must be approved by the end of the third year. Upon completion of all predisertation requirements, including the prospectus, students are admitted to candidacy for

the Ph.D. degree. What remains, then, is the writing, submission, and approval of the dissertation during the final two years.

Students in Medieval Studies participate in the Teaching Fellows Program in the third and fourth years.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. In addition, the program offers an M.Phil. in Medieval Studies for students enrolled in the Ph.D. programs of relevant humanities departments. Requirements for this degree are (1) six courses in the medieval area from departments other than that in which the student is enrolled (two of these will normally be the Medieval Studies interdisciplinary seminar and either a course in research methodology [HIST 540 or NELC 850] or in Latin or Arabic Paleography); (2) proficiency in Latin or Arabic as tested by an examination administered and evaluated by the department; and (3) an oral examination. These requirements are in addition to those in force in the student's home department. The M.Phil. in Medieval Studies thus requires a year of study in addition to the five years required by the student's home department. Fellowships that provide support for this extra year are available from the Graduate School; application forms may be obtained from the program in Medieval Studies.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program may qualify for the M.A. degree upon satisfactory completion of the first year. Minimum requirements include a High Pass average in courses and passing the Latin examination.

Master's Degree Program. For this terminal master's degree students must take at least seven term courses with a general average of High Pass and with at least one term course of Honors. Two languages are required: Latin and either French or German. No thesis is required.

Courses

MDVL 550a or b, Directed Reading.

By arrangement with faculty.

MDVL 551b, Liturgical Drama and Its Architectural Settings in the Latin Middle Ages and the Latin New World. Margot Fassler, Jaime Lara.

T 1.30–3.40

The course treats of dramatic musical productions and their architectural and festive settings, from origins in the Carolingian period to the transplantation of these musical genres, liturgical practices, and architectural settings to the New World. Materials include study of original sources (for those students who know Latin and/or music), of filmed performances and sound recordings, of slides and other visual materials, and of texts of plays in translation. Plays are studied in English with Latin or Spanish for listening. *Also MUSI 945b, REL 858b.*

MICROBIOLOGY

Boyer Center for Molecular Medicine, 295 Congress Ave., BCMM 366B, 737.2404
M.Phil., Ph.D.

Director of Graduate Studies

Joann Sweasy

Student Services Officer

Darlene Smith

Professors

Serap Aksoy (*Epidemiology & Public Health*), Sidney Altman (*Molecular, Cellular & Developmental Biology*), Norma Andrews (*Microbial Pathogenesis*), Kim Bottomly (*Immunobiology*), Yung-chi Cheng (*Pharmacology*), Donald Crothers (*Emeritus, Chemistry*), Daniel DiMaio (*Genetics*), Durland Fish (*Epidemiology & Public Health*), Jorge Galán (*Microbial Pathogenesis*), Nigel Grindley (*Molecular Biophysics & Biochemistry*), Margaret Hostetter (*Pediatrics*), K. Brooks Low (*Therapeutic Radiology*), Diane McMahon-Pratt (*Epidemiology & Public Health*), I. George Miller (*Pediatrics*), L. Nicholas Ornston (*Molecular, Cellular & Developmental Biology*), Curtis Patton (*Epidemiology & Public Health*), John Rose (*Pathology*), Nancy Ruddell (*Epidemiology & Public Health*), Clifford Slayman (*Cellular & Molecular Physiology*), Dieter Söll (*Molecular Biophysics & Biochemistry*), William Summers (*Therapeutic Radiology*), Peter Tattersall (*Laboratory Medicine*), Elisabetta Ullu (*Internal Medicine*)

Associate Professors

Susan Baserga (*Therapeutic Radiology*), Michael Cappello (*Pediatrics*), Erol Fikrig (*Internal Medicine*), Craig Roy (*Microbial Pathogenesis*), Joann Sweasy (*Therapeutic Radiology*), Christian Tschudi (*Epidemiology & Public Health; Internal Medicine*)

Assistant Professors

Herve Agaïssé (*Microbial Pathogenesis*), Louis Alexander (*Epidemiology & Public Health*), S. P. Dinesh-Kumar (*Molecular, Cellular & Developmental Biology*), Roger Ely (*Chemical & Environmental Engineering*), Akiko Iwasaki (*Epidemiology & Public Health*), Christine Jacobs-Wagner (*Molecular, Cellular & Developmental Biology*), Susan Kaech (*Immunobiology*), Barbara Kazmierczak (*Internal Medicine*), John MacMicking (*Microbial Pathogenesis*), Robert Means (*Pathology*), Walther Mothes (*Microbial Pathogenesis*), Michael Robek (*Pathology*), Paul Turner (*Ecology & Evolutionary Biology*), Liangbiao Zheng (*Epidemiology & Public Health*)

Fields of Study

The Graduate Program in Microbiology is a multidepartmental, interdisciplinary Ph.D. program in training and research in the study of microorganisms and their effects on their hosts. The faculty of the program share the view that understanding the biology of microorganisms requires a multidisciplinary approach; therefore, the Microbiology

graduate program emphasizes the need for strong multidisciplinary training. The program is designed to provide individualized education in modern microbiology and to prepare students for independent careers in research and teaching. Students can specialize in various areas, including bacteriology, virology, microbe-host interactions, microbial pathogenesis, cell biology and immunobiology of microbial infections, microbial genetics and physiology, parasitology, and microbial ecology and evolution.

Special Admissions Requirements

To enter the Ph.D. program, students apply to the Microbiology track within the interdepartmental graduate program in the Biological and Biomedical Sciences. An undergraduate major in biology, biophysics, biochemistry, microbiology, or molecular biology is recommended; the GRE General Test or MCAT is required.

Program materials are available upon request from Darlene Smith in the Microbiology Graduate Program, Section of Microbial Pathogenesis, BCMM 336B, Yale University, New Haven CT 06536.

Special Requirements for the Ph.D.

Course work generally occupies the first two years of study. Each student, together with a faculty committee, outlines a course of study tailored to the individual's background and career goals. A program of course work may include general microbiology, virology, parasitology, and/or microbial genetics, as well as complementary courses in such areas as epidemiology, cell biology, immunology, biochemistry, genetics, ecology, vector biology, and statistics. The program also sponsors journal clubs and seminars in microbiology and related areas. All students participate in three laboratory rotations (MBIO 670a and b), with different faculty members, in their area of interest. Laboratory rotations assure that students quickly become familiar with the variety of research opportunities available in the program. An individualized qualifying exam on topics selected by each student, in consultation with the faculty, is given before the end of the second year. Students then undertake an original research project under the direct supervision of a faculty member. In the third year, students organize their thesis committee and prepare a dissertation prospectus, which is submitted to the Graduate School after approval by their committee. The student is then admitted to candidacy. Upon completion of the student's research project, the Ph.D. requirements conclude with the writing of a dissertation and its oral defense.

An important aspect of graduate training in microbiology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school level. Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Students are not permitted to teach during their first year.

Master's Degree

M.Phil. See Graduate School requirements, page 442. Although the program does not formally offer a master's degree, students who have been admitted to candidacy qualify for an M.Phil.

Courses

MBIO 642a, Roles of Microorganisms in the Living World. L. Nicholas Ornston, Diane McMahon-Pratt.

TTTh 11.30–12.45

A topical course exploring the biology of microorganisms. Emphasis on mechanisms underlying microbial adaptations and how they influence biological systems. Prerequisites: biology, chemistry, biochemistry. *Also EMD 642a, GENE 642a, MCDB 642a.*

MBIO 664b, Biology of Parasitic Protozoa and Helminths. Serap Aksoy, Curtis Patton, Christian Tschudi.

MW 11–12

Human diseases caused by eukaryotic parasites are the most prevalent in the world. They are also important causes of mortality. Malaria alone is the leading killer of children under the age of five. This course focuses on the epidemiology, developmental biology, and cellular and molecular biology of the major eukaryotic parasites. We discuss the impact of these organisms on health in developing countries and also touch on the role of selected parasites on disease burden in the United States. The format consists of two one-hour lectures a week and a total of three laboratory demonstrations. *Also EMD 664b.*

MBIO 670a,b, Laboratory Rotation. Joann Sweasy.

Rotation in three laboratories. Required for all first-year graduate students.

MBIO 680b, Advanced Topics in Molecular Parasitology. Diane McMahon-Pratt, Curtis Patton, Christian Tschudi.

F 12–1.30

An advanced graduate-level seminar course in modern parasitology. The class is focused on the reading and critical evaluation of papers from the current literature selected by the students in cellular and molecular mechanisms of parasitism. Prerequisites: EMD 684a is highly recommended; permission of the instructor. *Also EMD 680b.*

MBIO 684a, Molecular and Cellular Processes of Parasitic Eukaryotes. Diane McMahon-Pratt, Curtis Patton, Christian Tschudi.

F 12–2

An introductory graduate-level lecture and seminar course in modern parasitology. The class is focused on the reading and critical evaluation of papers and reviews from the current literature in cellular and molecular mechanisms of parasitism. Permission of instructor required. *Also EMD 684a.*

MBIO 685b, Molecular Mechanisms of Microbial Pathogenesis. Jorge Galán, Norma Andrews, Craig Roy, Walter Mothes, John MacMicking, Herve Agaissé.

TF 10–11.30

The course focuses on current topics related to host pathogen interactions. Each week a lecture is given on the topic followed by student presentations of seminal papers in the field. All participants are required to present a paper.

[MBIO 700b, Seminal Papers on the Foundations of Modern Microbiology.]

MBIO 701a,b, Research in Progress. Joann Sweasy.

^{M 2}

All students, beginning in their third year, are required to present their research once a year at the Graduate Student Research-in-Progress, held on Mondays at 2 p.m. These presentations are intended to give each student practice in presenting his or her own work before a sympathetic but critical audience and to familiarize the faculty with the research.

MBIO 702a,b, Microbiology Seminar Series. Joann Sweasy.

^{TH 4}

All students are required to attend all Microbiology seminars scheduled throughout the academic year. Microbiologists from around the world are invited to describe their research.

[**MBIO 734a, Molecular Biology of Animal Viruses.**]

COUNCIL ON MIDDLE EAST STUDIES

Yale Center for International and Area Studies (YCIAS)

Luce Hall, 34 Hillhouse, Ste 232, 432.5596

www.yale.edu/ycias/cmcs

Graduate Certificate of Concentration in Modern Middle East Studies

Chair

Ellen Lust-Okar (*Political Science*)

Professors

Abbas Amanat (*History*), Harold Attridge (*Divinity; Religious Studies*), Gerhard Böwering (*Religious Studies*), Adela Yarbrow Collins (*Divinity*), John J. Collins (*Divinity*), John Darnell (*Near Eastern Languages & Civilizations*), Owen Fiss (*Law*), Benjamin Foster (*Near Eastern Languages & Civilizations*), Steven Fraade (*Religious Studies*), Beatrice Gruendler (*Near Eastern Languages & Civilizations*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Stanley Insler (*Linguistics*), Bentley Layton (*Religious Studies*), Ivan Marcus (*History*), Ashgar Rastegar (*Medical School*), W. Michael Reisman (*Law*), Lamin Sanneh (*Divinity; History*), Harvey Weiss (*Near Eastern Languages & Civilizations*), Robert Wilson (*Religious Studies*)

Assistant Professors

Michael Gasper (*History*), Frank Griffel (*Religious Studies*), Kaveh Khoshnood (*Epidemiology & Public Health*), Ellen Lust-Okar (*Political Science*), Hala Nassar (*Near Eastern Languages & Civilizations*)

Lecturer

Adel Allouche (*History, Religious Studies*)

Senior Lectors

Fereshteh Amanat-Kowssar, Ayala Dvoretzky, Bassam Frangieh

Lector

Neta Stahl

Librarians

Simon Samoeil (*Sterling Memorial Library*), Ulla Kasten (*Babylonian Collection*), Susan Matheson (*Yale University Art Gallery Ancient Arts*), Fereshteh Molavi (*Persian Bibliographer*)

Students with an interest in the Middle East should apply to one of the University's degree-granting departments, like Anthropology, History, Linguistics, Near Eastern Languages and Civilizations, Political Science, or Religious Studies. The Council on Middle East Studies is part of the Yale Center for International and Area Studies. It has been organized to provide guidance to graduate students who desire to use the resources of the departments of the University that offer Middle East-related courses.

The council brings together faculty and students sharing an interest in the Middle East by sponsoring conferences, discussions, films, and a lecture series by scholars from

Yale as well as visiting scholars. It provides information concerning grants, fellowships, research programs, and foreign study opportunities. It also administers research projects in a variety of Middle East-related areas.

In addition to the resources of the individual departments, Yale's library system has much to offer the student interested in Middle East Studies. Of particular note are the collections of Arabic and Persian manuscripts, as well as large holdings on the medieval and modern Middle East.

The Council on Middle East Studies administers the Middle East Studies National Resource Center at Yale. The Center supports a number of projects and activities, including postdoctoral and visiting scholar appointments, summer and academic year language fellowships, and an extensive outreach program as well as conferences, travel funds, and research projects. The National Resource Center is funded by the United States Department of Education.

As of the academic year 2004–2005, the council will be offering a Graduate Certificate of Concentration in Modern Middle East Studies. For general certificate guidelines, see the YCIAS section (under Research Institutes) in this bulletin.

The Graduate Certificate of Concentration in Modern Middle East Studies

The certificate represents acknowledgment of substantial preparation in Middle East Studies, both in the student's major graduate or professional field and also in terms of the disciplinary and geographical diversity required by the council for recognized competency in the field of Middle East Studies. As language and culture are the core of the area studies concept, students are required to attain or demonstrate language proficiency.

Requirements:

1. Language proficiency: the equivalent of two years of study at a passing grade in one of the four languages of the Middle East — Arabic, Hebrew, Persian, and Turkish.
2. Course work: six graduate courses in at least two different disciplines. No more than four courses may count in any one discipline. Included in these six courses must be an introductory Middle East history course, such as *State and Society and Culture in the Middle East* (taken with special supplemental graduate readings and assignments).
3. Interdisciplinary coverage: both courses and any research project undertaken in lieu of a course must reflect experience of at least two disciplines.
4. Research: a major graduate course research paper, dissertation prospectus, dissertation, or thesis that demonstrates ability to use field resources, ideally in one or more languages of the region.

For more information on the Graduate Certificate and inquiries about Middle East studies, contact the Council on Middle East Studies, Yale University, PO Box 208206, New Haven CT 06520-8206, or the administrative assistant of the Council, Barbara Papacoda, e-mail, barbara.papacoda@yale.edu.

MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

301 Josiah Willard Gibbs Laboratories, 432.5662

M.S., M.Phil., Ph.D.

Chair

Nigel Grindley

Director of Graduate Studies

Mark Solomon (301 JWG, 432.5662, nessie.stewart@yale.edu)

Professors

Gary Brudvig (*Chemistry*), Donald Crothers (*Emeritus, Chemistry*), Donald Engelman, Joseph Fruton (*Emeritus*), Alan Garen, Sankar Ghosh (*Immunobiology*), Nigel Grindley, Andrew Hamilton (*Chemistry*), Mark Hochstrasser, William Konigsberg, Peter Lengyel (*Emeritus*), Richard Lifton (*Genetics; Internal Medicine/Nephrology*), I. George Miller (*Pediatric Infectious Diseases; Epidemiology & Public Health*), Simon Mochrie (*Physics; Applied Physics*), Peter Moore (*Chemistry*), Thomas Pollard (*Molecular, Cellular & Developmental Biology*), Anna Pyle, Charles Radding (*Emeritus, Genetics*), Lynne Regan, Frederic Richards (*Emeritus*), Gaston Schmir (*Emeritus*), Robert Shulman (*Emeritus*), Sofia Simmonds (*Emeritus*), Michael Snyder (*Molecular, Cellular & Developmental Biology*), Dieter Söll, Joan Steitz, Thomas Steitz, Scott Strobel, Julian Sturtevant (*Emeritus, Chemistry*), William Summers (*Therapeutic Radiology*), Patrick Sung, Kenneth Williams (*Adjunct, Research*)

Associate Professors

Susan Baserga, Mark Gerstein, Lise Heginbotham, Michael Koelle, Anthony Koleske, Andrew Miranker, Mark Solomon, Vinzenz Unger, Sandra Wolin (*Cell Biology*)

Assistant Professors

Thomas Biederer, João Cabral, Enrique De La Cruz, Yorgo Modis

Fields of Study

The principal objective of members of the department is to understand living systems at the molecular level. Areas of current interest include structure and function of biological macromolecules as determined by amino acid or nucleotide sequencing, diffraction, spectroscopic or computational analyses; mechanisms of enzyme action; bioenergetics, motility, and chemotaxis; structure and function of membranes, viruses, ribosomes, ribozymes, nucleosomes, ribonucleoprotein particles, and other macromolecular assemblies; developmental genetics; animal virology; plant molecular genetics; metabolic regulation; protein degradation; DNA transposition replication, recombination, and repair; regulation of RNA and protein synthesis; cell cycle; molecular immunology; chromosome segregation; nuclear organization.

Special Admissions Requirements

Courses in introductory biology, general chemistry, organic chemistry, physical chemistry, mathematics through differential equations, and one year of physics with calculus

are required for admission. Biochemistry is recommended. Applicants must take the GRE General Test, which is preferred, or the MCAT.

To enter the Ph.D. program, students apply to an interest-based track within the inter-departmental graduate program in the Biological and Biomedical Sciences (see pages 71–73).

Special Requirements for the Ph.D. Degree

All first-year students (except M.D./Ph.D.) take three laboratory rotations (MB&B 650a and 651b, Lab Rotation for First-Year Students). All students are required to take, for credit, seven one-term science courses. To obtain the desired breadth and depth of education, students are strongly encouraged to take (or to have taken the equivalent of) the core graduate courses offered by the department in biochemistry, molecular genetics, and structural biology (MB&B 705a, 720a, 721b, 730a, 743b). Additional courses, chosen from within MB&B or from related graduate programs, should form a coherent background for the general area in which the student expects to do dissertation research. All students attend the two departmental seminars: MB&B 675a, Seminar for First-Year Students, and MB&B 676b, Responsible Conduct of Research. Students with an extensive background in biochemistry or biophysics are permitted to substitute advanced courses for the introductory courses. There is no foreign language requirement. The student's research committee (see below) makes the final decision concerning the number and selection of courses required of each student. All students are required to teach two terms during their graduate careers, usually during the second and third years. The student selects a research adviser by the end of the second term of residence. At that time two additional faculty members are chosen to form a research committee. Requirements for admission to candidacy, which usually takes place after four terms of residence, are: (1) completion of course requirements; (2) completion of the qualifying examination; (3) certification of the student's research abilities by vote of the faculty upon recommendation from the student's research committee; and (4) submission of a brief prospectus of the proposed thesis research. The qualifying examination, usually taken in the fall of the second year, is an oral defense of two short, written research proposals, one in the same area as the student's thesis research and one in a different area; the three-member oral examination committee includes at least one of the two members of the research committee excluding the thesis adviser, and the remaining one or two members are selected by the Qualifying Examination Committee. Once final drafts of the thesis chapters have been approved by the research committee, the student presents a dissertation seminar to the entire department, only after which may the thesis be submitted. Students must have written at least one first-author paper that is submitted, in press, or published by the time of the thesis seminar.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see pages 438–39). Students must also maintain an overall High Pass average.

Master's Degree

M.Phil. See Graduate School requirements, page 442. Awarded only to students admitted to candidacy who are continuing for the Ph.D. Students are not admitted for this degree.

M.S. May be awarded to a student who is in good standing upon completion of at least two terms of graduate study and who will not continue in the Ph.D. program. A student must receive grades of Pass or higher in at least five courses approved by the DGS as counting toward a graduate degree, exclusive of seminars or research. A student must also meet the Graduate School's Honors requirement for the Ph.D. program and maintain a High Pass average.

M.S. (for industrial affiliates). Scientists working in industry may attend courses and conduct research projects leading to the M.S. degree. Information may be obtained from the director of graduate studies.

More detailed program materials are available upon request to the Director of Admissions, Department of Molecular Biophysics and Biochemistry, Yale University, PO Box 208114, New Haven CT 06520-8114.

Courses

MB&B 523a, Biological Physics. Simon Mochrie.

TTH 2.30–3.45

An introduction to the physics of biological systems, including molecular motors, protein folding, membrane self-assembly, ion pumping, and bacterial locomotion. Background concepts in probability and statistical mechanics are introduced as necessary. *Also PHYS 523a.*

MB&B 600a^U, Principles of Biochemistry I. Michael Koelle, Thomas Biederer.

TTH 11.30–12.45

Discussion of the physical, structural, and functional properties of proteins, lipids, and carbohydrates, three major classes of molecules in living organisms. Energy metabolism, hormone signaling, and muscle contraction as examples of complex biological processes whose underlying mechanisms can be understood by identifying and analyzing the molecules responsible for these phenomena.

MB&B 601b^U, Principles of Biochemistry II. Scott Strobel, Joan Steitz.

TTH 11.30–12.45

A continuation of MB&B 600a that considers the chemistry and metabolism of nucleic acids, the mechanism and regulation of protein and nucleic acid synthesis, and selected topics in macromolecular biochemistry.

MB&B 602a, Molecular Cell Biology. Sandra Wolin, Mark Solomon, Vinzenz Unger, and staff.

MW 1.45–3

A comprehensive introduction to the molecular and mechanistic aspects of cell biology for graduate students in all programs. Emphasizes fundamental issues of cellular organization, regulation, biogenesis, and function at the molecular level. *Also CBIO 602a, MCDB 602a.*

MB&B 625a^U, Basic Concepts of Genetic Analysis. Tian Xu, Michael Koelle, and staff.

TTH 1.05–2.20

The universal principles of genetic analysis in eukaryotes are discussed in lectures. Students also read a small selection of primary papers illustrating the very best of genetic analysis and

dissect them in detail in the discussion sections. While other Yale graduate molecular genetics courses emphasize molecular biology, this course focuses on the concepts and logic underlying modern genetic analysis. *Also GENE 625a, MCDB 625a^U.*

MB&B 650a and 651b, Lab Rotation for First-Year Students. Mark Solomon.

Required for all first-year MB&B graduate students.

MB&B 675a, Seminar for First-Year Students. Lise Heginbotham, Andrew Miranker.

F 4

Required for all first-year MB&B graduate students.

MB&B 676b, Responsible Conduct of Research. Vinzenz Unger and staff.

F 4

Designed for students who are beginning to do scientific research. The course seeks to describe some of the basic features of life in contemporary research and some of the personal and professional issues that researchers encounter in their work. Approximately six sessions, run in a seminar/discussion format. Required for all first-year MB&B graduate students.

MB&B 705a^U, Molecular Genetics of Prokaryotes. Nigel Grindley, Patrick Sung, Joann Sweasy.

MW 11.30–12.45

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. Required: previous or concurrent introductory courses in genetics and biochemistry. *Also GENE 705a, MCDB 505a.*

MB&B 710b4, Electron Cryo-Microscopy for Protein Structure Determination.

Fred Sigworth, Vinzenz Unger.

HTBA

Understanding cellular function requires structural and biochemical studies at an ever-increasing level of complexity. The course is an introduction to the concepts and applications of high-resolution electron cryo-microscopy. This rapidly emerging new technique is the only method that allows biological macromolecules to be studied at all levels of resolution from cellular organization to near atomic detail. *Also C&MP 710b.*

MB&B 720a^U, Macromolecular Structure and Biophysical Analysis.

Andrew Miranker, João Morais Cabral, Anna Pyle.

TTh 11.30–12.45

An in-depth analysis of macromolecular structure and its elucidation using modern methods of structural biology and biochemistry. Topics include architectural arrangements of proteins, RNA, and DNA; practical methods in structural analysis; and an introduction to diffraction and NMR. Prerequisites: physical chemistry (may be taken concurrently) and biochemistry.

MB&B 721b^U, Macromolecular Interactions and Dynamic Properties. Anna Pyle,

Enrique De La Cruz, Donald Engelman.

MW 11.30–12.45

This course examines dynamic properties of macromolecules, their interactions, catalytic activities, and methods for analyzing their behavior. Topics include macromolecular folding, binding interfaces, ligand interactions, and the properties of membrane proteins, enzymes, ribozymes, and molecular motors. These areas are presented together with modern methods for analysis of macromolecular associations and dynamic properties. Prerequisites: biochemistry, physical chemistry, and MB&B 720a or permission of the instructor.

MB&B 730a, Methods and Logic in Molecular Biology. Mark Solomon,
Donald Engelman, Lynne Regan, Scott Strobel.
TTH 5–8

This course examines fundamental concepts in molecular biology through intense critical analysis of the primary literature. The objective is to develop primary literature reading and critical thinking skills. Required of and open only to first-year graduate students in MB&B.

MB&B 743b^U, Advanced Eukaryotic Molecular Biology. Mark Hochstrasser,
Patrick Sung.

TTH 11.30–12.45

Selected topics in regulation of chromatin structure and remodeling, mRNA processing, mRNA stability, translation, protein degradation, DNA replication, DNA repair, site-specific DNA recombination, somatic hypermutation. Prerequisite: biochemistry or permission of the instructor. *Also GENE 743b.*

MB&B 749a^U, Medical Impact of Basic Science. Joan Steitz, Enrique De La Cruz,
Mark Hochstrasser, Andrew Miranker, Lynne Regan, Patrick Sung.

TTH 1–2.30

Consideration of examples of recent discoveries in basic science that have elucidated the molecular origins of disease or that have suggested new therapies for disease. Emphasis is placed on the fundamental principles on which these advances rely. Reading is from the primary scientific and medical literature, with emphasis on developing the ability to read this literature critically. Aimed primarily at undergraduates. Prerequisite: biochemistry or permission of the instructor. *Also GENE 749a.*

MB&B 750a2, Biological Membranes. Thomas Biederer, Lise Heginbotham.

TTH 10–11.15

Biological membranes and their resident proteins are essential for cellular function; yet comparatively little is known about their structure and dynamics. This class provides an introduction to the biochemistry and biophysics of lipids, lipid bilayers, and lipid-derived second messengers. In addition, structural as well as functional aspects of the different classes of membrane proteins are discussed along with an outline of experimental approaches used to achieve an understanding of membrane protein structure and function at a molecular level. Prerequisite: biochemistry.

MB&B 752a^U, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein,
Michael Snyder.

MW 1–2.15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, comparative genomics, geometric analysis of protein structure, and macromolecular simulation. Prerequisite: EEB 122b and MATH 115, or permission of the instructor. *Also CB&B 752a, CPSC 752a^U, MCDB 752a^U.*

MB&B 760b3^U, Principles of Macromolecular Crystallography. João Morais Cabral,
Thomas Steitz.

TTH 9–10.15

Rigorous introduction to the principles of macromolecular crystallography, aimed at students who are planning to carry out structural studies involving X-ray crystallography or who want to obtain in-depth knowledge for critical analysis of published crystal structures. Prerequisites: physical chemistry and biochemistry.

MB&B 761b4, X-ray Crystallography Workshop. Scott Strobel and staff.

HTBA

This laboratory course provides hands-on training in the practical aspects of macromolecular structure determination by X-ray crystallography. Topics include data collection, data reduction, phasing by multiwavelength anomalous diffraction and molecular replacement, solvent flattening, non-crystallographic symmetry averaging, electron density interpretation, model building, structure refinement, and structure validation. The course includes training in the use of computer programs used to perform these calculations. Prerequisites: MB&B 760b3 and a working exposure to the Unix operating system.

MB&B 765b^U, Enzyme Mechanisms. Enrique De La Cruz, Gary Brudvig, Thomas Steitz, Scott Strobel.

MW 9–10.15

An advanced course on the structure, function, and reaction mechanisms of protein and nucleic acid enzymes. The course covers the theoretical and practical aspects of steady-state and transient kinetic methods, kinetic isotope effects and transition-state theory, with emphasis on how these methods in combination with high-resolution structures have provided a molecular understanding of the catalytic strategy of enzymes. Topics include mechanisms of the classic metabolic enzymes; molecular motors, polymerases, and machines; electron transfer, redox enzymes, and their higher-order complexes; ribozymes and DNA enzymes; and the design and selection of novel enzymes. Prerequisites: physical chemistry and biochemistry.

MB&B 800a, Advanced Topics in Molecular Medicine. Susan Baserga, William Konigsberg, George Miller, and staff.

M 11–1

This seminar course, which covers topics in the molecular mechanisms of disease, illustrates timely issues in areas such as protein chemistry and enzymology, intermediary metabolism, nucleic acid biochemistry, gene expression, and virology. M.D. and M.D./Ph.D. students only. Prerequisite: biochemistry (may be taken concurrently).

MB&B 900a or 901b, Reading Course in Biophysics. Mark Solomon.

Directed reading course in biophysics. Term paper required. By arrangement with faculty.

MB&B 902a or 903b, Reading Course in Molecular Genetics. Mark Solomon.

Directed reading course in molecular genetics. Term paper required. By arrangement with faculty.

MB&B 904a or 905b, Reading Course in Biochemistry. Mark Solomon.

Directed reading course in biochemistry. Term paper required. By arrangement with faculty.

The following course is for students in the joint B.S./M.S. program with Yale College:

MB&B 570a or MB&B 571b, Intensive Research for B.S./M.S. Candidates. Scott Strobel, Mark Solomon.

MOLECULAR, CELLULAR, AND DEVELOPMENTAL BIOLOGY

Kline Biology Tower, 432-3538

M.S., Ph.D.

Chair

Thomas Pollard

Director of Graduate Studies

Shirleen Roeder (804 KBT, 432-3501, shirleen.roeder@yale.edu)

Professors

Sidney Altman, Kim Bottomly (*Immunology*), Ronald Breaker, John Carlson, Lynn Cooley (*Genetics*), Stephen Dellaporta, Xing-Wang Deng, Paul Forscher, Mary Helen Goldsmith, Mark Hochstrasser (*Molecular Biophysics & Biochemistry*), Vivian Irish, Douglas Kankel, Michael Kashgarian (*Pathology*), Haig Keshishian, Perry Miller (*Anesthesiology*), Mark Mooseker, Jon Morrow (*Pathology*), Frederick Naftolin (*Obstetrics & Gynecology*), Timothy Nelson, L. Nicholas Ornston, Thomas Pollard, Shirleen Roeder, Joel Rosenbaum, Alanna Schepartz (*Chemistry*), Steven Segal (*Cellular & Molecular Physiology*), Michael Snyder, Robert Wyman

Associate Professors

Craig Crews, Savithramma Dinesh-Kumar, Archibald Perkins (*Pathology*), Frank Slack, Weimin Zhong

Assistant Professors

Martín García-Castro, Scott Holley, Christine Jacobs-Wagner, Elke Stein, David Wells

Fields of Study

Research in genetics and molecular biology encompasses studies of catalytic RNAs, cell cycle regulation, chromosome segregation, genetic recombination, mutation, transposons, and oncogenes. Research topics in cellular and developmental biology include structure of the cell cytoskeleton, molecular motors, chemical biology, cell surface receptors, protein transport, hormone action, mammalian transcription factors, and the regulation of cell proliferation and differentiation. Research in neurobiology focuses on sensory signal transduction, animal color vision, growth cone motility, neural differentiation, synaptogenesis, and the formation of topographic maps. A Special Program in Plant Sciences provides research and training in the molecular genetics of flowering, the developmental biology of leaves, the physiology of hormone action, sex determination, and the cellular and molecular biology of photomorphogenesis. Because of the breadth of the track, students are provided with unique opportunities for interdisciplinary studies.

To enter the Ph.D. program, students apply to the Molecular Cell Biology, Genetics, and Development (MCGD) track within the interdepartmental graduate program in the Biological and Biomedical Sciences (BBS) (see pages 71–73).

Special Admissions Requirements

Applicants should have obtained training in the structure, development, and physiology of organisms; the structure, biochemistry, and physiology of cells; genetics; elementary calculus; elementary physics; inorganic and organic chemistry; statistics or advanced mathematics. Lack of some prerequisites can be made up in the first year of graduate study. Students having different science training, such as degrees in chemistry, physics, or engineering, are encouraged to apply. In addition to the GRE General Test, a Subject Test is recommended, preferably in Biology, or in Biochemistry, Cell and Molecular Biology.

Special Requirements for the Ph.D. Degree

None of the fields of study has a required curriculum of courses. Instead, with the help of a faculty committee, each student plans a specific program that includes appropriate courses, seminars, laboratory rotations, and independent reading fitted to individual needs and career goals. There is no foreign language requirement. Late in the third term of study the student meets with a faculty committee to decide on a preliminary topic for dissertation work and to define the research areas in which he or she is expected to demonstrate competence. By the end of the second year each student prepares a dissertation prospectus outlining the research proposed for the Ph.D. When this is accepted by a dissertation committee of faculty members, when the committee is satisfied that the student has demonstrated competence in the areas necessary to conduct the proposed work, and when the other requirements indicated above are fulfilled, the student is admitted to candidacy for the Ph.D. (but no later than the end of the second year of study). The remaining requirements include completion of the dissertation research, presentation and defense of the dissertation, and submission of acceptable copies of the dissertation to the Graduate School and to the Kline Science Library. All students are required to teach in two one-term courses during their Ph.D. study excluding the first year.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see pages 438–39).

Master's Degree

M.S. (en route to the Ph.D.). The minimum requirements for award of the Master of Science Degree are: (1) two academic years registered and in residence full time in the graduate program; (2) satisfactory completion of the first two years of study and research leading to the Ph.D.; this requirement may be met either (a) by completing a minimum of five courses with an average grade of High Pass, or (b) by successfully completing an approved combination of courses and research and passing the prospectus examination; (3) recommendation by the department for award of the degree, subject to final review and approval by the appropriate degree committee. No courses that were taken prior to

matriculation in the graduate program, or in Yale College, or in summer programs may be applied toward these requirements.

Prospective applicants are encouraged to visit the BBS Web site (info.med.yale.edu/bbs), MCGD Track.

Courses

MCDB 500a^U, Biochemistry. L. Nicholas Ornston, Ronald Breaker, Donald Engelman.

MWF 9.30–10.20

An introduction to the biochemistry of animals, plants, and microorganisms, emphasizing the relations of chemical principles and structure to the evolution and regulation of living systems.

MCDB 505a, Molecular Genetics of Prokaryotes. Nigel Grindley, Patrick Sung, and staff.

MW 11.30–12.45

Molecular aspects of the storage, replication, evolution, and expression of genetic material in prokaryotes. *Also GENE 705a, MB&B 705a^U.*

MCDB 530a^U, Biology of the Immune System. Kim Bottomly and staff.

MWF 9.30–10.20

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens; autoimmunity. *Also IBIO 530a.*

MCDB 550a^U, Physiological Systems. Steven Segal and staff.

MWF 9.30–10.20

Organ systems of the human body, emphasizing the principles of physiological control. Biophysical properties of cells, tissues, and organs are considered in light of homeostasis and the regulation of body functions. *Also C&MP 550a, ENAS 550a^U.*

MCDB 555a^U, Molecular Basis of Development. Xing-Wang Deng, Martín García-Castro, Scott Holley, Frank Slack, Weimin Zhong.

TRH 2.30–3.45

Current understanding of the molecular mechanism of cell signaling and development in multicellular organisms. Topics include the basics of cell signaling and experimental model organisms, cell proliferation and death, cell specification and determination, cell migration, hormonal regulation, and environmental regulation.

MCDB 560b^U, Cellular and Molecular Physiology: Molecular Machines in Human Disease. Emile Boulpaep, Michael Caplan, Mark Mooseker.

MWF 9.30–10.20

Study of the processes that transfer molecules across membranes. Topics include the different classes of molecular machines that mediate membrane transport. Emphasis on interactions among proteins in determining the physiologic behaviors of cells and tissues. *Also C&MP 560b, ENAS 570b^U.*

MCDB 570b^U, Biotechnology. Michael Snyder, Kenneth Nelson, Ronald Breaker, Joseph Wolenski.

MW 11.30–12.45

The principles and applications of cellular, molecular, and chemical techniques that advance biotechnology. Topics include the most recent tools and strategies used by government agencies, industrial labs, and academic research to adapt biological and chemical compounds as medical treatments, industrial agents, or for the further study of biological systems.

MCDB 600Lb, Advanced Biological Techniques. Michael Snyder, Xing-Wang Deng, Scott Holley, Kenneth Nelson, Joseph Wolenski, David Austin.

MW 1–5

A laboratory course to familiarize graduate students with state-of-the-art technologies in molecular biology, genomics. Students carry out research projects and incorporate their own projects into the lab. The class meets for two afternoons each week and consists of 2–3 week modules covering the following topics: microarray analysis, plant genetic engineering, mouse genetic engineering, imaging/microscopy, ribozyme enzymol/engineering, phage display/chemical biology.

MCDB 602a, Molecular Cell Biology. Sandra Wolin, Mark Mooseker, Thomas Pollard, Graham Warren.

MW 1.45–3

A comprehensive introduction to the molecular and mechanistic aspects of cell biology for graduate students in all programs. Emphasizes fundamental issues of cellular organization, regulation, biogenesis, and function at the molecular level. *Also CBIO 602a, MB&B 602a.*

MCDB 603a, Seminar in Molecular Cell Biology. Sandra Wolin, Mark Mooseker, Thomas Pollard, Graham Warren.

Th 9–11

A graduate-level seminar course in modern cell biology. The class is devoted to the reading and critical evaluation of classical and current papers. The topics are coordinated with the MCDB 602a lecture schedule. Thus, concurrent or previous enrollment in MCDB 602a is required. *Also CBIO 603a.*

MCDB 625a^U, Basic Concepts of Genetic Analysis. Tian Xu, Michael Koelle, Richard Lifton, Shirleen Roeder, Michael Stern, Kevin White.

TTh 1.05–2.20

The universal principles of genetic analysis in eukaryotes are discussed in lectures. Students also read a small selection of primary papers illustrating the very best of genetic analysis and dissect them in detail in the discussion sections. While other Yale graduate molecular genetics courses emphasize molecular biology, this course focuses on the concepts and logic underlying modern genetic analysis. *Also GENE 625a, MB&B 625a^U.*

MCDB 630b, Biochemical and Biophysical Approaches in Molecular and Cellular Biology. Thomas Pollard, Enrique De La Cruz, and staff.

This graduate course introduces the theory and application of biochemical and biophysical methods to study the structure and function of biological macromolecules. The course considers the basic physical chemistry required in cellular and molecular biology but does not require a previous course in physical chemistry. One class per week is a lecture introducing a topic. The second class is a discussion of one or two research papers utilizing those methods.

MCDB 642a, Roles of Microorganisms in the Living World. L. Nicholas Ornston, Diane McMahon-Pratt, Dieter Söll.

TTh 11.30–12.45

A topical course exploring the biology of microorganisms. Emphasis on mechanisms underlying microbial adaptations and how they influence biological systems. *Also EMD 642a, GENE 642a, MBIO 642a.*

MCDB 660a, Structure, Function, and Development of Vascular Plants. Graeme Berlyn.

TTh 2.30–3.45

Morphogenesis and adaptation of vascular plants considered from seed formation and germination to maturity. Physiological and developmental processes associated with structural changes in response to environment discussed from both a phylogenetic and an adaptive point of view.

MCDB 670b, Advanced Seminar in Biochemistry and Genetics. Sidney Altman, Ronald Breaker, Stephen Dellaporta, Frank Slack.

W 1.30–3.45

New aspects of the molecular biology of RNA, ribonucleoproteins, and prions. Topics include the localization and function of RNA and ribonucleoproteins; the role of RNA in dosage compensation, chromosome silencing, and gene regulation; novel ribozymes and RNA technology; prions. Discussion; involvement and attendance are required.

MCDB 677b, Mechanisms of Development. Lynn Cooley, Xing-Wang Deng, Scott Holley, Valerie Reinke, Frank Slack, Michael Stern.

M 9.45–11, F 2–3.15

An advanced course on the mechanisms of animal development focusing on the genetic specification of cell organization and identity during embryogenesis and somatic differentiation. The use of evolutionarily conserved signaling pathways to carry out developmental decisions in a range of animals is highlighted. Course work includes student presentations, critical analysis of primary literature, and a research proposal term paper. *Also GENE 777b.*

[MCDB 685b^U, Evolutionary Developmental Biology.]

[MCDB 692a, Advanced Seminar in Cell Biology: Mechanisms of Signal Transduction.]

MCDB 720a^U, Neurobiology. Haig Keshishian, Paul Forscher.

MWF 11.30–12.20

Examination of the excitability of the nerve cell membrane as a starting point for the study of molecular, cellular, and intercellular mechanisms underlying the generation and control of behavior. *Also NBIO 720a, NSCI 720a.*

MCDB 721La^U, Laboratory for Neurobiology. Haig Keshishian, John Fitzpatrick, Robert Wyman.

T or W 1.30–6

Optional laboratory. Introduction to the neurosciences. Projects include the study of neuronal excitability, sensory transduction, CNS function, synaptic physiology, and neuroanatomy.

MCDB 735b^U, Seminar in Brain Development and Plasticity. Weimin Zhong, Elke Stein.

MW 2.30–3.45

Weekly seminars and discussion sessions to explore recent advances in our understanding of brain development and plasticity, including neuronal determination, axon guidance, synaptogenesis, and developmental plasticity. *Also NSCI 504b.*

MCDB 750b, Core Topics in Biomedical Informatics. Perry Miller and staff.

HTBA

Introduction to common unifying themes that serve as the foundation for different areas of biomedical informatics, including clinical, neuro-, and genome informatics. The course is designed for students with significant computer experience and course work who plan to build computational tools for use in bioscience research. Emphasis is on understanding basic principles underlying informatics approaches to biomedical data modeling, interoperability among biomedical databases and software tools, standardized biomedical vocabularies and ontologies, modeling of biological systems, and other topics of interest. The course involves lectures, class discussions, student presentations, and computer programming assignments. Prerequisite: previous computer programming experience and permission of the instructor. *Also CB&B 750b.*

MCDB 752a^U, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein, Michael Snyder.

MW 1–2.15

Genomics describes the determination of the nucleotide sequence and many further analyses to discover functional and structural information on all the genes of an organism. Topics include the methods and results of functional and structural gene analysis on a genome-wide scale as well as a discussion of the implications of this research. Bioinformatics describes the computational analysis of genomes and macromolecular structures on a large scale. Topics include sequence alignment, biological database design, geometric analysis of protein structure, and macromolecular simulation. *Also CB&B 752a*, *CPSC 752a^U*, *MB&B 752a^U*.

MCDB 861b^U, Global Problems of Population Growth. Robert Wyman.

TR 2.30–3.45

The worldwide population explosion in its human, environmental, and economic dimensions. Sociobiological bases of reproductive behavior. Population history and the cause of demographic change. Interactions of population growth with economic development and environmental alteration. Political, religious, and ethical issues surrounding fertility; human rights; and the status of women.

MCDB 900a, First-Year Introduction to Research. Shirleen Roeder, Craig Crews.

Lab rotations, grant writing, and ethics for Molecular Cell Biology, Genetics, and Development track students. *Also CBIO 900a*, *GENE 900a*.

MCDB 901b, First-Year Introduction to Research. Michael Stern, Carl Hashimoto.

Lab rotations, seminars for Molecular Cell Biology, Genetics, and Development track students. *Also CBIO 901b*, *GENE 901b*.

MCDB 950a and 951b, Second-Year Research.

By arrangement with faculty.

The following courses are required for students in the joint B.S./M.S. program with Yale College:

MCDB 585b, Research in MCDB for B.S./M.S. Candidates.

A two-credit course taken in the third-to-last term (typically the second term of the junior year). At the start of this course, each student forms a committee composed of their adviser and two faculty members that meets to discuss the research project. At the end of this course, students complete a detailed prospectus describing their thesis project and the work completed thus far. The committee evaluates an oral and written presentation of this prospectus; the evaluation determines whether the student may continue in the combined program.

MCDB 595, Intensive Research in MCDB for B.S./M.S. Candidates.

A four-credit, yearlong course (two credits each term) that is similar to MCDB 495 and is taken during the senior year. During this course, students give an oral presentation describing their work. At the end of the course, a student is expected to present his or her work to the department in the form of a poster presentation. In addition, the student is expected to give an oral thesis defense, followed by a comprehensive examination of the thesis conducted by the thesis committee. Upon successful completion of this examination, as well as other requirements, the student is awarded the combined B.S./M.S. degree.

MUSIC

143 Elm, 432.2985
M.A., M.Phil., Ph.D.

Chair

Patrick McCreless

Director of Graduate Studies

James Hepokoski (143 Elm, 432.2991, james.hepokoski@yale.edu)

Professors

Richard Cohn, Margot Fassler, Michael Friedmann (*Adjunct*), Daniel Harrison, James Hepokoski, Patrick McCreless, Robert Morgan, Ellen Rosand, Craig Wright

Associate Professors

Kathryn Alexander, David Clampitt, John Halle, Richard Lalli (*Adjunct*)

Assistant Professors

Gundula Kreuzer, Ian Quinn, Michael Veal, Sarah Weiss

Fields of Study

Fields include music theory and music history. (Students interested in performance or composition should apply to the Yale School of Music.)

Special Admissions Requirements

Previous training in music theory or music history is required. Samples of the applicant's previous work including extended papers, advanced exercises, and analyses must be submitted. The GRE General Test is required by the Graduate School. Applicants whose native language is not English must take the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

Two years of course work, comprising sixteen courses, are normally required. Students in the music theory program must pass examinations in two foreign languages: German and normally French, Latin, or Italian. For students in the music history program, German and two other languages are required. Language examinations, partly with dictionary and partly without, are administered at the beginning of each term. A musicianship exam (ear training, keyboard, and basic theory and analysis) is given to all entering students. Admission to candidacy for the Ph.D. must occur before the end of the third year of study. It is granted if the student has received a grade of Honors in two full-year courses or in four term courses, has passed the language and qualifying examinations, and has submitted an acceptable dissertation prospectus. The departmental qualifying examination is given near the beginning of the third year and all language requirements must be satisfied by that time. Students attend a weekly prospectus/dissertation seminar

during the third year of study. Before the end of that year, the student must submit a dissertation prospectus for faculty approval.

The faculty considers teaching to be essential to the professional preparation of graduate students in Music. Students in Music participate in the Teaching Fellows Program in their third and fourth years.

Combined Ph.D. Program: Music and Renaissance Studies

The Department of Music also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in Music and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the Ph.D.). Students enrolled in the Ph.D. program qualify for the M.A. degree upon the successful completion of eight courses, at least six of which are seminars given in the department, along with the passing of an examination in one foreign language. Of the six departmental seminars, at least two grades must be Honors; the remaining six grades must average High Pass.

Master's Degree Program. The department offers admission to a small number of students in a terminal M.A. program. Candidates must pass eight term courses achieving an average of High Pass and at least one Honors, complete a special project, and pass an examination in one foreign language.

Program materials are available upon request to the Director of Graduate Studies, Department of Music, Yale University, PO Box 208310, New Haven CT 06520-8310.

Courses

MUSI 701a, Theory and Aesthetics: pre-1600. Craig Wright.

W 10–12

This course investigates the writings of the principal Western music theorists from Greek antiquity to 1600—Aristoxenus, Boethius, Guido, Franco, Philippe de Vitry, Tinctoris, Gaffurius, Glareanus, Zarlino, and Morley among them. Issues of modality, scalar structures, chromatic inflections, counterpoint, and voice leading, as well as aesthetic questions concerning the meaning of music and its function in society, are discussed. Whenever possible, relevant musical compositions are analyzed to exemplify theoretical principles.

MUSI 705b, Theory and Aesthetics: The Nineteenth Century. Patrick McCreless.

M 1.30–3.30

A consideration of nineteenth-century European thought about music, including the development of music theory (harmony, form, pedagogy of musical composition, music theory as institutionalized in the conservatory), the place of music in the philosophy and aesthetics of Romanticism, musical criticism, and the beginnings of the discipline of musicology.

MUSI 711a, Permeable Boundaries: Explorations in Musical Hybridity. Sarah Weiss.

W 1.30–3.30

Using the critical discourse on hybridity, this course examines the musical results of cultural interaction, investigating both “natural” and “intentional” hybrids as well as the political and

cultural impact and implications of these kinds of fusion. Repertoire may include genres such as Indonesian *kroncong*, American bluegrass and klezmer, Chinese jazz, and composed works by composers such as Colin McPhee, Toru Takemitsu, Béla Bartók, Evan Ziporyn, Lou Harrison, Steve Reich, I.M. Harjito, Dewa Putu Berata.

MUSI 814a, Directed Studies in the History of Music.

By arrangement with faculty.

MUSI 814b, Directed Studies in the History of Music.

By arrangement with faculty.

MUSI 821b, Monteverdi's *Incoronazione di Poppea*: Sources, Context, Interpretation, Reception. Ellen Rosand.

W 1:30–3:30

Following an investigation of the manuscript and printed sources of the music and text of Monteverdi's opera (two manuscript scores, five manuscript librettos, two printed librettos, and a printed scenario), and the various literary sources for Busenello's libretto, the seminar considers the place of Monteverdi's work within the context of early Venetian opera and the ways in which that context affects larger questions of interpretation. We also consider issues surrounding the reception of the work, from its discovery in the late nineteenth century to the present, through the examination of historical accounts as well as recorded performances.

MUSI 842b, American Musical Genres, 1900–1940. James Hepokoski.

W 1–4

Musical genres as participants in the larger tensions and discourse networks of American culture in the first decades of the twentieth century. The seminar has a twofold aim. On the one hand, it is research-oriented, involving individualized work with Yale's music resources, such as the Charles Ives Papers, the Cole Porter Collection, and the Yale Collection of Historical Sound Recordings. On the other hand, it explores paradigms for music analysis and cultural interpretation — genre recognition, recurring but flexible structural formats, intertextual dialogues — within repertory families that have not often been examined from these musicological perspectives. The seminar focuses primarily on four areas that are illustrative of some of the competing concepts of musical style and purpose in the United States during the period in question: Charles Ives and the challenges of an American art music; blues in the 1920s and 1930s; American musical theater and Tin Pan Alley songs in the same years, with special attention given to Cole Porter; and historical sound recordings as primary-source documents. Reading- and listening-intensive; individual research projects and papers.

MUSI 844a, Reception History: Theory and Practice. Gundula Kreuzer.

T 10–12

An exploration of the critical and epistemological dimensions offered to musicological research by reception history. Developed mainly by literary scholars (such as Jauss, Iser, and Koselleck) since the early 1970s, theories of aesthetic reception have long remained suspicious among musicologists. The seminar probes their possible applications to music from a variety of theoretical and practical perspectives, focusing on the transnational reception of nineteenth-century Italian opera. This prestigious musical “export article” provides a particularly rich object for reception studies that seek to address processes of cultural transfer, canonization, and identity formation.

MUSI 849a, Music and German Modernism. Walter Frisch.

F 10–12

This seminar examines the cultural, intellectual, and musical contexts of the first generation of Austro-German modernists around 1900, including Schoenberg, Mahler, Reger, Strauss, and Pfitzner, as well as less-often-studied figures like Schreker, d'Albert, Busoni, and

Schillings. We focus on the relationships with the other arts and on the way in which these early modernists related to their musical pasts, from Bach to Wagner.

MUSI 901a, Theory and Analysis of Tonal Music I. Daniel Harrison.

T 1–3:30

An investigation of small-scale tonal structures integrated by counterpoint, harmony, and form using basic concepts, graphic representations, and analytical interpretations derived from Heinrich Schenker.

MUSI 901b, Theory and Analysis of Tonal Music II. Robert Morgan.

T 10–12

Continuing study of Schenkerian concepts, practice in graphic analysis, and critical readings of writings both by and about Schenker.

MUSI 914a, Directed Studies in the Theory of Music.

By arrangement with faculty.

MUSI 914b, Directed Studies in the Theory of Music.

By arrangement with faculty.

MUSI 945b, Liturgical Drama and Its Architectural Settings in the Latin Middle Ages and the Latin New World. Margot Fassler, Jaime Lara.

T 1:30–3:40

The course treats of dramatic musical productions and their architectural and festive settings, from origins in the Carolingian period to the transplantation of these musical genres, liturgical practices, and architectural settings to the Spanish-speaking New World. Materials include study of original sources (for those students who know Latin and/or music), of filmed performances and sound recordings, of slides and other visuals, and of texts of plays in translation. Plays are studied in English with Latin or Spanish performances for listening. *Also MDVL 551b, REL 858b.*

MUSI 951b, Metric Dissonance in the Music of Brahms. Richard Cohn.

Th 10–12

This seminar is concerned with developing a conceptual basis (together with associated vocabulary and graphing technique) for modeling metric complexity in nineteenth-century music; exploring how various scholars (David Lewin, Peter Smith, Scott Murphy, Harald Krebs, Yonatan Malin, Richard Cohn) have used this technology to understand and communicate about aspects of Brahms's compositional craft; and analyzing vocal and instrumental compositions of Brahms whose metric features have not yet been treated extensively in the published literature.

MUSI 980a, Lewinian Transformation Theory and Analysis. David Clampitt.

Th 10–12

An introduction to transformational approaches, including neo-Riemannian theory and its extensions and generalizations. Both tonal and post-tonal repertoire are explored, with an emphasis on the tonally dissolute music of the late nineteenth and early twentieth centuries.

MUSI 998a, Prospectus Workshop. Ellen Rosand.

T 4–5:30

MUSI 999b, Dissertation Colloquium. Ellen Rosand.

T 4–5:30

NEAR EASTERN LANGUAGES AND CIVILIZATIONS

314 Hall of Graduate Studies, 432.2944

M.A., M.Phil., Ph.D.

Chair

Beatrice Gruendler

Director of Graduate Studies

John Darnell (320 HGS, 432.2159, john.darnell@yale.edu)

Professors

Benjamin Foster, John Darnell, Beatrice Gruendler, Dimitri Gutas, Bentley Layton, Harvey Weiss

Assistant Professors

Eckart Frahm, Hala Nassar

Lecturers

Adel Allouche, Karen Foster, Kathryn Slanski

Senior Lectors

Fereshteh Amanat-Kowssar, Ayala Dvoretzky, Bassam Frangieh

Lectors

Fatma-Nihan Ketrez, Klara Wistinetzki

Fields of Study

Fields include Arabic and Islamic studies (also with interdisciplinary minor), Greco-Arabic studies, Assyriology, and Egyptology.

Special Admissions Requirements

Applicants should state their specific field of study and intended specialization. Evidence of a reading knowledge of *both* French and German is required of all students. Proficiency in one of these languages is normally prerequisite for admission and deficiency in the second language must be rectified before admission to a second year of study. Proficiency will be certified by passing a departmental examination upon registration at Yale. Students admitted with only one of the two required languages or who fail the departmental examination are expected to enroll in an appropriate full-year course given by the French or German department at Yale. Completion of such a course with a grade of A or B will be accepted as fulfilling the proficiency requirement in either language; exceptions, e.g., for native speakers of French or German, may be made by the department upon recommendation of the director of graduate studies.

Special Requirements for the Ph.D. Degree

Course Work: The department normally requires three full years of course work, four year courses or eight term courses per year being considered a full load. This may be reduced

to two years in cases of exceptional background in Near Eastern languages. Normal progress in course work is considered to be consistent achievement of grades of High Pass or better, and at least four term courses or two year courses with Honors per year.

Special Language and Course Requirements: Course work should be planned to meet two departmental general standards: core languages for the primary fields of study, and minimum competence in a secondary field. The core languages in each of the major fields of study are as follows: *Arabic and Islamic Studies:* Arabic, Persian (Farsi) or Syriac or Greek; *Assyriology:* Sumerian and Akkadian; *Egyptology:* Egyptian and at least four terms of Demotic or Coptic. Minimum competence in a secondary field of study is defined as follows: at least two terms of a Near Eastern language to be evaluated either by examination or with a course grade of High Pass or better, or at least two terms of nonlanguage courses outside the area of specialization. A minimum grade of High Pass in these courses will be considered successful fulfillment of this requirement.

In Arabic and Islamic Studies, the minimum competence can be extended to an interdisciplinary course of study in a minor field. Minors may include six to eight term courses in the following departments and programs: Anthropology, Comparative Literature, French, German Studies, Greek and Classics, History, History of Medicine and Science, Judaic Studies, Italian, Linguistics, Medieval Studies, Political Science and Sociology, Philosophy, Religious Studies, Spanish and Portuguese, or others, by permission of the director of graduate studies. Students in all programs of the department will be expected to declare their choice of a secondary language or area, or a minor field, by their third term of study.

Examinations and the Dissertation: The comprehensive examination is normally taken at the end of the third year of study or, where advanced standing has been granted, at the end of the second year, but in no case later than September of the academic year following the last year of the student's required course work. The scope of the examination will be determined by the director of graduate studies in consultation with the student and department member(s) in whose area the student's studies are concentrated. The examination will consist of written and oral portions and will cover no fewer than five and no more than six areas. In the case of the program in Arabic and Islamic Studies with an interdisciplinary minor, the written portion will consist of two language examinations and one subject in the minor field, and the oral of two subjects in Arabic studies and one in the minor field. The written examinations will be set by the individual faculty members responsible for particular areas of study, but the oral portion will be conducted by the full staff of the department. The dissertation proposal is normally submitted one month following the completion of the qualifying examination. Successful completion of the comprehensive examination and submission of an acceptable prospectus will qualify the student for admission to candidacy for the Ph.D. degree. After completion of the dissertation, the candidate may receive a final examination concerned primarily with the defense of the thesis.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in Near Eastern Languages and Civilizations are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies. In addition to the Graduate School requirements, the dissertation prospectus must have been accepted.

M.A. Applicants who do not wish to enroll in the Ph.D. program may pursue a Master of Arts degree. Students enrolled in such a program should complete a minimum of twelve term courses with at least two term grades of Honors and an average of High Pass in the remaining courses, and will be required to submit a master's thesis no later than April 1 of the fourth term of study. No financial aid is available. Students enrolled in the Ph.D. program are also eligible for this degree by meeting the same requirements.

Program materials are available upon request from the Director of Graduate Studies, Department of Near Eastern Languages and Civilizations, Yale University, PO Box 208236, New Haven CT 06520-8236.

Courses

ARBC 501^U, Elementary Modern Standard Arabic. Staff.

501-1 MTWThF 1.30–2.20

501-2 MTWThF 12.30–1.20

Develops a basic knowledge of modern standard Arabic. Emphasis on grammatical analysis, vocabulary acquisition, and the development of reading and writing skills.

ARBC 502^U, Spoken Modern Standard Arabic. Staff.

502-1 TTh 2.30–3.45

502-2 WF 2.30–3.45

A supplement to the elementary course in modern standard Arabic, emphasizing oral skills. Corequisite or prerequisite: ARBC 501^U or permission of instructor.

ARBC 503^U, Intermediate Modern Standard Arabic. Staff.

503-1 MTWThF 1.30–2.20

503-2 MTWThF 12.30–1.20

Intensive review of grammar; readings from contemporary and classical Arab authors with emphasis on serial reading of unvoweled Arabic texts, prose composition, and formal conversation.

ARBC 504^U, Advanced Modern Standard Arabic. Hala Nassar.

TTh 1–2.15

Focus on improving the listening, writing, and speaking skills of students who already have a substantial background in the study of modern standard Arabic.

ARBC 505a^U or b^U, Arabic Seminar. Beatrice Gruendler [F], Dimitri Gutas [Sp].

T 3.30–5.20

Study and interpretation of classical Arabic texts for advanced students.

NELC 829a, History of the Arabic Language. Beatrice Gruendler.

The course covers the development of the Arabic language from the earliest epigraphic evidence through the formation of the Classical 'Arabiyya and further, to Middle Arabic and Neo-Arabic. Readings of textual specimens and survey of secondary literature.

[ARBC 511a, Greco-Arabic Seminar.]

NELC 521b, Seminar in the Philosophy of Avicenna. Dimitri Gutas.

M 3.30–5.20

ARBC 514^u, Introduction to Judeo-Arabic. Uri Melammed.

TTh 9–10.15

Introduction to the grammar and lexicography of classical Judeo-Arabic in its different dialects from the tenth century to the sixteenth. Examination of texts from various fields of Jewish studies. Prerequisite: knowledge of classical Arabic or fluency in modern Judeo-Arabic. *Ako JDST 690^u*.

ARBC 551a^u, East Meets West: Drama and Theater in the Arab World. Hala Nassar.

Th 2.30–4.20

[ARBC 552b^u, Gender and Nationalism in Arab Women's Literature.]

NELC 830a, The History of the Islamic Near East from Mohammad to the Mongol Invasion. Adel Allouche.

TTh 11.30–12.45

An examination of the shaping of society and polity from the rise of Islam to the Mongol conquest of Baghdad in 1258. The origins of Islamic society; conquests, and social and political assimilation under the Umayyads and Abbasids; the changing nature of political legitimacy and sovereignty under the caliphate; provincial decentralization; and new sources of social and religious power.

[ARBC 564b, Poetic Motif and Literary Theft.]

[ARBC 572b^u, Greek into Arabic into Latin: Foundations of Western Culture.]

[ARBC 573b, Introduction to Medieval Arabic Literary Criticism.]

ARBC 807b^u, Modern Arab Thought. Hala Nassar.

Th 2.30–4.20

Major trends of twentieth-century Arab thought critically examined through readings in translation from a wide range of thinkers. Issues are analyzed in the context of the historical-colonial, postcolonial, and neocolonial background from which they emerged.

ARBC 844b, Arabic Paleography. Adel Allouche.

Th 1.30–3.20

ARBC 849a or b, Directed Readings: Arabic.

ARBC 850a, Introduction to Arabic and Islamic Studies. Dimitri Gutas.

W 2.30–4.20

Comprehensive survey of the various subjects treated in Arabic and Islamic studies, with representative readings from each. Detailed investigation into the methods and techniques of scholarship in the field, with emphasis on acquiring familiarity with the bibliographical and other research tools.

CPTC 501^u, Biblical Coptic: Elementary Course. Colleen Manassa.

TTh 11.30–12.45

CPTC 502a^u, Introduction to Gnostic Texts in Coptic. Bentley Layton.

MW 2.30–3.45

CPTC 503b^u, Egyptian Monastic Literature in Coptic. Bentley Layton.

TTh 11.30–12.45

[CPTC 504b^u, Seminar: The Making of Monasticism.]**NELC 726a^u, History of Christianity in the Ancient World: Jesus to Augustine. Bentley Layton.**

The rise of Christianity and the development of Western culture into the Middle Ages, including the creation of Christian orthodoxy; religious, political, social, gender, literary, and theological history of Christian religion in many forms. No previous background assumed.

NELC 735b^u, Gnostic Religion and Literature.**NELC 736b, The Manichaean World Religion. Bentley Layton.**
w 4–6

Recent research on the world religion of Mani, founded in the third century. Its spread to Africa, Europe, the Middle East, and central Asia, as attested in text, art, and archaeology. An exploratory seminar, with no special prerequisites. Texts are read in modern translation. The grades of Satisfactory/Unsatisfactory will be assigned.

EGYP 501^u, Introduction to Classical Hieroglyphic Egyptian. David Klotz.
tth 9–10.15

An introduction to the language of ancient pharaonic Egypt (Middle Egyptian) and its hieroglyphic writing system, with short historical, literary, and religious texts. Grammatical analysis with exercises in reading, translation, and composition.

EGYP 531, Egyptian Historical Texts. John Darnell.**EGYP 533, Egyptian Literary Texts. John Darnell.****[EGYP 566b, Late Period Historical Texts: Napatan Historical Inscriptions.]****EGYP 567b, Temple Inscriptions: Medinet Habu. John Darnell.**

Overview of a complete temple from the New Kingdom, the “Temple of Millions of Years” of Ramesses III located on the west bank at Thebes. Readings of historical and religious texts that discuss the temple’s historical significance. Ramesside religious texts with discussion of their transmission, “grammar of the temple,” etc. Additional readings cover supporting materials, such as passages from the Great Papyrus Harris, other monuments of Ramesses III, and late variants of the Book of the Dead.

EGYP 577a, Egyptian Rock Inscriptions. John Darnell.**HEBR 501^u, Elementary Modern Hebrew. Ayala Dvoretzky, Ilana Wistinetzki.**

501-1 MTWTHF 1.30–2.20, drill 1 HTBA (for beginners)

501-2 MTWTHF 9.30–10.20, drill 1 HTBA (for students with some knowledge of Modern Hebrew)

Introduction to the language of contemporary Israel, both spoken and written. Fundamentals of grammar; extensive practice in speaking, reading, and writing under the guidance of a native speaker.

HEBR 502^u, Intermediate Modern Hebrew. Ayala Dvoretzky, Ilana Wistinetzki.

502-1 MW 11.30–12.45, drill 1 HTBA

502-2 MW 1–2.15, drill 1 HTBA

Continuation of modern Hebrew, with literary readings selected from contemporary prose and verse. Review and continuation of grammatical study leading to a deeper comprehension of style and usage, under the guidance of a native speaker. Prerequisite: HEBR 501^u or equivalent.

HEBR 503b^u, Advanced Modern Hebrew: Ideological and Social Discourse. Ilana Wistinetzki.

MW 2.30–3.45

HEBR 504b^u, Introduction to Modern Israeli Literature. Ayala Dvoretzky.

MW 11.30–12.45

Reading, discussion, and analysis of short stories, poetry, and magazine articles representative of contemporary Israeli culture, with attention to different styles. Conducted in Hebrew. Prerequisite: HEBR 502^u or equivalent.

HEBR 511, Elementary Biblical Hebrew. Michael Novick.

TTh 11.30–12.45

HEBR 513a^u, Mishnaic Hebrew Grammar. Moshe Bar-Asher.

th 2.30–3.45

Introduction to the orthography, phonology, and morphology of Mishnaic Hebrew, the Hebrew employed in rabbinic texts of the first two centuries C.E. Prerequisite: two years of biblical or modern Hebrew. *Also JDST 680a^u.*

MESO 501^u, Elementary Akkadian. Thomas Eby [F], Elizabeth Payne [Sp].

MWF 11.30–12.45

MESO 502, Advanced Akkadian. Kathryn Slanski.**MESO 531, Beginning Sumerian. Emmanuelle Salgues.**

[MESO 532b, Intermediate Sumerian.]

[MESO 533a or b, Advanced Sumerian.]

MESO 539a or b, Directed Readings: Sumerian.

[MESO 543a, Neo-Assyrian History.]

[MESO 544b, Mesopotamian Selected Texts: Scholarly Texts.]

MESO 559a or b, Directed Readings: Assyriology.

[MESO 571a or b, Tales from before Homer: An Introduction to Sumerian and Babylonian Literature.]

[MESO 572a or b, Prophecy in Mesopotamia.]

[MESO 573a or b, Neo-Babylonian and Late-Babylonian Texts.]

[NELC 516a or b, Mythology of the Ancient Near East.]

[NELC 520a or b, Parallel Worlds: Ancient Egypt and Mesopotamia.]

PERS 501^u, Elementary Persian (Farsi). Fereshteh Amanat-Kowssar.

MTWThF 9.30–10.20

An introduction to modern Persian, with emphasis on grammar and syntax as well as writing and reading simple prose. Both literary and classical Persian are taught in the second term.

PERS 502^u, Intermediate Persian (Farsi). Fereshteh Amanat-Kowssar.

MWF 10.30–11.20

Detailed analysis of Persian usage and syntax through the study of modern and classical texts in prose and poetry. Readings from newspapers, textbooks, historical writings, travelogues, classical and modern literature.

PERS 503a^u, Persian Seminar: Identity and Awakening. Fereshteh Amanat-Kowssar.

MW 11.30–12.45

An advanced reading course concentrating on primary sources in Persian, with emphasis on nineteenth- and twentieth-century ideas of identity and change. Some religious and Sufi material is studied as background. Prerequisite: PERS 502 or equivalent.

PERS 859a or b, Directed Readings: Persian.

[SMTC 501b, Introduction to Comparative Semitics.]

[SMTC 511, Introduction to Ugaritic.]

[SMTC 521^U, Elementary Syriac.]**SMTC 522a, Syriac Prose Texts. Staff.**

The different genres of Syriac prose literature are introduced with reference to historical background, philological problems, and variations in grammar. Knowledge of Syriac, Greek, and preferably also Hebrew is assumed.

SMTC 522b, Syriac Poetic Texts. Staff.

The different genres of Syriac poetic literature are introduced with reference to theological and philological problems and poetic structure. Knowledge of Syriac, Greek, and preferably also Hebrew is assumed.

SMTC 531a^U, Aramaic Survey I: First Millennium B.C.E. Staff.

The different dialects of Aramaic attested in the first millennium B.C.E. are analyzed with reference to historical and philological problems. Knowledge of Hebrew is assumed. Special attention is paid to the comparative grammar of the Aramaic dialects.

SMTC 532b^U, Aramaic Survey II: Dialects of the Common Era. Staff.

The different dialects of Aramaic attested in the Common Era are analyzed with reference to historical and philological problems. Knowledge of Hebrew and preferably Biblical or Talmudic Aramaic is assumed. Special attention is paid to the comparative grammar of the Aramaic dialects. A special feature of this course is the analysis of various modern dialects of Aramaic, which are facing extinction in the near future. These dialects display an increased level of borrowing from Arabic and Persian.

[SMTC 542b, Ethiopic.]

TKSH 501^U, Elementary Turkish. Nihan Ketrez.

MTWThF 9.30–10.20

Development of a basic knowledge of modern Turkish, with emphasis on grammatical analysis, vocabulary acquisition, and the training of reading and writing skills.

TKSH 502^U, Intermediate Turkish. Nihan Ketrez.

MWF 11.30–12.45

Continued study of modern Turkish, with emphasis on advanced syntax, vocabulary acquisition, and the beginnings of free oral and written expression. Prerequisite: TKSH 501 or permission of instructor.

[TKSH 506a, Orkhon Turkic.]

[TKSH 507b, Old Turkic Literature.]

[NELC 503a, The Art of Ancient Palaces.]

NELC 504b^U, Art of the Ancient Near East and Aegean. Karen Foster.

MW 2.30–3.45

Introduction to the art and architecture of Mesopotamia, Egypt, and the Aegean, with attention to cultural and historical contexts.

NELC 506a, History of Mesopotamia: Third Millennium B.C.E. Benjamin Foster.

[NELC 507b, History of Mesopotamia: Second Millennium B.C.E.]

[NELC 508b, History of Mesopotamia: First Millennium B.C.E.]

[NELC 510a^u, Conflicts that Shaped Pharaonic Egypt.]

[NELC 511b^u, Ancient Egypt from the Ramesside to the Ptolemaic Periods.]

[NELC 512b^u, Egyptian Religion through the Ages.]

[NELC 544a, Mesopotamian Selected Texts: Bilingual.]

[NELC 545b, Neo-Babylonian.]

[NELC 563b, From Pictograph to Pixel: Changing Ways of Human Communication.]

[NELC 566a, Late Period Historical Texts: Napatan Historical Inscriptions.]

NELC 587b^u, Environmental History of the Near East. Harvey Weiss.

Th 9.30–11.20

Natural and anthropogenic climate and environmental changes of the Holocene studied in the lake, marine, and terrestrial records of West Asia. Periodic adaptations to these changes through the modern period within regional habitat-tracking, agricultural innovation and pastoralism, political expansion and disintegration, and ideological reformulation.

NELC 588b^u, Civilizations and Collapse. Harvey Weiss.

Th 2.30–4.20

Collapse documented in the archaeological and early historical records of the Old and New Worlds, including Mesopotamia, Mesoamerica, the Andes, and Europe. Analysis of politico-economic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict. *Also ANTH 773b^u, ARCG 773b^u.*

NELC 849a or b, Directed Readings: Arabic.

NELC 850a, Introduction to Arabic and Islamic Studies. Staff.

W 2.30–4.20

Comprehensive survey of the various subjects treated in Arabic and Islamic studies, with representative readings from each. Detailed investigation into the methods and techniques of scholarship in the field, with emphasis on acquiring familiarity with the bibliographical and other research tools.

NEUROBIOLOGY

C300 Sterling Hall of Medicine, 785.4323

M.S., M.Phil., Ph.D.

Chair

Pasko Rakic

Director of Graduate Studies

Amy Arnsten (SHM B428, 785.4431, amy.arnsten@yale.edu)

Director of Medical Studies

Michael Schwartz (SHM B163D, 785.4324, michael.schwartz@yale.edu)

Professors

Amy Arnsten, Colin Barnstable, Benjamin Bunney, Nigel Daw, Charles Greer, Jeffery Kocsis, Robert LaMotte, Csaba Leranth, David McCormick, Pasko Rakic, Joseph Santos-Sacchi, Ilsa Schwartz, Gordon Shepherd, Stephen Strittmatter, Stephen Waxman

Associate Professors

Meenakshi Alreja, Charles Bruce, Nihal de Lanerolle, Tamas Horvath, Thomas Hughes, James Mazer, Bitu Moghaddam, Marina Picciotto, Michael Schwartz, Flora Vaccarino, Christopher van Dyck

Assistant Professors

Hal Blumenfeld, Wei Chen, Maria Donoghue Velleca, Reiko Maki Fitzsimonds, Mark Laubach, Rick Matthews, James Mazer, Dhasakumar Navaratnam, Vincent Pieribone, Nenad Sestan, Ning Tian, Mark Yeckel

Fields of Study

Fields include the development, neuronal organization, and function of the mammalian central nervous system. The range of methods includes molecular and cellular neurobiology, neuroanatomy, receptor biochemistry, neuropharmacology, neurophysiology, and behavior. An integrative, multidisciplinary approach is encouraged.

Special Requirements for the Ph.D.

COURSE REQUIREMENTS

Six courses are required, and students must obtain a grade of Honors in two of these courses and maintain an HP average. Required courses are Principles of Neuroscience (NBIO 501a), Neurobiology (NBIO 720a), and Structural and Functional Organization of the Human Nervous System (NBIO 500b). Three more elective graduate-level courses are required. In addition to these six science courses, students must also take the Bioethics course.

LABORATORY ROTATIONS

Two rotations are required; typically completed in the first year. Rotations outside the Neuroscience track will count toward this requirement upon approval of the Neuroscience track directors.

TEACHING REQUIREMENTS

An important aspect of graduate training in Neurobiology is the acquisition of teaching skills through participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses at the undergraduate, graduate, and medical school levels. Ph.D. students are required to serve as Teaching Fellows (TF) for two terms. First-year students may not serve as a TF without written permission from the Neuroscience track directors. It is recommended that one term of teaching should be completed by the end of the third year, and both requirements be completed by the end of the fourth year.

Specifically, it is recommended that the first requirement be met by teaching in either Principles of Neuroscience (NBIO 501a), Neurobiology (NBIO 720a), Brain and Thought (CGSC 201a), or Structural and Functional Organization of the Human Nervous System (NSCI 510). The second course may be chosen from the list of neuroscience-related courses in the Graduate School of Arts and Sciences bulletin, or from the INP Bioethics course. A course not directly related to neuroscience must have the approval of the DGS.

QUALIFYING EXAM

Ph.D. students must complete their qualifying exam before the end of their second year as a graduate student. The student must choose four faculty members to read with; it is strongly encouraged that these faculty represent interests spanning from molecular to systems/cognitive neuroscience. The student and faculty should devise a reading list of about fifteen papers on a defined topic. They should meet regularly (at least three or four meetings) to discuss the papers in depth. For the written exam, the student is given two questions from each faculty member. The student has three hours to write an answer to one of the two questions for each faculty member, i.e., a twelve-hour written exam spread over two days. The exam is performed on a laptop observing the honor system and is proctored by the DGS. The student may refer to the papers and his/her notes but not to the Internet. The answers are distributed to the faculty, and several days later an oral exam is held to further evaluate the student's knowledge. A fifth faculty member (a reader) chosen by the student is also present at the oral exam, along with the DGS. If the student fails the qualifying exam, he/she may have one more attempt at passage; this must be completed within one term of taking the original exam.

PROSPECTUS

Ph.D. students must complete and submit their dissertation prospectus (also called thesis proposal) by the end of the third year as a graduate student. The guidelines are as follows:

1. The student should discuss with his/her mentor an appropriate topic and research plan for the thesis proposal, as well as discussing likely names of faculty to serve on the thesis committee.
2. The student should write a proposal of approximately ten pages (similar to an NRSA application). This should include (a) the hypothesis to be addressed, (b) a few pages of background and significance, (c) preliminary data to demonstrate feasibility, and (d) a research plan including strategies in case proposed experiments fail. It is highly recommended that the thesis include a core of conservative experiments, i.e., very feasible, well-controlled studies. High risk/high payoff studies should only be included as “halo” research; i.e., if these fail, the student should still be able to graduate.
3. The mentor should approve the thesis proposal.
4. The student should distribute the proposal to his/her thesis committee members at least several days before the thesis committee meeting, and optimally discuss the proposal with each member individually prior to the meeting to ensure that there are no major problems. The thesis committee is required to have four members: the mentor, and three other faculty, with at least one of those three faculty from outside the Neurobiology department. Faculty outside of Yale can be included if they can attend on a regular basis. Non-Yale faculty are often best included as a fifth member, so that a meeting can officially be held in their absence if needed.
5. The student meets with the thesis committee to approve the thesis proposal. It is at this time that the proposal is often modified, for instance by the suggestion of an additional control experiment. Goals should be realistic and in the interest of the student completing his/her degree in a timely manner. The finalized approved protocol is then provided to the Neurobiology business office, where the registrar will complete the paperwork for advancement to candidacy and send it to the Graduate School. As this must be completed before September 1, it is hoped that students will convene the thesis committee meetings prior to August 1.

The student should meet with his/her thesis committee on a yearly basis to update progress and problems. A one-page summary of this meeting, signed by the mentor and the DGS, should also be given to the business office to reside in the student's file.

ADMISSION TO CANDIDACY

Ph.D. students are required to have been admitted to candidacy by the end of the third year as a graduate student. Generally, the submission of the thesis prospectus is the final requirement for admission to candidacy and paperwork for both is submitted to the Graduate School at the same time.

OTHER REQUIREMENTS

All graduate students who are admitted to candidacy are required to have an annual thesis committee meeting. All graduate students are required to give a student research presentation annually (a brief INP rotation talk early in the graduate career, followed by

a longer Neurobiology Student Research Talk as the student's research advances). All students are expected to attend rotation/student research talks.

THESIS DEFENSE

There are several parts to the thesis defense: (1) The student gives the thesis document to the thesis committee with sufficient time for them to read this large document. (2) The student defends the thesis in front of the thesis committee. It is expected that small changes will be made before submitting the final document to the Graduate School. If substantial changes are needed, the defense must be delayed. (3) The student gives the public defense, a one-hour seminar summarizing the research and open to the community. The seminar follows successful defense before the committee. These can be several days apart, but should not be more than a week apart without permission of the DGS.

Special Requirements for the M.D./Ph.D.

COURSE REQUIREMENTS

Five courses are required; students must obtain a grade of Honors in two of these courses, and this must be achieved in the first two years of the combined program. Required courses are Principles of Neuroscience (NBIO 501a) and Structural and Functional Organization of the Human Nervous System (NBIO 500b). Three more elective graduate-level courses are required. The following courses taken during the first two years of medical school will count toward the student's elective requirements in the Neurobiology program, provided the student has registered to receive a graduate grade in the course: CBIO 502, CBIO 601, GENE 500a, MB&B 800a, Physiology 500. In the case of students accepted into the M.D./Ph.D. program during their first year of medical school, a letter from the faculty member in charge of the first-year course indicating the grade achieved in the course is required and an official transcript from the School of Medicine must be submitted to the Graduate School.

LABORATORY ROTATIONS

Two rotations are required; rotations in another department/program will count toward this requirement upon approval of the Neuroscience track directors.

TEACHING REQUIREMENTS

M.D./Ph.D. students are required to serve as Teaching Fellows (TF) for one term; two terms are preferred. Previous teaching (as TF) in the histology labs or courses in MCDB does count toward this requirement as long as the student has taught while enrolled at Yale as an M.D./Ph.D. student.

QUALIFYING EXAM

M.D./Ph.D. students must complete their qualifying exam before the end of their first year as an affiliated graduate student. Thus, if the student affiliates at the customary 2½-year point (beginning of the spring term of the third year of matriculation at Yale), he/she must complete the examination before registering for the spring term of the fourth year at Yale.

PROSPECTUS

M.D./Ph.D. students must complete and submit their dissertation prospectus (i.e., thesis proposal) by the end of the second year as an affiliated graduate student. Thus, if the student affiliates at the customary 2½-year point, he/she must submit the approved prospectus before registering for the spring term of the fifth year (at the beginning of year 3 as an affiliated graduate student).

Please note that every dissertation prospectus must be approved by the thesis committee.

ADMISSION TO CANDIDACY

M.D./Ph.D. students are required to have been admitted to candidacy by the end of the second year as an affiliated graduate student. Generally, the submission of the dissertation prospectus is the final requirement for admission to candidacy and paperwork for both is submitted to the Graduate School at the same time.

OTHER REQUIREMENTS

All graduate students who are admitted to candidacy are required to have an annual thesis committee meeting. All graduate students are required to give a student research presentation annually (a brief INP rotation talk early in the graduate career, followed by a longer Neurobiology Student Research Talk as the student's research advances). All students are *expected* to attend rotation/student research talks.

Affiliation requirement: A copy of the student's application to the M.D./Ph.D. program, a copy of the student's current transcript, and notation of rotations completed must be submitted to the Neurobiology program business office. The DGS must have this information in hand before the official M.D./Ph.D. student affiliation form can be approved. The Neurobiology program business office requests that copies of transcripts for all affiliated M.D./Ph.D. students be forwarded when they are received by the M.D./Ph.D. office.

TIMELINE

Year One: M.D./Ph.D. students complete courses in the School of Medicine and register for selected courses in the Graduate School. Most who identify Neuroscience as their probable Ph.D. field will take the required course, Principles of Neuroscience, in the fall term. This is the recommended timing. M.D./Ph.D. students should take NBIO 500b in the spring for graduate school credit/grade. Other electives as listed above may be taken for graduate school credit to fulfill our requirements, and indeed, it is recommended that this be done. Two laboratory rotations should be completed in the summer. The DGS's of both the Neurobiology program and the INP may be of assistance in identifying appropriate laboratories based in the student's interests.

Year Two: Courses in the School of Medicine are typically taken. Part 1 of the Boards is taken.

Year Three: By January of the third year, a thesis lab should be identified and all paperwork should be completed (affiliation form completed and copy of student's academic

record including application transferred to the Neurobiology business office). Student's stipend is supplemented by PI/PI's primary department at time of affiliation.

Year Four: The Qualifying Examination must be completed within one year of laboratory/program affiliation. Registration for the following term will be denied if this requirement is not fulfilled in a timely manner. Typically this will be fulfilled before the spring term of the fourth year.

Year Five: The dissertation prospectus must be approved and submitted to the Graduate School by the end of the second year of laboratory/PI affiliation. Typically, this is by the end of the fall term of year five. Registration for the following term will be denied if this requirement is not fulfilled in a timely manner. The Thesis Committee approves the prospectus, and required paperwork is then delivered to the Neurobiology program business office by the student. The Neurobiology program business office will then complete the Admission to Candidacy paperwork and submit it to the Graduate School. The prospectus must be submitted to the Graduate School at least six months before the dissertation is submitted.

Year Six: Typically an M.D./Ph.D. student will complete and defend his/her dissertation at the end of the fall term or the beginning of the spring term. We require that M.D./Ph.D. students defend their dissertations before returning to fulfill the remaining Medical School requirements.

Year Seven: Student completes all remaining requirements and graduates in May.

While this is considered a guideline for a typical M.D./Ph.D. student, we recognize that not every student will follow this path. Any digression from this timeline must be discussed and approved by the DGS, with appropriate notes to the student's file and copies to the M.D./Ph.D. office. Continued participation in the Neurobiology program is subject to the satisfactory completion of requirements in a timely fashion. If any question arises about the satisfactory progress of a student, and the qualifying examination committee or the thesis committee cannot agree on an appropriate resolution, then the Neurobiology faculty will meet to determine a course of action.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Awarded only to students who are continuing for the Ph.D. degree. Students are not admitted for this degree.

M.S. Awarded only to students who are not continuing for the Ph.D. degree but who have successfully completed one year of the doctoral program (i.e., passing of at least four courses, including two Honors grades, and two successful laboratory rotations). Students are not admitted for this degree.

Program materials are available upon request to the Director of Graduate Studies, Department of Neurobiology, Yale University, PO Box 208001, New Haven CT 06520-8001.

Courses

NBIO 500b, Structural and Functional Organization of the Human Nervous System.

Pasko Rakic, Michael Schwartz, and staff.

An integrative overview of the structure and function of the human brain as it pertains to major neurological and psychiatric disorders. Neuroanatomy, neurophysiology, and clinical correlations are interrelated to provide essential background in the neurosciences. Lectures in neurocytology and neuroanatomy survey neuronal organization in the human brain, with emphasis on long fiber tracts related to clinical neurology. Weekly three-hour laboratory sessions devoted to neuroanatomy in which students dissect the human brain and examine histological sections in close collaboration with faculty members. Lectures in neurophysiology cover various aspects of neural function at the cellular level, with a strong emphasis on the mammalian nervous system. Each student may participate in a weekly physiology conference with a faculty member, covering such topics as vision, sensory physiology, motor systems, simple nervous systems, or general neurophysiology. Clinical correlations consist of five sessions given by one or two faculty members representing both basic and clinical sciences. These sessions relate neurological symptoms to cellular processes in various diseases of the brain. Variable class schedule; contact course instructors. *Also NSCI 510b.*

NBIO 501a, Principles of Neuroscience. Marina Picciotto, Reiko Fitzsimonds.

WF 3.15–4.45

General neuroscience seminar: lectures, readings, and discussion of selected topics in neuroscience. Emphasis is on how approaches at the molecular, cellular, physiological, and organismal levels can lead to understanding of neuronal and brain function. *Also NSCI 501a.*

NBIO 502a, Structure and Function of Neocortex. Faculty.

This seminar/lecture course covers anatomical, biochemical, and physiological organization of selected sensory, motor, and association regions of cortex. Sample topics discussed include development, evolution of multiple representations, columnar organization, and plasticity of neocortex. Permission of instructor required.

[NBIO 507b, Cellular and Molecular Mechanisms of Neurologic Disease.]

NBIO 509b, Synaptic Organization of the Nervous System. Gordon Shepherd,

Anne Williamson, Michael Hines.

An integrative introduction to the principles underlying the organization of neural systems. The focus is on the best-understood systems, including spinal cord, olfactory bulb, retina, cerebellum, thalamus, basal ganglia, and cerebral cortex. Students integrate experimental findings from anatomy, electrophysiology, and neuropharmacology with computational models at the cellular and circuit level. *Also NSCI 539b.*

NBIO 510, Introduction to Methods in Cellular and Molecular Neurobiology.

Faculty.

Firsthand insight into various techniques and approaches used in neuroscience. Light microscopic techniques include various metallic impregnation methods, autoradiography, anterograde and retrograde axonal transport methods, hybridoma and recombinant DNA technology, deoxyglucose metabolic method, fluorescent and immunocytochemical methods. Electron microscopy encompasses transmission, electronmicroscopic autoradiography, and immuno-peroxidase methodology. Choice of techniques and hours to be arranged with individual faculty or staff members of the Department of Neurobiology.

NBIO 511, Introduction to Techniques Used in Electrophysiological Analysis at the Cellular Level. Faculty.

Includes practical training in *in vivo* and *in vitro* nervous system preparations, extracellular and intracellular recordings, sensory stimulation, dye injections, and selected neuropharmacolog-

ical procedures. Choice of techniques and hours to be arranged with individual faculty or staff members of the Department of Neurobiology.

[NBIO 520a, Vision: Cellular and Network Dynamics of the Cerebral Cortex.]

[NBIO 524a, The Regulation of Cell Fate during CNS Development.]

[NBIO 530b, Neurobiology of Schizophrenia.]

NBIO 550, Introduction to Neuroinformatics. Gordon Shepherd, Perry Miller, and staff.

NBIO 570a, Cellular and Network Dynamics of Sensory and Motor Functions. Charles Bruce and faculty.

NBIO 601, Topics in Olfactory Physiology. Gordon Shepherd.
Advanced tutorial course.

NBIO 610b, Fundamentals in Neurophysiology. Vincent Pieribone, Fred Sigworth.
This course is designed for students who wish to gain a theoretical and practical knowledge of modern neurophysiology. Graduate students specializing in neurophysiology and non-neurophysiology are encouraged to attend, as the course begins at a very basic level and progresses to more complicated topics. Topics include properties of ion channels, firing properties of neurons, synaptic transmission, and neurophysiology methodology.

NBIO 720a, Neurobiology. Haig Keshishian, Paul Forscher.

MWF 11.30 – 12.20

Examination of the excitability of the nerve cell membrane provides a starting point for the study of molecular, cellular, and intracellular mechanisms underlying the generation and control of behavior. *Also MCDB 720a^{II}, NSCI 720a.*

NEUROSCIENCE

L-200 Sterling Hall of Medicine, 785.5932

M.S., M.Phil., Ph.D.

Directors of Graduate Studies

Haig Keshishian (*Molecular, Cellular & Developmental Biology*) (KBT 640, 432.3478, haig.keshishian@yale.edu)

Charles Greer (*Neurosurgery; Neurobiology*) (FMB 412, 785.4034, charles.greer@yale.edu)

Professors

George Aghajanian (*Psychiatry; Pharmacology*), Amy Arnsten (*Neurobiology*), Colin Barnstable (*Ophthalmology & Visual Science; Neurobiology*), Linda Bartoshuk (*Surgery; Psychology*), Walter Boron (*Cellular & Molecular Physiology*), Benjamin Bunney (*Psychiatry; Pharmacology; Neurobiology*), John Carlson (*Molecular, Cellular & Developmental Biology*), Marvin Chun (*Psychology*), Lawrence Cohen (*Cellular & Molecular Physiology*), Nigel Daw (*Ophthalmology & Visual Science; Neurobiology*), Pietro De Camilli (*Cell Biology*), Ronald Duman (*Psychiatry; Pharmacology*), Barbara Ehrlich (*Pharmacology; Cellular & Molecular Physiology*), Reiko Maki Fitzsimonds (*Cellular & Molecular Physiology; Neurobiology*), Paul Forscher (*Molecular, Cellular & Developmental Biology*), Charles Greer (*Neurosurgery; Neurobiology*), Marcia Johnson (*Psychology; Psychiatry*), Leonard Kaczmarek (*Pharmacology; Cellular & Molecular Physiology*), Kenneth Kidd (*Genetics; Molecular, Cellular & Developmental Biology; Psychiatry*), Jeffery Kocsis (*Neurology; Neurobiology*), Robert LaMotte (*Anesthesiology; Neurobiology*), Thomas Lentz (*Cell Biology*), Laura Manuelidis (*Neuropathology*), David McCormick (*Neurobiology*), Mark Mooseker (*Molecular, Cellular & Developmental Biology; Cell Biology; Pathology*), Frederick Naftolin (*Obstetrics & Gynecology; Molecular, Cellular & Developmental Biology*), Angus Nairn (*Psychiatry; Pharmacology*), Pasko Rakic (*Neurobiology*), Robert Roth (*Psychiatry; Pharmacology*), Gary Rudnick (*Pharmacology*), W. Mark Saltzman (*Chemical Engineering; Biomedical Engineering*), Joseph Santos-Sacchi (*Surgery; Neurobiology*), Ilsa Schwartz (*Surgery; Neurobiology*), Steven Segal (*Cellular & Molecular Physiology; Molecular, Cellular & Developmental Biology; Biomedical Engineering*), Gordon Shepherd (*Neurobiology*), Frederick Sigworth (*Cellular & Molecular Physiology; Biomedical Engineering*), Stephen Strittmatter (*Neurology; Neurobiology*), Allan Wagner (*Psychology*), Stephen Waxman (*Neurology; Pharmacology; Neurobiology*), Robert Wyman (*Molecular, Cellular & Developmental Biology*), Tian Xu (*Genetics*), Steven Zucker (*Computer Science; Electrical Engineering; Biomedical Engineering*)

Associate Professors

Meenakshi Alreja (*Psychiatry; Neurobiology*), Charles Bruce (*Neurobiology*), R. Todd Constable (*Diagnostic Radiology; Neurosurgery*), Nihal de Lanerolle (*Neurosurgery; Neurobiology*), Lise Heginbotham (*Molecular Biophysics & Biochemistry*), James Howe (*Pharmacology*), Anthony Koleske (*Molecular Biophysics & Biochemistry; Neurobiology*), Gero

Miesenböck (*Cell Biology*), Marina Picciotto (*Psychiatry; Pharmacology; Neurobiology*), Vincent Pieribone (*Cellular & Molecular Physiology; Neurobiology*), George Richerson (*Neurology; Cellular & Molecular Physiology*), Michael Schwartz (*Neurobiology*), Jane Taylor (*Psychiatry; Psychology*), Flora Vaccarino (*Child Study Center; Neurobiology*), Michael Westerveld (*Neurosurgery*), Anne Williamson (*Neurosurgery*), Weimin Zhong (*Molecular, Cellular & Developmental Biology*)

Assistant Professors

Patrick Allen (*Psychiatry*), Robert Beech (*Psychiatry*), Thomas Biederer (*Molecular Biophysics & Biochemistry*), Hal Blumenfeld (*Neurology; Neurobiology*), Angélique Bordey (*Neurosurgery*), Wei Chen (*Neurobiology*), Ralph DiLeone (*Psychiatry*), Maria Donoghue Velleca (*Neurobiology*), Karyn Frick (*Psychology*), Jeremy Gray (*Psychology*), Hür Köser (*Electrical Engineering*), Mark Laubach (*Neurobiology*), David LaVan (*Mechanical Engineering*), Erin Lavik (*Biomedical Engineering*), Michael Levene (*Biomedical Engineering*), Christy Marshuetz (*Psychology*), Russell Matthews (*Neurobiology*), Dhasakumar Navaratnam (*Neurology; Neurobiology*), Michael Nitabach (*Cellular & Molecular Physiology*), Maria Mercedes Piñango (*Linguistics*), Laurie Santos (*Psychology*), Glenn Schafe (*Psychology*), Nenad Sestan (*Neurobiology*), Dana Small (*Psychology; Surgery*), Matthew State (*Child Study Center; Genetics*), Elke Stein (*Molecular, Cellular & Developmental Biology*), Ning Tian (*Ophthalmology & Visual Science*), Vinzenz Unger (*Molecular Biophysics & Biochemistry*), David Wells (*Molecular, Cellular & Developmental Biology*), Mark Yeckel (*Neurobiology*), David Zenisek (*Cellular & Molecular Physiology*)

Research Scientists

Joel Black (*Neurology*), Nicholas Carnevale (*Psychology*)

Fields of Study

The Interdepartmental Neuroscience Program offers flexible but structured interdisciplinary training for independent research and teaching in neuroscience. The goal of the program is to ensure that degree candidates obtain a solid understanding of cellular and molecular neurobiology, physiology and biophysics, neural development, systems and behavior, and neural computation. In addition to course work, graduate students participate in a regular journal club, organize the *Interdepartmental Neuroscience Program Seminar Series*, and attend other seminar programs, named lectureships, symposia, and an annual research retreat.

Special Admissions Requirements

Applicants to the Neuroscience Program should have a B.S. or B.A. Most applicants have had course work in neuroscience, psychobiology, physiological psychology, mathematics through calculus, general physics, general biology, general chemistry, organic chemistry, biochemistry, computer science, or engineering. Deficiencies in these areas can be corrected through appropriate course work in the first year of residence. Laboratory research experience is desirable but is not a formal requirement. Scores for the GRE

(General Test required; Subject Test recommended) or MCAT, three letters of recommendation, transcripts of undergraduate grades, and a statement of interest must accompany the application.

To enter the Ph.D. program, students apply to an interest-based track within the interdepartmental graduate program in the Biological and Biomedical Sciences (see pages 71–73).

Special Requirements for the Ph.D. Degree

Each entering student is assigned a faculty advisory committee to provide guidance. This committee is responsible for establishing the student's course of study and for monitoring his or her progress. This committee will be subsequently modified to include faculty with expertise in the student's emerging area of interest. Although each student's precise course requirements are set individually to take account of background and educational goals, the course of study is based on a model curriculum beginning with four core courses (Principles of Neuroscience, Neurobiology, Bioethics in Neuroscience, and Structural and Functional Organization of the Human Nervous System) designed to ensure broad competence in modern neuroscience. Students are also required to complete at least three additional courses from a broad set of neuroscience-related courses. The Graduate School uses grades of Honors, High Pass, Pass, and Fail and requires two term grades of Honors during the first two years of study. Students are expected to maintain at least a High Pass average. A series of at least two laboratory rotations during the first year of the program also ensures that degree candidates obtain a solid background in systems, cellular, and molecular approaches to neuroscience. Admission to candidacy requires passing a qualifying examination normally given during the second year, and submission of a dissertation prospectus (NIH grant format) before the end of the third year. In accordance with the expectations of the BBS program, Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Thesis committee meetings are required annually. Also required is the completion and satisfactory defense of the thesis.

Requirements for M.D./Ph.D. students are the same as for Ph.D. students with the following differences: five courses are required (Principles of Neuroscience and Structural and Functional Organization of the Human Nervous System, and three elective graduate level courses). M.D./Ph.D. students are required to serve for one term as teaching assistants; however, two terms of teaching are preferred.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. Awarded only to students who are not continuing for the Ph.D. degree but who have successfully completed one year of the doctoral program. The minimum requirement for this is a passing grade in at least four courses, including two Honors grades, and two successful laboratory rotations. Students are not admitted for this degree.

Program materials are available upon request to the Director of Graduate Studies, Neuroscience, Yale University, PO Box 208074, New Haven CT 06520-8074.

Courses

NSCI 501a, Principles of Neuroscience. Marina Picciotto, Mark Yeckel.

WF 3:15–4:45

General neuroscience seminar: lectures, readings, and discussion of selected topics in neuroscience. Emphasis is on how approaches at the molecular, cellular, physiological, and organismal levels can lead to understanding of neuronal and brain function. *Also NBIO 501a.*

[NSCI 502b, Cell Biology of the Nerve Cell.]

[NSCI 503b, Molecular Neurobiology.]

NSCI 504b, Seminar in Brain Development and Plasticity. Weimin Zhong.

MW 2:30–3:45

Weekly seminars (Monday) and discussion sessions (Wednesday) to explore recent advances in our understanding of brain development and plasticity, including neuronal determination, axon guidance, synaptogenesis, and developmental plasticity. *Also MCDB 735b^{II}.*

[NSCI 506b, Introduction to Brain and Behavior.]

NSCI 507b, Cellular and Molecular Mechanisms of Neurological Disease.

Dhasakumar Navaratnam, Stephen Strittmatter, Stephen Waxman.

TTh 4–5

Focuses on those diseases (Alzheimer's, Parkinson's, ALS and other neurodegenerative diseases, triplet repeat induced diseases, multiple sclerosis, epilepsy, etc.) in which modern neuroscience has advanced mechanistic explanations for clinical conditions. The course highlights recent molecular, electrophysiological, and imaging experiments in parsing disease mechanisms. The application of pathophysiological understanding to therapeutics is considered.

NSCI 510b, Structural and Functional Organization of the Human Nervous System.

Michael Schwartz, Pasko Rakic.

An integrative overview of the structure and function of the human brain pertaining to major neurological and psychiatric disorders. *Also NBIO 500b.*

[NSCI 514a, The Regulation of Cell Fate during CNS Development.]

NSCI 519a/b, Tutorial.

By arrangement with faculty and approval of the director of graduate studies.

[NSCI 521a, Neuroimaging in Neuropsychiatry.]

[NSCI 535b, History of Modern Neuroscience.]

NSCI 539b, Synaptic Organization of the Nervous System. Gordon Shepherd,

Anne Williamson, Michael Hines.

An integrative introduction to the principles underlying the organization of neural systems. The focus is on the best-understood systems, including spinal cord, olfactory bulb, retina, cerebellum, thalamus, basal ganglia, and cerebral cortex. Students integrate experimental findings from anatomy, electrophysiology, and neuropharmacology with computational models at the cellular and circuit level. *Also NBIO 509b.*

[NSCI 540a, Introduction to Statistics in Psychology.]

[NSCI 571b, Neurophysiology.]

[NSCI 580a, The MAP Kinase Pathway and Cognitive Disorders.]

NSCI 580b, Bioethics in Neuroscience. Charles Greer.

th 4–5:30

This course is an introduction to ethics and ethical decision-making in the neurosciences. Format for the course is an informal discussion. Each week we are joined by members of the Yale faculty and community who can share their experiences and expertise as it relates to the topic of the week. This course is mandatory for first-year graduate students in the Interdepartmental Neuroscience Program (INP). Grading is Pass/Fail and is based on attendance/participation, weekly reaction papers, and a final term paper.

NSCI 590a, Sensory Neuroethology: Bats, Owls, Electric Fish, and Beyond. James Mazer.

In this course we review the neurophysiology of sensory processing with particular attention to animal behavior (ethology) and computation. We begin with the classic neuroethology literature and end with current work on neocortical circuits underlying sensory processing in higher vertebrates. This seminar course meets once per week to read and discuss (mostly) primary research papers selected and presented by the students.

NSCI 600a, Experimental Methods in Neuroscience. R. Todd Constable.

trh 2–4

This course examines the experimental techniques currently available for the neuroscientist. It explores the kinds of information obtainable in studying phenomena ranging from electrophysiological recordings of individual neurons, to metabolic processes, ensembles of neurons, to behavioral output. Techniques covered include microscopic methods (light, electron), electrophysiology (extracellular/intracellular single-cell recordings, multiple cell recording methods, brain slices), macroscopic methods (ERP, MEG, TMR), metabolic measures (microdialysis, biosensors, MR spectroscopy), imaging approaches (optical tomography, PET, SPECT, functional MRI), and interventional techniques (lesions, cortical stimulation, knockout genetics, surgery, drugs). The knowledge gained from each of these approaches, the limitations of the methods, and future developments are considered.

NSCI 605b, Pathways of Discovery in Neuroscience. Meenakshi Alreja, Patrick Allen, Sabrina Diano, Jane Taylor.

This course deals with how some of the very major scientific discoveries have been made in the neurosciences, the personalities associated with those discoveries, along with the current status of that field. Topics to be discussed include “The Growth of Growth Factors.” We discuss how Rita Levi Montalcini, Stanley Cohen, and Victor Hamburger discovered NGF, the controversy behind their Nobel Prize, and how that field has grown over the last few decades, with growth factors now being considered for treatment of stress-related and neurodegenerative disorders. A second topic, “The Saga of GABA,” focuses on the inhibitory neurotransmitter, GABA; a profile of Eugene Roberts, the man who discovered GABA fifty years ago; the current status of GABA and GABA receptors; and how GABA receptors are being targeted for treatment of neurological and mental disorders. Additional lectures focus on other ground-breaking discoveries such as neurogenesis in the adult brain, hypocretins and narcolepsy, drugs of abuse.

NSCI 611a, Stem Cells and Approaches to Repair in the Nervous System. Erin Lavik.

This new course is a seminar in the isolation, differentiation, and therapeutic potential of neural stem cells. The seminar begins by focusing on the isolation of neural stem cells using a variety of techniques including FACS sorting, preferential passaging, and cloning. It then

covers the development of techniques to control the differentiation of NSCs as well as identify their potential using gene and drug delivery approaches as well as novel high throughput assays. Comparisons are made between the *in vitro* and *in vivo* data across stem cell lines and models. The ultimate therapeutic potential of NSCs is then addressed and current results along these lines are compared with other stem cell populations as well as fetal tissue. Weekly readings are drawn from the current literature and are used to guide discussion. Experts in the field are also invited to lead sessions. *Also ENAS 811a.*

NSCI 611b, Neurophysiology. Thomas Brown.

TR 1.30–4

The purpose of the course is to learn the basic principles, facts, and methods of cellular and systems neurophysiology. The topics range from molecular and subcellular levels of analysis to small circuits and large systems. At the same time, the strengths and limitations of the methods of data acquisition and analysis are addressed, as this is a field which is very much technology-driven. The principal readings are from a modern textbook in the field. These are supplemented where necessary with original scientific research papers. The ultimate goal is to understand the physical basis for the kinds of information processing and storage in the brain that ultimately give rise to such higher-level functions as learning and memory, perception, and motor functions. The course is intended for advanced undergraduates or beginning graduates.

NSCI 612b, Molecular Transport and Intervention in the Brain. Mark Saltzman.

This new course is a graduate-level seminar on mechanisms and rates of movement of molecules in the brain and the design of novel drug delivery systems. Topics include mathematical methods for modeling diffusion and flow processes, diffusion in the brain interstitium, fluid flows in the brain and spinal cord, the blood-brain barrier, microdialysis measurements, controlled release systems, microfluidic approaches for drug delivery. Weekly readings are assigned from neuroscience and engineering texts; current papers from the literature are used to guide discussion each week. *Also ENAS 812b.*

NSCI 614b, Neurobiology of Learning and Memory. Thomas Brown.

TR 1.30–4

This seminar integrates hypotheses and research methods used to elucidate the neurobiological mechanisms underlying learning and memory. Levels of analysis range from molecular and cellular to systems and behavioral, with a primary focus on cellular and systems neurophysiology. Discussion includes the philosophy and rationale underlying some of the more successful and interesting methods. A goal is to evaluate critically how one might connect synaptic phenomena such as long-term potentiation and depression to behavioral changes such as acquisition and extinction. Focus is on combining *in vitro* and *in vivo* methods that offer the possibility of yielding quantitative theoretical or computational models. *Also PSYC 572b.*

[NSCI 645a, Foundations of Behavioral Neuroscience.]

[NSCI 646, Advances in Cognitive Neuroscience: Prefrontal Cortex and Memory.]

NSCI 648b, Cellular Analysis of Learning and Memory: Vertebrate Model Systems.

Glenn Schafe.

TH 9.30–11.20

Course examines behavioral, neuroanatomical, cellular, and molecular aspects of learning and memory in various vertebrate models. The learning phenomena considered range from nonassociative or nonrelational learning (a single stimulus learning) to associative or relational learning (the learning of a relation between two or more stimuli or between stimuli and behavior). *Also PSYC 648b^{II}.*

[NSCI 654b, Sensory Processes.]

NSCI 720a, Neurobiology. Haig Keshishian, Paul Forscher.

MWF 11.30–12.20

Examination of the excitability of the nerve cell membrane provides a starting point for the study of molecular, cellular, and intracellular mechanisms underlying the generation and control of behavior. *Also MCDB 720a^{II}, NBIO 720a.*

The following course is also of particular value to students in Neuroscience:

MCDB 721La^{II}, Laboratory for Neurobiology. Haig Keshishian, Robert Wyman.

ORGANISMAL AND INTEGRATIVE BIOLOGY (OIB)

Osborn Memorial Laboratories, Rm 101, 165 Prospect Street, 432.3837

www.biology.yale.edu/oib

Ph.D.

Advisory Committee

Durland Fish, Vice Director (*Epidemiology & Public Health*)

Leo Hickey (*Geology & Geophysics*)

Andrew Hill (*Anthropology*)

Richard Prum (*Ecology & Evolutionary Biology*)

Nancy Ruddle (*Epidemiology & Public Health*)

Oswald Schmitz (*Forestry & Environmental Studies*)

David Skelly, Director (*Forestry & Environmental Studies*)

Organismal and Integrative Biology (OIB) was created in response to changing opportunities for cross-disciplinary research in the biological sciences. Our goal is to provide an environment for doctoral study utilizing Yale's diverse resources to encourage broad intellectual development. New theory, empirical findings, and technological developments promise unification of formerly disparate biological fields through research approaches that are actively synthetic, reaching across levels of organization to uncover fundamental organizing principles of biology.

Special Admissions Requirements

Based on their interests, students should seek admission to one of the participating departments: Anthropology, Ecology and Evolutionary Biology, Epidemiology and Public Health, Forestry & Environmental Studies, Geology and Geophysics. The Ph.D. and M.Phil. requirements are those of the participating departments.

PHARMACOLOGY

B-334 Sterling Hall of Medicine, 785.4545

M.S., M.Phil., Ph.D.

Chair

Joseph Schlessinger

Director of Graduate Studies

William Sessa (BCMM 436, 737.2291, william.sessa@yale.edu)

Director of Medical Studies

Karen Anderson

Professors

George Aghajanian, Karen Anderson, G. Peter Beardsley, Harold Behrman, B. Stephen Bunney, Evangelo Canellakis (*Emeritus*), Yung-chi Cheng, J. G. Collins, Jack Cooper (*Emeritus*), Priscilla Dannies, Ronald Duman, Barbara Ehrlich, Robert Handschumacher (*Emeritus*), Leonard Kaczmarek, Perry Molinoff (*Adjunct*), William Prusoff (*Emeritus*), J. Murdoch Ritchie (*Emeritus*), Sara Rockwell, Robert Roth, Gary Rudnick, Alan Sartorelli, Joseph Schlessinger, William Sessa, Stephen Waxman

Associate Professors

Anton Bennett, Edward Chu, Valentin Gribkoff (*Adjunct*), Robert Heimer, James Howe, Elias Lolis, Marina Picciotto, Guiseppe Pizzorno, Todd Verdoorn (*Adjunct*)

Assistant Professors

David Calderwood, Michael DiGiovanna, Ya Ha, Sven-Eric Jordt, Benjamin Turk

Lecturers

Louise-Marie Dembry, Gregory Gardiner, Robert Levine, John Pawelek, Alexander Scriabine

Fields of Study

Major emphases in the department are in the areas of molecular pharmacology, mechanisms of drug action, structural biology, neuropharmacology, and chemotherapy.

Special Admissions Requirements

A bachelor's degree in biology, chemistry, or another science is required. Undergraduate courses should include biology, organic chemistry, physics, and calculus. GRE scores are required; a GRE Subject Test, preferably in Biology or Chemistry, is recommended.

To enter the Ph.D. program, students apply to an interest-based track within the interdepartmental graduate program in the Biological and Biomedical Sciences (see pages 71–73).

Special Requirements for the Ph.D. Degree

Because the field of pharmacology encompasses many disciplines, the department's flexible program of study toward the Ph.D. degree permits students to concentrate in areas of their particular interest. The only common courses required of all students are the basic course in pharmacology, seminars in which students present papers, and laboratory rotations that provide students with exposure to a variety of experimental approaches.

The basic requirements for admission to candidacy for the Ph.D. degree include one and one-half to two years of course work (including the basic course in pharmacology, seminars, and laboratory rotations), during which time the Graduate School Honors requirement and an oral qualifying examination must be completed. There is no foreign language requirement. A thesis prospectus must be submitted by the end of the third year. Admission to candidacy is usually achieved by the end of the third year. A doctoral dissertation based upon original research, with an oral examination in defense of the dissertation, is required for the degree. The norm for completion of the Ph.D. program is four to five years.

An important aspect of graduate training in pharmacology is the acquisition of teaching skills through the participation in courses appropriate for the student's scientific interests. These opportunities can be drawn from a diverse menu of lecture, laboratory, and seminar courses given at the undergraduate, graduate, and medical school level. Ph.D. students are expected to participate in two terms (or the equivalent) of teaching. Students are not expected to teach during their first year.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. (en route to the Ph.D.). Students are eligible for the M.S. degree upon successful completion of the first three terms of the Ph.D. program.

Program materials are available upon request to the Director of Graduate Studies, Department of Pharmacology, Yale University, PO Box 208066, New Haven CT 06520-8066.

Courses

PHAR 502a and b, Seminar in Pharmacology. To be announced.

A seminar given by a department faculty member on his or her area of interest to teach students how to critically evaluate papers and to improve the ability of the students to give oral presentations.

PHAR 504a, Pharmacology I: Maintaining and Restoring Homeostasis.

Priscilla Dannies and staff.

MW 10.30–12

Lectures covering drug-receptor interactions, control of messenger systems and channels, and regulation of physiological systems.

PHAR 504b, Pharmacology II: Interfering Selectively. Elias Lolis and staff.

MW 10:30–12

Lectures covering antibiotics, immunotherapy, and chemotherapy.

PHAR 506a and b, Methods in Pharmacological Research (Rotations).

William Sessa.

Students work in laboratories of faculty of their choice. The period spent in each laboratory is one term.

PHAR 508b, Neuropharmacology. James Howe.

T 2–4

An intensive examination of current understanding of the sites and mechanisms involved in drug action on single nerve cells and on the brain. Emphasis on basic functions and illustrative examples of their disturbance by drugs.

PHAR 518b, Current Topics in Cancer and Viral Therapy. Yung-chi Cheng, Elias Lolis.

W 5:15–7:15

PHILOSOPHY

Connecticut Hall, 432.1665

M.A., M.Phil., Ph.D.

Chair

Michael Della Rocca

Directors of Graduate Studies

Karsten Harries (107 Connecticut Hall, 432.1682, karsten.harries@yale.edu)

Professors

George Bealer, Seyla Benhabib, Susanne Bobzien, Jules Coleman, Michael Della Rocca, Keith DeRose, John Hare, Karsten Harries, Shelly Kagan, Holmes Rolston (*Visiting*), Sun-Joo Shin

Associate Professor

Michael Weber

Assistant Professors

Katalin Balog, Troy Cross, Jonathan Gilmore, James Kreines, Matthew Smith

Lecturers

Suzanne Obdrzalek, James Woodbridge

Fields of Study

Fields include most of the major areas of philosophy. Please write for departmental statement.

Special Requirements for the Ph.D. Degree

In the first two years all students must complete a total of twelve term courses. Graduate courses are grouped: (1) metaphysics, theory of knowledge, philosophy of science; (2) ethics, aesthetics, philosophy of religion, political philosophy, and theory of value; (3) history of philosophy. No more than six and no fewer than two courses may be taken in each group. A course in logic must also be taken, although on the basis of previous work a student may petition to have this requirement waived. Two qualifying papers must be submitted, one in history, the other in another distribution area; normally the first of these papers will be submitted by mid-September, the second by December, of a student's third year. It is expected that these papers will be more substantial and professional than an ordinary term paper. Students must demonstrate competence in at least one of the following languages: French, German, Greek, or Latin, normally by the end of the second year. Students in Philosophy will teach in the third and fourth years. They must have teaching experience in at least two distribution areas. Approval of the dissertation prospectus is expected before the end of the sixth term. Upon completion of all pre-dissertation requirements, including the prospectus, students are admitted to candidacy for the Ph.D. Admission to candidacy must take place by the end of the third year of study. The norm for completion of the Ph.D. degree is five to six years.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the Ph.D.). An M.A. degree is awarded to students after completion of six term courses with an average grade of High Pass.

Program materials are available upon request to the Director of Graduate Studies, Department of Philosophy, Yale University, PO Box 208306, New Haven CT 06520-8306. See Philosophy Web page for information (www.yale.edu/philos).

Courses

PHIL 528b^U, European Political Thought from Weber to Derrida. Seyla Benhabib.

TRH 2.30–3.45

Twentieth-century European political thought is dominated by the shadows of Hegel and Nietzsche. Hegel believed in realizing reason in the modern state, whereas Nietzsche argued that modern politics mobilized resentment and anti-rational impulses. We examine Weber, Lukacs, the Frankfurt School, Arendt, Heidegger, Habermas, and Derrida in the light of this dual legacy of Hegel and Nietzsche. Special focus on the Habermas-Derrida exchanges. *Also PLSC 604b^U.*

PHIL 567a^U, Mathematical Logic. Sun-Joo Shin.

TRH 11.30–12.45

An introduction to the metatheory of first-order logic, up to and including the completeness theorem for the first-order calculus. An introduction to the basic concepts of set theory is included.

PHIL 568a^U, Mathematical Logic II. Sun-Joo Shin.

TRH 2.30–3.45

A technical exposition of Gödel's first and second incompleteness theorems and of some of their main consequences in proof theory and model theory, such as Lob's theorem, Tarski's undefinability of truth, provability logic, and nonstandard models of arithmetic.

PHIL 604b^U, Hegel. James Kreines.

W 3.30–5.20

An in-depth study of Hegel's philosophy, with special emphasis on Hegel's metaphysics and its relation to his philosophy of human agency, freedom, and social life.

PHIL 605a^U, Skepticism, Ancient and Modern. Suzanne Obdrzalek.

M 3.30–5.20

An examination of skeptical arguments from classical antiquity to the present. The course focuses primarily on Academic and Pyrrhonian skepticism, Descartes and Hume, but will also address contemporary arguments for and against skepticism. Students discuss interpretive issues as well as more general philosophical questions.

PHIL 606a, Hume's Treatise on Human Nature: Books Two and Three.

Matthew Smith.

TH 1.30–3.20

A close reading of the second and third books of David Hume's *Treatise on Human Nature*.

PHIL 632a^U, Persistence and Possibility. Michael Della Rocca.

M 1.30–3.20

An examination of two central metaphysical topics: what is it for an object to persist through time and what is the nature of modality, of necessity, and of possibility? Consideration of how

these questions bear on one another. Topics to be covered include temporal parts vs. spatial parts, three-dimensional vs. four-dimensional accounts of persistence, counterpart theory, modal realism, material constitution, restricted versus unrestricted composition. Readings from Lewis, Kripke, Parfit, Adams, Unger, van Inwagen, and others.

PHIL 633a^U, Theories of Truth. James Woodbridge.

W 3:30–5.20

The notion of truth is an enduring philosophical enigma, as it remains controversial what truth itself is. Is it an objective property whose applicability is independent of any opinions? Is truth a property that applies only relative to some belief system or world view? Is truth a property at all? In this course we examine the strengths and weaknesses of the main philosophical accounts of truth, including correspondence, coherence, pragmatist, and deflationary views.

PHIL 655a^U, Normative Ethics. Shelly Kagan.

T 1.30–3.20

A systematic examination of normative ethics, the part of moral philosophy that attempts to articulate and defend the basic principles of morality. The bulk of the course surveys and explores some of the main normative factors relevant in determining the moral status of a given act or policy (features that help make a given act right or wrong). Brief consideration of some of the main views about the foundations of normative ethics (the ultimate basis or ground for the various moral principles).

PHIL 659a^U, Freedom of Expression. Jonathan Gilmore.

Th 1.30–3.20

The history and theory of freedom of expression from the standpoints of philosophy, law, art history, and literary criticism. Topics include censorship of art and literature, self-expression and self-realization, First Amendment interpretation, autonomy, paternalism, and rights.

PHIL 700a, Contemporary Critical Theory. Seyla Benhabib, Thomas McCarthy.

W 1.30–3.20

Concepts such as the post-national constellation, the end of the Westphalian model, beyond the nation-state, and empire have become legion in contemporary social and political thought. This seminar examines how contemporary critical theorists are conceptualizing this new constellation, by focusing on social theory as well as normative philosophy. Readings from Juergen Habermas, Hauke Brunkhorst, David Harvey, David Held, Saskia Sassen, Charles Taylor, Hardt and Negri, and Carl Schmitt. *Also PLSC 583a.*

PHIL 701b, Philosophy and Politics in Hannah Arendt's Thought. Seyla Benhabib.

W 1.30–3.20

This course examines mainly Arendt's posthumous work *The Life of the Mind*. We focus on her readings of Kant, Nietzsche, and Heidegger; her theories of judgment and of the will; action, narrative, and interpretation. Readings from Arendt, Heidegger, Kant (*Third Critique*), and Nietzsche. *Also PLSC 616b, WGSS 765b.*

PHIL 702b, Epistemology: Safety and Sensitivity of Beliefs. Troy Cross, Keith DeRose.

Th 1.30–3.20

An investigation of these two properties of beliefs, which have played a large role in much recent epistemology: sensitivity (which a true belief has, roughly, when it would not have been held if it had been false) and safety (which a true belief has, roughly, when it could not easily have happened that it was held though it was false). We take a critical look at applications of these notions, both to the explication of the concept of knowledge, and to the problem of philosophical skepticism, evaluating how successful these applications are and which of the

two notions works better in the proposed applications. Our investigation takes us into closely related issues in epistemology, including the issue of whether and how knowledge is closed under known entailment.

PHIL 703b, Philosophy of Religion: The Problem of Evil. Keith DeRose.

Th 10.30–12.20

An investigation of several of the main versions of the problem of evil and, especially, several of the most prominent theistic defenses against the problem. We focus on the important contrasts between the free will defense and several of the other, structurally quite different, defenses that have been the focus of recent philosophical debate. We evaluate how well each of the various defenses fares on its own in responding to the problem of evil, but we also investigate the prospects for combining elements of the various defenses into a perhaps more powerful response to the problem.

PHIL 704a, Schopenhauer's *The World as Will and Representation*. Karsten Harries.

T 10.30–12.20

A careful reading, with special emphasis on the reception of Schopenhauer's ideas. *Also CPLT 702a.*

PHIL 705b, Heidegger's *Being and Time*. Karsten Harries.

T 10.30–12.20

Also CPLT 699b.

PHIL 706a, Poetics I: Theory of the Work of Literature. Benjamin Harshav.

M 1.30–3.20

The course presents a comprehensive theory of works of literature as the highest sign-complexes in human culture. From rhythm and sound patterns through metaphor and fictional worlds to genre and representation, a work of literature combines elements of structure with a network of necessary and possible or contradictory constructs. The seminar develops a conceptual network for the descriptive analysis of individual works of poetry and fiction. The theory focuses on questions of fictionality and art in language, yet goes beyond linguistics and philosophy of language, on the one hand, and narratology, on the other. It is grounded in close readings of poems and narrative texts by Kafka, Joyce, Eliot, Dostoevsky, and others. *Also CPLT 541a^{II}.*

PHIL 707a, Work-in-Progress Seminar. George Bealer, Troy Cross.

F 2–4

In consultation with the instructors, each student presents a significant work in progress, such as a revised version of an advanced seminar paper or a dissertation chapter. On completion of the writing, the student presents the work in a mock colloquium format, including a formal question-and-answer period.

PHIL 750, Tutorial.

By arrangement with faculty.

PHYSICS

35 Sloane Physics Laboratory, 432.3607

M.S., M.Phil., Ph.D.

Chair

Ramamurti Shankar

Director of Graduate Studies

Steven Girvin (35 SPL, 432.3607, graduatephysics@yale.edu)

Professors

Robert Adair (*Emeritus*), Charles Ahn (*Applied Physics*), Yoram Alhassid, Thomas Appelquist, Charles Bailyn (*Astronomy*), Charles Baltay, Sean Barrett, Cornelius Beusang (*Adjunct*), William Bennett, Jr. (*Emeritus*), Richard Casten, Richard Chang (*Applied Physics*), Paolo Coppi (*Astronomy*), David DeMille, Michel Devoret (*Applied Physics*), Frank Firk (*Emeritus*), Paul Fleury (*Applied Physics*), Moshe Gai (*Adjunct*), Steven Girvin, Robert Grober (*Applied Physics*), Martin Gutzwiller (*Adjunct*), John Harris, Victor Henrich (*Applied Physics*), Arvid Herzenberg (*Emeritus*), Jay Hirshfield (*Adjunct*), Francesco Iachello, Martin Klein (*Emeritus*), Henry Kraybill (*Emeritus*), William Lichten (*Emeritus*), Samuel MacDowell (*Emeritus*), William Marciano (*Adjunct*), Simon Mochrie, Vincent Moncrief, Peter Parker, Daniel Prober (*Applied Physics*), Nicholas Read, Jack Sandweiss, Michael Schmidt, Robert Schoelkopf (*Applied Physics*), Ramamurti Shankar, Charles Sommerfield (*Emeritus*), A. Douglas Stone (*Applied Physics*), John Tully (*Chemistry*), Thomas Ullrich (*Adjunct*), C. Megan Urry, John Wettlaufer (*Geology & Geophysics*), Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*), Michael Zeller

Associate Professors

Colin Gay, Homer Neal, Witold Skiba

Assistant Professors

Helen Caines, Eric Dufresne (*Mechanical Engineering*), Richard Easther, Bonnie Fleming, Walter Goldberger, Jack Harris, Andreas Heinz, Sohrab Ismail-Beigi (*Applied Physics*), Daniel McKinsey, Priyamvada Natarajan (*Astronomy*), Corey O'Hern (*Mechanical Engineering*), Volker Werner

Fields of Study

Fields include atomic physics and quantum optics; nuclear physics; particle physics; astrophysics and cosmology; condensed matter; quantum information physics; applied physics; and other areas in collaboration with faculties of Engineering and Applied Science, Mathematics, Chemistry, Geology and Geophysics, and Astronomy.

Special Admissions Requirements

The prerequisites for work toward a Ph.D. degree in physics include a sound undergraduate training in physics and a good mathematical background. The GRE General Test and the Subject Test in Physics are required.

Special Requirements for the Ph.D. Degree

To complete the course requirements students are expected to take a set of nine term courses. A set of five core courses (Dynamics, Electromagnetic Theory, Quantum Mechanics I and II, and Statistical Mechanics) serves to complete the student's undergraduate training in classical and quantum physics. A set of four advanced courses, including required courses in classical and quantum field theory, provides an introduction to modern physics and research. Certain equivalent course work may reduce the course requirement or allow substitution of elective courses for individual students. In addition, all students are required to be proficient and familiar with mathematical methods of physics (such as that necessary to master the material covered in the five core courses) and to be proficient and familiar with advanced laboratory techniques. These requirements can be met either by having had sufficiently advanced prior course work or by taking a course offered by the department. All students will also attend a seminar during their first term in order to be introduced to the various research efforts and opportunities at Yale.

Students who have completed their course requirements with satisfactory grades (a High Pass average and the Graduate School requirement of two Honors), pass the qualifying examination, and submit an acceptable thesis prospectus are recommended for admission to candidacy. The qualifying examination, normally taken at the beginning of the third term (and no later than the beginning of the fifth term), is a six-hour written examination covering the five core courses and mathematical methods as described above. Students normally submit the dissertation prospectus before the end of the third year of study. Approximately eighteen months after passing the qualifying examination, but no later than the end of the fourth year, students take an oral examination in their chosen field of specialization (the Field Oral Examination).

There is no foreign language requirement. Teaching experience is regarded as an integral part of the graduate training program. Students are expected to serve as teaching fellows at some point during their study, usually in the first two years. Formal association with a dissertation adviser normally begins in the fourth term after the qualifying examination has been passed and required course work has been completed. An adviser from a department other than Physics can be chosen in consultation with the director of graduate studies, provided the dissertation topic is deemed suitable for a physics Ph.D.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.S. (en route to the Ph.D.). Students who complete the first-year graduate courses with a satisfactory record (including two Honors or four High Passes) qualify for the M.S. degree.

Program materials are available upon request to the Director of Graduate Studies, Department of Physics, Yale University, PO Box 208120, New Haven CT 06520-8120; e-mail, graduatephysics@yale.edu; Web site, www.yale.edu/physics.

Courses

PHYS 500a, Dynamics. Francesco Iachello.

MW 10.45–12

Newtonian dynamics, Lagrangian dynamics, and Hamiltonian dynamics. Small oscillations and rigid bodies. Strings, membranes. Fluids.

PHYS 502b, Electromagnetic Theory I. Nicholas Read.

MW 9–10.15

Classical electromagnetic theory including boundary-value problems and applications of Maxwell equations. Macroscopic description of electric and magnetic materials. Wave propagation.

PHYS 504Lb, Modern Physics Measurements. Andreas Heinz and staff.

HTBA

A laboratory course with experiments in condensed matter, nuclear, and elementary particle physics. Data analysis provides an introduction to computer programming and to the elements of statistics and probability.

PHYS 506a^u, Mathematical Methods of Physics. Richard Easter.

MW 9–10.15

Survey of mathematical techniques useful in physics. Includes vector and tensor analysis, group theory, complex analysis (residue calculus, method of steepest descent), differential equations and Green's functions, and selected advanced topics.

PHYS 508a, Quantum Mechanics I. Jack Harris.

TTh 9–10.15

The principles of quantum mechanics with application to simple systems. Canonical formalism, solutions of Schrödinger's equation, angular momentum and spin.

PHYS 512a, Statistical Physics I. Yoram Alhassid.

TTh 10.45–12

Review of thermodynamics, the fundamental principles of classical and quantum statistical mechanics, canonical and grand canonical ensembles, identical particles, Bose and Fermi statistics, phase transitions and critical phenomena, renormalization group, irreversible processes, fluctuations.

PHYS 515a, Topics in Modern Physics Research. John Harris.

M 2.30–3.30

A seminar course intended to provide an introduction to current research in physics and an overview of physics research opportunities at Yale.

PHYS 522a, Introduction to Atomic Physics. David DeMille.

MW 10.45–12

This course is intended to develop basic theoretical tools needed to understand fundamental atomic processes. Emphasis given to applications in laser spectroscopy. Experimental techniques discussed when appropriate.

PHYS 523a, Biological Physics. Simon Mochrie.

TTh 2.30–3.45

An introduction to the physics of biological systems, including molecular motors, protein folding, membrane self-assembly, ion pumping, and bacterial locomotion. Background

concepts in probability and statistical mechanics are introduced as necessary, as well as key constituents of living cells. *Also MB&B 523a.*

PHYS 524a, Introduction to Nuclear Physics. Richard Casten.

MW 10.45–12

Introduction to a wide variety of topics in nuclear structure, nuclear reactions, and nuclear physics at extremes of angular momentum, isospin, energy, and energy density. The aim is to give a broad perspective on the subject and to develop the key ideas in as simple a way as possible. Physics ideas always have precedence over mathematical formalism. The course assumes no prior knowledge of nuclear physics and only elementary quantum mechanics.

[PHYS 526b, Introduction to Elementary Particle Physics.]

PHYS 538a, Introduction to Relativistic Astrophysics and General Relativity. Vincent Moncrief.

MW 9–10.15

Basic concepts of differential geometry (manifolds, metrics, connections, geodesics, curvature); Einstein's equations and their application to such areas as cosmology, gravitational waves, black holes.

PHYS 548a^u and 549b^u, Solid State Physics I and II. Victor Henrich [F], Charles Ahn [Sp].

TTh 1–2.15 [F], TTh 9–10.15 [Sp]

A two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structures, phonons, energy bands, semiconductors, Fermi surfaces, magnetic resonance, phase transitions, and superconductivity. *Also ENAS 850a^u, 851b^u.*

PHYS 570a^u, High-Energy Astrophysics. Paolo Coppi.

A survey of current topics in high-energy astrophysics, including accreting black holes, black holes and neutron stars, relativistic jets, gamma-ray bursts, and ultra-high-energy cosmic rays. The basic physical processes underlying the observed high-energy mission are also covered. *Also ASTR 570a.*

PHYS 600b, Cosmology. Priyamvada Natarajan.

The large-scale contents and structure of the universe and the origin of galaxies. *Also ASTR 600b.*

PHYS 602a, Classical Field Theory. Nicholas Read.

TTh 9–10.15

Covariant formulation of electrodynamics, radiation phenomena, and introduction to general relativity.

PHYS 608b, Quantum Mechanics II. Jack Harris.

TTh 10.45–12

Approximation methods, scattering theory, and the role of symmetries. Relativistic wave equations. Second quantized treatment of identical particles. Elementary introduction to quantized fields.

PHYS 609a, Relativistic Field Theory I. Walter Goldberger.

TTh 10.45–12

The fundamental principles of quantum field theory. Interacting theories and the Feynman graph expansion. Quantum electrodynamics including lowest order processes, one-loop corrections, and the elements of renormalization theory.

PHYS 610b, Quantum Many-Body Theory. Yoram Alhassid.

TTH 10.45–12

Second quantization, quantum statistical mechanics, Hartree-Fock approximation, linear response theory, random phase approximation, perturbation theory and Feynman diagrams, Landau theory of Fermi liquids, BCS theory, Hartree-Fock-Bogoliubov method. Applications to solids and finite-size systems such as quantum dots, nuclei, and nanoparticles. *Also ENAS 852b.*

[PHYS 624b^U, Group Theory.]

[PHYS 628a, Statistical Physics II.]

PHYS 630b, Relativistic Field Theory II. Walter Goldberger.

TTH 9–10.15

An introduction to nonabelian gauge field theories, spontaneous symmetry breakdown, and unified theories of weak and electromagnetic interactions. Renormalization group methods, quantum chromodynamics, and nonperturbative approaches to quantum field theory.

[PHYS 631a^U, Computational Physics I.]

[PHYS 633b, Introduction to Superconductivity.]

PHYS 634a, Mesoscopic Physics. Michel Devoret.

TTH 10.30–12

Introduction to the physics of nanoscale solid-state systems which are large and disordered enough to be described in terms of simple macroscopic parameters like resistance, capacitance, and inductance, but small and cold enough that effects usually associated with microscopic particles, like quantum-mechanical coherence and/or charge quantization, dominate. Emphasis is placed on transport and noise phenomena in the normal and superconducting regimes.

[PHYS 650a, Theory of Solids I.]

[PHYS 651b, Theory of Solids II.]

Special Topics Courses

[PHYS 661b, The Art of Data Analysis.]

PHYS 662b, Special Topics in Particle Physics: Beyond the Standard Model.

MW 9–10.15

Modern concepts in particle physics, including supersymmetry, extra dimensions, and brane world models. Material covered includes the theoretical basis of these ideas, experimental tests and constraints, and their implications for cosmology.

[PHYS 663b, Special Topics in Cosmology and Particle Physics.]

PHYS 664b, Special Topics in Nuclear Physics. Richard Casten.

TTH 9–10.15

The emphasis in this course is on nuclear structure models and their use in understanding atomic nuclei. A number of models are covered, ranging from the Shell Model to a variety of Collective models. In each case, practical calculations are carried out by the students so that the application of these models to real situations, and their strengths, weaknesses, and ranges of applicability, become clear. Finally, there is discussion of the evolution of nuclear structure as a function of nucleon number, both near and far from the valley of stability, the appearance of behavior resembling phase transitions, and simple guidelines to structural evolution.

[PHYS 667a, Special Topics in Condensed Matter Physics.]

[PHYS 668b, Special Topics in Geometry and Modern Field Theory.]

[PHYS 671b, Special Topics in Experimental Nuclear and Particle Physics.]

[PHYS 672a or b, Special Topics in Experimental Physics.]

[PHYS 673a or b, Special Topics in Atomic Physics.]

[PHYS 674b, Quantum Information, Quantum Cryptography, and Quantum Computation.]

PHYS 675b, Special Topics in Optics. Richard Chang.

TTh 2.30–3.45

A survey of the principles of optics. Topics include geometrical optics, optical imaging, interference, and diffraction. The course is taught from the experimentalist perspective and emphasizes real applications. *Also ENAS 859b.*

[PHYS 676a, Optical Properties of Semiconductors.]

[PHYS 677a, Noise, Dissipation, and Amplification.]

PHYS 678b, Computing for Scientific Research. Helen Caines, Thomas Ullrich.

F 1–3.30

An introduction to basic computational tools and techniques utilized in science and engineering research. The course focuses on developing hands-on experience via a mixture of lectures and practical programming. We introduce the fundamentals of UNIX/Linux computers and development of programs to solve physical and mathematical problems. Programming languages (e.g., C, C++, and Fortran) as well as the conceptual underlying numerical methods are covered to provide the tools for scientific problem solving. This course is intended for students with basic programming experience.

PHYS 679a, Nonlinear Optics. Richard Chang.

TTh 2.30–3.45

Fundamental aspects of laser interaction with matter, including both linear and nonlinear optical responses. Actual electro-optical and magneto-optical devices (such as harmonic doublers, parametric oscillators, modulators, and isolators) are introduced and analyzed. *Also ENAS 810a.*

POLITICAL SCIENCE

124 Prospect, 432.5241
M.A., M.Phil., Ph.D.

Chair

Peter Swenson

Director of Graduate Studies

Stephen Skowronek

Professors

Bruce Ackerman, Akhil Amar (*Law*), Arjun Appadurai (*Anthropology*), Seyla Benhabib, Paul Bracken (*Management*), David Cameron, William Foltz, Paul Gaddis (*History*), Alan Gerber, Donald Green, Stathis Kalyvas, Ilona Kickbusch (*Epidemiology*), Theodore Marmor (*Management*), David Mayhew, Barry Nalebuff (*Management*), Douglas Rae, John Roemer, Susan Rose-Ackerman, Frances Rosenbluth, Bruce Russett, James Scott, Ian Shapiro, Stephen Skowronek, Steven Smith, Susan Stokes, Alex Stone Sweet, Peter Swenson, Ivan Szelenyi (*Sociology*), John Wargo (*Forestry & Environmental Studies*), Michael Wallerstein, Elisabeth Wood

Associate Professors

José Cheibub, Jacob Hacker, Nicholas Sambanis, James Vreeland

Assistant Professors

Khalilah Brown-Dean, Seok-ju Cho, Keith Darden, Justin Fox, Bryan Garsten, Ange-Marie Hancock, Gregory Huber, Pierre Landry, John Lapinski, Ellen Lust-Okar, Karuna Mantena, Nikolay Marinov, Rose Razaghian, Vivek Sharma, Ebonya Washington

Fields of Study

Fields include contemporary theory, political philosophy, international relations, comparative politics, American politics, political economy, and empirical analysis and research methodology.

Special Admissions Requirement

The department requires that scores from the GRE General Test accompany an application.

Special Requirements for the Ph.D. Degree

Students are required to pass fourteen term courses during their first two years in the program, and receive a grade of Honors in at least two Political Science courses. Two of the courses may be in departments other than Political Science. Students are normally expected to complete seven courses in the first year. Courses are offered in seven fields: contemporary theory; political philosophy; international relations; comparative politics; American politics; political economy; and empirical analysis and research methodology.

Each student must demonstrate competence in three of the seven fields by the beginning of the third year. Competence is demonstrated by passing the comprehensive examination in the field. The department also allows students to petition for the creation of a special field of study and examination in exceptional cases.

As part of the second year of courses, all students are required to take the two-term course in Research and Writing, which is devoted to the preparation of a manuscript based on original research on a topic of the student's choice. The course is conducted as a seminar including all second-year students and directed by two members of the faculty. Performance in the first-term course (540a) is graded on a Satisfactory/Unsatisfactory basis. The second-term course (541b) carries conventional letter grades that are assigned retroactively to 540a at the end of the second term.

Students are required to take a one-term course in statistical methods, successful completion of which satisfies the statistics requirement. All students are also required to demonstrate at least an elementary reading competence in one foreign language. Such competence is usually demonstrated by taking, or having completed, two years of undergraduate course work. Alternatively the language requirement can be satisfied by successfully completing two terms of formal theory at the graduate level, in addition to the required course in statistical methods.

In order to be admitted to candidacy for the Ph.D. degree, the student must have a prospectus approved by a dissertation director and two other members of the faculty. This must occur by no later than May 1 of the student's third year.

Students are admitted to candidacy by the end of the third year, but only after all courses, including those involving statistics, language, and Research and Writing, and approval of the dissertation prospectus have been completed.

Almost without exception, those who successfully complete the Ph.D. in Political Science will join the faculties of colleges and universities. For that reason, learning what is involved in teaching and gaining teaching experience is an essential and central component of graduate education. The department normally expects students to devote themselves exclusively to course work and comprehensive examinations in their first two years in the Ph.D. program. Students in Political Science typically teach in their third and fourth years.

A joint Ph.D. degree is available with African American Studies. Students must apply to and be accepted by both departments independently. Consult that department for details.

Master's Degrees

M.Phil. The academic requirements for the M.Phil. degree are the same as for the Ph.D. degree except for the completion of the dissertation.

M.A. (en route to the Ph.D.). The M.A. degree is awarded upon completion of a full year of course work in the program (i.e., at least seven term courses) with an average of High Pass or better. The course must include one each in at least three of the department's substantive fields and a basic course in statistical analysis. Language requirements are the same as for the Ph.D. degree.

Program materials are available upon request to the Director of Graduate Studies, Political Science Department, Yale University, PO Box 208301, New Haven CT 06520-8301.

Courses

EMPIRICAL ANALYSIS AND RESEARCH METHODOLOGY

PLSC 500a, Statistics. Donald Green.

T 10–12, Th 4–5:30

The goal of this course is to introduce basic statistical theory and techniques for Political Science graduate students. The first part of the course covers probability theory, and the second part is devoted to estimation and inference, including an introduction to the classic multiple linear regression framework. Although emphasis is on the development of the relevant theory and statistical concepts, a series of applications and examples is considered on a variety of political science problems, such as turnout, crime, elections, party systems.

PLSC 503b, Quantitative Methods. Ebonya Washington.

W 10–12

This course provides an extensive treatment of the linear regression model. It covers a wide array of regression techniques including those that address problems of measurement error, reciprocal causation, and nonlinearities. Time series and pooled time-series-cross-sectional models are also covered. The aim is to make students intelligent consumers of published quantitative research and to prepare them to conduct original research in political science. The course assumes students have command of the material covered in PLSC 500 including basic knowledge of probability theory.

PLSC 512b^U, Experimental Methods in Political Science. Donald Green, Alan Gerber.

W 3:30–5:20

An introduction to how experimental methods can be used to study politics. The strengths and weaknesses of experimental and non-experimental studies are explored. Applications include the effects of television advertising, formation of political attitudes, causes of voter turnout. Students participate in the design and implementation of an experiment. Background in introductory statistics is helpful but not required.

PLSC 517a, Fundamentals of Modeling. John Roemer, Michael Wallerstein.

Th 10:30–12:20

This course is an introduction to techniques of microeconomic modeling, as applied to problems in political science. The level is that of a fairly sophisticated course in intermediate microeconomics. Topics include preferences, utility functions, Pareto efficiency, economic equilibrium, voting for public goods, Nash equilibrium, the first theorem of welfare economics, Hotelling-Downs political equilibrium, Wittman-Nash political equilibrium, Arrow's theorem and social welfare functions, equilibria in multidimensional issue spaces and Bayesian equilibria with applications to the politics of redistribution, market and government failures, and turnout. Prerequisites are differential calculus, and/or the Political Science MathCamp. Microeconomics at the intermediate level is helpful but not mandatory.

PLSC 518b, Fundamentals of Modeling II. Seok-ju Cho, Justin Fox.

M 3:30–5:20

A game is a situation in which the outcome of a person's choice depends on the choices made by others. Since social sciences study human interaction, game theory is a basic theory in the social sciences. This course is an introduction to game theory with a particular emphasis on its applications to political science. Coverage includes the fundamental concepts of strategic

games, extensive games with perfect information, coalitional games, Bayesian games, and extensive games with imperfect information, among others. The goal of the course is to explain the key concepts of game theory as simply as possible while maintaining complete precision.

PLSC 540a, 541b, Research and Writing. David Cameron, Gregory Huber.

Th 2.30–4.30

This is a required course for all second-year students. Although it is designated as a spring-term course, in fact it meets for the first six weeks of the fall term and the first six weeks of the spring term. The fall meetings are devoted to discussion of research design as well as individual student projects. These meetings supplement 540a, the individual meetings with faculty advisers. The spring meetings are devoted to discussion of drafts of student papers. The work of the spring-term seminar includes criticism of the organization, arguments, data evaluation, and writing in each student's paper by the instructors and the other students. Using this criticism, and under the supervision of the instructors, each student conducts additional research, if necessary, rewrites the paper as required, and prepares a final paper representing the best work of which the student is capable. Students must submit a one-page outline of the proposed project for the first fall-term meeting and a complete draft of the paper at the first meeting in the spring. Six weeks in beginning of fall term; six weeks in beginning of spring.

CONTEMPORARY THEORY

PLSC 558a, Issues in Democratic Theory. Ian Shapiro.

T 3.30–5.20

This seminar deals with contemporary scholarship on democracy. Among the topics to be covered: competing definitions of democracy; the causes of transitions to democracy and the sources of democratic stability; the relations between democracy and other values such as equality, efficiency, community, justice, and truth; participation, representation, and delegation in decision making; the roles for argument, deliberation, contestation, and opposition; courts and constitutionalism; the impact of democracy on the distribution of income and wealth; membership, diversity, and group rights. Students are expected to write a research paper or take a twenty-four-hour take-home exam. Graduate students only. Enrollment limited to eighteen, with preference to Political Science Ph.D. students.

PLSC 583a, Contemporary Critical Theory. Seyla Benhabib, Thomas McCarthy.

W 1.30–3.20

Concepts such as the post-national constellation, the end of the Wetsphalian model, beyond the nation-state, and empire have become legion in contemporary social and political thought. This seminar examines how contemporary critical theorists are conceptualizing this new constellation, by focusing on social theory as well as normative philosophy. Readings from Jürgen Habermas, Hauke Brunkhorst, David Harvey, David Held, Saskia Sassen, Charles Taylor, Hardt and Negri, and Carl Schmitt. *Also PHIL 700a.*

PLSC 595a, Theories of Distributive Justice. John Roemer.

W 10.30–12.20

We survey the main theories of distributive justice proposed by economists and political philosophers since 1950, critiquing each theory from both the economic and the philosophical perspective. Topics covered include Arrow's impossibility theorem and its resolution, axiomatic bargaining theory (J. Nash and followers), utilitarianism according to J. Harsanyi and others, egalitarianism according to J. Rawls and A. Sen, the veil of ignorance as a thought experiment, neo-Lockeanism according to R. Nozick, resource egalitarianism according to R. Dworkin, and equality of opportunity according to R. Arneson, G.A. Cohen, and

J. Roemer. The main text, *Theories of Distributive Justice* (J.E. Roemer, 1996), is supplemented with other readings. Prerequisite: PLSC 517 or equivalent sophistication in microeconomic modeling. Also *ECON 791a*.

PLSC 597b^u, Lincoln: Principle, Statesmanship, Persuasion. Steven Smith.

M 1.30–3.20

An inquiry into the problem of statesmanship as epitomized by the career of Abraham Lincoln.

POLITICAL PHILOSOPHY

PLSC 602a^u, Ancient and Medieval Political Thought. Robert Wokler.

TTh 2.30–3.45

An intensive study of the foundations of political philosophy. An analysis of the origins of political philosophy in Socratic and Platonic thought, followed by Machiavelli's comprehensive critique of the Socratic tradition.

PLSC 604b^u, European Political Thought from Weber to Derrida. Seyla Benhabib.

TTh 2.30–3.45

A survey of major themes in twentieth-century continental political thought. Topics include reason and rationalization in modernity; legality, legitimacy, and sovereignty; decline of the public sphere; origins of totalitarianism; communicative ethics; and the inclusion of the "other" in the new Europe. Readings from Max Weber, the Frankfurt School, Walter Benjamin, Hannah Arendt, Martin Heidegger, Carl Schmitt, Jürgen Habermas, and Jacques Derrida. Also *PHIL 528b^u*.

PLSC 616b, Philosophy and Politics in Hannah Arendt's Thought. Seyla Benhabib.

W 1.30–3.20

This course examines mainly Arendt's posthumous work on *The Life of the Mind*. We focus on her readings of Kant, Nietzsche, and Heidegger; her theories of judgment and of the will; action, narrative, and interpretation. Readings from Arendt, Heidegger, Kant (*Third Critique*), and Nietzsche. Also *PHIL 701b*, *WGSS 765b*.

PLSC 622b^u, The Age of Enlightenment and Its Critics. Robert Wokler.

Th 1.30–3.20

Introduction to central themes and currents of European social and political thought in the eighteenth century, including notions of religious toleration, civilization, and progress, and the emancipation of women, slaves, and Jews. Analysis of twentieth-century claims that modern totalitarianism and even the Holocaust may be traced to Enlightenment principles.

PLSC 624b^u, Empire and Political Thought. Karuna Mantena.

W 3.30–5.20

Examines the relationship between the development of modern political thought and the history of empire, focusing especially on how the imperial experience shaped central concepts of political theory such as reason, liberty, rights, sovereignty, property, and progress. Readings from Montaigne, Locke, Diderot, Kant, Herder, Burke, Marx, Mill, Tocqueville, and others.

PLSC 636b^u, Representation. Bryan Garsten.

T 3.30–5.20

A historical survey of political thought about the principles of representative government. The course begins with the prehistory of representation in ancient Athens and Rome, continues through medieval, early modern, and Enlightenment theories (including those debated after the American and French revolutions), and ends with several weeks considering recent debates on representation in the U.S. and the European Union.

INTERNATIONAL RELATIONS

PLSC 650b^U, Theories of War and Peace. Bruce Russett.

W 3:30–5:20

Comprehensive review and analysis of the theoretical literature on the causes of war and survey of some major ongoing research programs on war and peace. Includes structural systemic, dyadic, domestic political, bureaucratic/organizational, and psychological approaches.

PLSC 656b^U, American National Security Policy. William Odom.

M 3:30–5:20

The course examines the institutions and processes for making U.S. national security strategy and policy; reflects critically on inherent tensions in the way Americans view the nature of war, the use of force, the aims of diplomacy, and America's role in the world; and addresses several contemporary challenges facing the U.S. national security policy making.

PLSC 661b, Business, Government, and Globalization. Paul Bracken.

HTBA

Transformational forces of globalization and technology are changing the configuration of business and government throughout the world. This course applies to countries the tools and frameworks developed for studying business. A comparative approach (East and South Asia, Europe, the U.S.) is used to analyze the politics and strategy of the multinational corporation. Topics covered include technology strategies, risk and the global corporation, the Global Compact, and organizational formats for multinational enterprise. *Also MGT 580a.*

PLSC 662a^U, Strategy, Technology, and War. Paul Bracken.

HTBA

The interrelationship of strategy, foreign policy, and military technology since 1900. Examination of classic and modern formulations of this relationship, including new post-Cold War theories of the role of force in international affairs. Topics include multipolarity and the emergence of new competitors; developments in military technology and their impact on the balance of power and U.S. international position; proliferation of weapons of mass destruction; information warfare and the revolutionary impact of new technologies. *Also MGT 586a.*

PLSC 667b^U, The Causes of War. Keith Darden.

M 1:30–3:20

The course examines classical and contemporary theories of the causes of war and delves into several of the historical cases that spawned them. Attention is given to the Peloponnesian War, the Thirty Years' War, and World Wars I and II.

PLSC 668b^U, International Dimensions of Democratization. Nikolay Marinov.

M 1:30–3:20

The current wave of democratizations around the world leads us to investigate the role played by international factors such as socialization, coercion, emulation. The main question of interest is how much democratic processes can be affected from the outside.

PLSC 672b^U, NATO in the Post-Cold War World: Adaptation or Decline?

Jolyon Howorth.

T 3:30–5:20

The course analyzes the attempts by NATO to adapt to the post-Cold War world. It assesses the impassioned debates between Europeans and Americans over burden-sharing, "going global," and enlargement. It assesses the lessons to be learned from NATO's reluctant involvement in crisis management and scrutinizes the prospects for genuine alliance transformation since 9/11.

PLSC 673b^U, International Security. Vivek Sharma.

Th 3.30–5.20

This course is designed to review the state of theorizing in international relations on security issues. Part of the goal of the course is to sort out where the real as opposed to artificial debates exist and to arrive at a more synthetic vision of international relations.

PLSC 685a, Theories in International Relations. Nikolay Marinov.

M 3.30–5.20

This course provides an introduction to the major concepts and theories in the field of international relations. By the end of the course, students should be familiar with some of the major debates in the field, and be comfortable using IR concepts and theories to understand and explain events in international politics. The course is a reading-intensive seminar, and the weekly meetings are structured around student-led presentations and discussions of the assigned readings for the week. The student presentations should provide a brief overview of the main arguments of the readings and raise questions for group discussion. All students should prepare to participate in the group discussion by preparing discussion notes, which are turned in at the end of each session of class. There are approximately 150–200 pages of required reading per week. *Also INRL 555a.*

PLSC 687b, European Union Law. Alec Stone Sweet.

TTh 9.10–11

This course takes up a set of generic questions about how new legal systems emerge and evolve, focusing on the European Union. Topics include the new constitutionalism in Europe; the sources and consequences of the constitutionalization of the Treaty of Rome; the relationship between national and the EU legal orders; litigating and adjudicating EU law in national courts; the development of precedent; the evolution of judicial rulemaking in three legal domains (free movement of goods, sex equality, and environmental protection); and the impact of the legal system on other processes associated with European integration, such as trade, market regulation, and policymaking at both the national and supranational levels. Self-scheduled examination and several short discussion papers. *Also LAW 21492.*

PLSC 688a^U, European Union: U.S. Relations since the End of the Cold War.

Jolyon Howorth.

T 1.30–3.20

This course focuses on the changing nature of relations between the U.S. and the EC/EU since the late 1980s. The course is predicated on the assumption that two major policy areas (foreign and security policy and economic and trade policy) have undergone significant transformations over the past fifteen years.

PLSC 715a, Studies in Grand Strategy, Part II. John Gaddis, Paul Kennedy.

M 3.30–5.20

Part II of the two-term linked seminar offered during the calendar year 2005. Research seminar. *Also HIST 985a.*

PLSC 715b, Studies in Grand Strategy, Part I. John Gaddis, Paul Kennedy.

M 1.30–3.20

This two-term course begins in January with readings in classical works from Sun Tzu to Clausewitz to Kissinger. Students identify principles of strategy and examine the extent to which these were or were not applied in historical case studies from the Peloponnesian War to the post-Cold War period. During the summer, students undertake research projects or internships designed to apply resulting insights to the detailed analysis of a particular strategic problem or aspect of strategy, whether of a historical or contemporary character. Written

reports on these projects are presented and critically discussed early in the fall term. The seminar then turns its attention to strategic dilemmas currently facing governments, corporations, and nongovernmental organizations. Students must take both terms, fulfill the summer research/internship requirement, and attend additional lectures on grand strategy to be scheduled throughout the spring and fall terms. For the first term, students from the Graduate School receive a grade of FY (full year), which converts to a final grade for both terms upon completion of the course. Other students receive grades in accordance with the grading systems of their respective schools. In both terms the seminar meets during reading week and holds a total of fourteen weekly sessions. Admission is by competitive application only; forms are available at International Security Studies. *Also HIST 985b.*

COMPARATIVE POLITICS

PLSC 709b, Comparative Constitutional Law. Bruce Ackerman.

T 4.10–6

A search to define the basic categories that permit an understanding of the varieties of liberal democratic constitutionalism throughout the world.

PLSC 711a^U, Comparative Inequality. Michael Wallerstein.

M 1.30–3.20

This course investigates the causes of differences between countries and over time in the distribution of income and wealth and in the design and generosity of redistributive policies. Topics to be covered include normative ideas of equality, popular support for greater equality, the impact of democracy on economic equality, the relations of inequality and poverty, and relationship between inequality and economic performance. Whereas much of the class focuses on inequality in advanced industrial societies, the last third deals with inequality between countries and in the less developed countries.

PLSC 719b, Labor and Capital in Advanced Capitalist Democracies. Peter Swenson.

F 10.30–12.20

This course examines some of the economic, social, technological, political, and institutional logic behind labor and capital market governance in economically advanced democratic polities. From the logics of regulation, the course proceeds to analysis and explanation of major and current macropolitical issues like the shift from Keynesianism to monetarism, the centralization of industrial relations, the creation of financial systems and independent central banks, the foundations and transformations of welfare states, and international pressures forcing change if not necessarily convergence on distinct national systems of governance. Material for the course is drawn largely from the literature on Western Europe, the U.S., and Japan.

PLSC 734a,b, Comparative Research Workshop. Ivan Szelenyi, Andrew Schrank.

w 6–8

This workshop is a weekly interdisciplinary seminar at which work-in-progress by distinguished visiting scholars, Yale graduate students, and faculty from various social science disciplines is discussed. Papers are distributed a week ahead of time and also posted at the Web site of the Center for Comparative Research. Students who take the course for a letter grade have to present a paper the term they are enrolled for credit. *Also SOCY 560a,b.*

PLSC 735a, Political Parties and Democracy. Susan Stokes.

w 10–12

This course addresses the following sorts of questions. Why are parties ubiquitous in democracies? How do they function: are they teams competing for office, overlapping generations of members that have to keep each other in check, or vehicles for social interests? What explains variation in the size and inclusiveness of party systems? What effect do political parties and varying party systems have on representation? We study micro- and macro-theories

of political parties, and read both classics in the field and new literature on established and developing democracies.

PLSC 744b^U, The Dynamics of Russian Politics. William Odom.

T 1.30–3.20

Issues of political stability, constitutionalism, and institutions for political participation and governing are examined in light of contemporary events as well as the legacy of the Soviet period. Concepts from political development literature are used to devise alternative interpretations of the most critical determinants of Russian political change and stability, today and in the future. Huntington's *Political Order in Changing Societies*, Dahl's *Polyarchy*, Barrington Moore's *The Social Origins of Dictatorship and Democracy*, as well as selected journal articles on transitions to democracy, provide the analytic tools for analysis. Students write a short midterm essay on concepts for analysis, and choose a research paper topic in one of the main issue areas, basing their research on the contemporary Russian press and other available sources on Russian affairs since 1985. *Also INLR 545b*.

PLSC 755a^U, European Politics. David Cameron.

T 1.30–3.20

A comprehensive survey of politics in Europe. Attention is given to a variety of issues such as the role of the state in the economy; party systems and electoral change; migration, immigration, and demographic change; political and economic transformations in post-Communist Europe; and social and economic policy in the European states and to the origins, development, and current performance of the European Union. With respect to the latter, the course concentrates on institutional arrangements within the EU, relations between the EU and its member states, and recent developments such as the creation of an Economic and Monetary Union, enlargement, and the negotiation of a constitutional treaty.

PLSC 756b^U, European Union. David Cameron.

TW 3.30–5.20

An examination of the origins, development, institutions, contemporary policymaking processes, and challenges facing the European Union. Topics include theories of European integration; the creation of a single internal market; the creation of an Economic and Monetary Union; the several enlargements; the contemporary role of the Union in economic policy, justice and home affairs, and foreign and defense policy; efforts to address the so-called democratic deficit in the Union; and the recent negotiation of a constitutional treaty.

PLSC 759a, Issues in the Analysis of African Politics. William Foltz.

W 1.30–3.20

Subjects include the influence of precolonial systems and colonial rule on contemporary politics, states and statelessness, the politics of economic performance, communal conflict, and attempts at regional and subregional unity. Students prepare two bibliographic essays, one on the politics of an African country, one of an analytic problem area. *Also AFST 759a*.

PLSC 775b^U, Patronage and Clientelism in Democratic Systems. Susan Stokes.

W 1.30–3.20

Examines the channeling of public resources to private individuals in order to mobilize electoral support for parties and candidates, both historically, in the advanced democracies, and in today's new democracies in the developing world.

PLSC 777a, Comparative Politics I: Research Design. Elisabeth Wood.

TW 1.30–3.20

Comparative Politics I and II is a seminar in two parts designed to introduce graduate students to the fundamentals of comparative politics, including the major debates, topics, and methods. Comparative Politics I explores questions of methodology with an emphasis on research

design. Comparative Politics II focuses on substantive issues. Students read and discuss several classic and more recent works that represent a major theme and/or theory in comparative politics, including Karl Polyani's *The Great Transformation*, Charles Tilly's *Coercion, Capital and European States*, Theda Skocpol's *States and Social Revolutions*, and Adam Przeworski, Michael E. Alvarez, Jose Cheibub, and Fernando Limongi's *Democracy and Development*. It is strongly recommended that students take both parts of the seminar and that they do so consecutively.

PLSC 778b, Comparative Politics II. Stathis Kalyvas.

M 6–8

See description under PLSC 777a.

PLSC 779a, Agrarian Societies: Culture, Society, History, and Development.

Michael Dove, James Scott, Steven Stoll.

M 1.30–5.20

An interdisciplinary examination of agrarian societies, contemporary and historical, Western and non-Western. Major analytical perspectives from economics, history, political science, and environmental studies are used to develop a meaning-centered and historically grounded account of the transformations of rural society. Team taught. Also ANTH 541a, F&ES 753a, HIST 965a.

PLSC 784a^U, Africa and the Disciplines. William Foltz.

T 1.30–3.20

This seminar is designed to introduce students to the study of Africa from the perspective of several disciplines, specifically history, anthropology, politics and economics, law, literature, linguistics, and art history. It examines how Africa has been studied from the various perspectives. Also AFST 764a^U.

PLSC 787a^U, Japanese Politics. Frances Rosenbluth.

TTh 11.30–12.45

This course places Japanese politics in historical, theoretical, and comparative perspectives. After comparing conceptual frameworks, we examine the organization and functioning of political parties, factions, and local electoral machines. The latter portion of the course takes a close look at the government's decision-making process in the area of economic regulation and social policies. Finally, we consider recent changes in Japanese politics and their implications for Japan's global role.

POLITICAL ECONOMY

PLSC 712b, Comparative Political Economy. Frances Rosenbluth.

W 10–12

The course introduces graduate students to the basic theoretical and methodological approaches to political economy (most notably rational choice and game theory), as well as analyzing important empirical questions and providing a forum for students to undertake their own research. Some of the empirical topics include transitions to democracy and the market, political competition and economic outcomes, globalization, deregulation, environment, regional integration, federalism, and corruption.

PLSC 786a&b, Political Economy Colloquium. Justin Fox.

M 12–1.30

This course meets throughout the year in conjunction with the Leitner Political Economy Seminar Series. The audience for this course includes those students who have substantive interests in the interaction between economics and politics, as well as those students interested in the research methods (analytical and empirical) employed by contemporary political econ-

omists. The colloquium serves as a forum for graduate students and faculty to present their own work and to discuss current research in the field as presented by outside speakers, faculty, and fellow students.

PLSC 792b, Models of Bargaining. Seok-ju Cho.

T 3:30–5:20

Collective decision making in politics often takes the form of bargaining; that is, a process through which actors try to reach an agreement on their own. This course offers a survey of the literature of bargaining theories in political science. We focus on non-cooperative bargaining models, which are applicable to many subfields of political science, such as legislative politics, cabinet formation, bargaining between different branches of the government, and conflict resolution between countries.

AMERICAN POLITICS

PLSC 800a, Introduction to American Politics. David Mayhew.

T 1:30–3:20

An introduction to the analysis of U.S. politics. Approaches given consideration include classical separation of powers, political culture, civil society, the state, the public sphere, attitudes, power and influence, ideology, on-site contextual, econometrics of elections, rational actors, and formal theories of institutions. Assigned authors include T. Skocpol, J. Gerring, J. Zaller, D. R. Kiewiet, L. Bartels, D. Mayhew, K. Poole and H. Rosenthal, M. Fiorina, K. Krehbiel, R. Erikson, E. Schickler, D. Carpenter, and A. Alesina. Students are expected to read and discuss each week's assignment, and, for each of five weeks, write a three- to five-page analytic paper that deals with a subject addressed or suggested by the reading.

PLSC 815b^U, Political Institutions. Rose Razaghian.

T 3:30–5:20

The purpose of this course is to introduce students to the theoretical literature on institutions as well as important, yet diverse, empirical applications that include the U.S. Congress, U.S. bureaucracy, sovereign debt, central bank independence, as well as international institutions such as the League of Nations, United Nations, and IMF.

PLSC 817a^U, Race and Violence in the American City. Douglas Rae, Paul Bass.

M 3:30–5:20

An examination of racial violence in American cities in the closing years of the Civil Rights era, and of the implications of that violence (often black on black) for subsequent politics and policy. The 1969 Black Panther murder of Alex Rackley, mistakenly identified as an FBI informer, serves as a central case study.

PLSC 820a, Executive Politics and the Presidency. Stephen Skowronek.

W 3:30–5:20

This course surveys the origins of the American presidency, its constitutional foundations, institutional development, and current operations. Special attention is given to topics of interest in current research. These include the politics of leadership, the scope and limits of unilateral action, changing relations with Congress, the bureaucracy and the public, and the managerial capacities of the Executive Office of the President.

PLSC 821a, Economic Insecurity and the American Family. Jacob Hacker.

W 4–6

A multifaceted investigation of the changing financial standing of American families and the political, economic, and social forces that have affected it. We consider the role of public policy in offsetting or exacerbating the effects of foreign economic competition, the rise of the

postindustrial economy, the large-scale entry of women into the work force, and the post-1970s political and economic pressures facing the American welfare state. Cross-national comparative research and competing theoretical perspectives on financial risk complement in-depth analyses of the recent economic experience of the American family, both by social scientists and by popular commentators.

PLSC 822a&b, Research Topics in American Politics. Alan Gerber.

W 12–1.30

This course meets throughout the year in conjunction with the ISPS American Politics Workshop. It serves as a forum for graduate students in American Politics to discuss current research in the field as presented by outside speakers and current graduate students. Students taking the course for a grade are required to present their work and submit a research paper.

PLSC 823a, Race and Ethnicity. Khalilah Brown-Dean.

T 10.30–12.20

This course is an introduction to research on race and ethnicity in American politics. Topics include the social construction of race; intersections between race and gender; black, Latino, and Asian American public opinion and political participation; minority representation; the relationship among race, racism, and public policy; immigration and citizenship; state politics; the psychology of racial politics; and the role of race in campaigns. We discuss and debate the empirical contributions of this literature, as well as questions of theory, methodology, and research design. *Also AFAM 814a.*

PLSC 826a, Public Opinion. Khalilah Brown-Dean.

T 1.30–3.20

At its core, democracy represents a conversation between citizens and their leaders. Based on this notion, it's important to determine what messages citizens send and receive through the process of politics. In this course we focus on the content (what it is) and the construction (how it is formed and conveyed) of American public opinion. We explore issues of conceptualization, measurement, and stability.

PLSC 829b, Theories of Lawmaking. John Lapinski.

M 3.30–5.20

A growing literature in political science seeks to understand the nature of lawmaking. This course provides a comprehensive review of literature focused on policy making in the United States with a special emphasis on the role of Congress and presidency in this process. Significant attention is given to how to model and evaluate theories of lawmaking across time. We also evaluate rational choice theories of policymaking, including preference- and institution-based models, to determine how well these models explain policymaking across different periods of American history. In addition, we also draw on policy-centered work within the genre of American political development, as this work is potentially quite useful in evaluating how institutional design and history matter for legislative accomplishment. While much of the course evaluates what might be referred to as micro-models of the policymaking process, we also read work that assesses the macro consequences of legislators' collective choices.

PLSC 842b, The Constitution: Philosophy, History, and Law. Bruce Ackerman.

MW 2.10–4

An inquiry into the foundations of the American Constitution, at its founding and at critical moments in its historical transformation – most notably in response to the Civil War, the Great Depression, and the Civil Rights movement. Philosophically speaking, do we still live under the Constitution founded by the Federalists, or are we inhabitants of the Second or Third or Nth Republic? Institutionally, in what ways are the patterns of modern American government similar to, and different from, those in post-Revolutionary (1787–1860) and post-Civil War (1868–1932) America? Legally, what is or was the role of constitutional law in the

organization of each of these historical regimes? Through asking and answering these questions, the course tries to gain a critical perspective on the effort by the present Supreme Court to create a new constitutional regime for the twenty-first century. Examination. *Also LAW 21046.*

PLSC 843b, Women and Politics. Ange-Marie Hancock.

T 6–8

This course surveys the various approaches to studying gender in political science. It explicitly crosses the subfields of political theory, American politics, and comparative politics in course content and discussions of research design and methodology. Students intending to write dissertations involving gender analyses or preparing for the gender politics special field exam are encouraged to enroll in the class. *Also AFAM 812b.*

PLSC 848a, Environmental Politics and Policy. John Wargo.

TRH 1–2.20

This course provides an overview of environmental politics and policy. The relations among science, politics, and law are taught via case histories that include pesticides, parks and protected area management, endangered species, radionuclides, facility-siting, air pollution, drinking water quality, food safety, hazardous site restoration, and vector borne disease. The concepts of authority, democracy, risk, secrecy, security, equity, and justice guide the examination of political debate. In each case history we explore the effectiveness of law and regulation. Students take a midterm and prepare a research paper. Students also prepare several short in-section assignments, either interpretations of readings or data. Two lectures and one discussion are held per week. *Also F&ES 728a.*

PLSC 853a^U, U.S. National Elections. David Mayhew.

W 1.30–3.20

A research seminar centering on presidential and congressional elections. Topics include electoral realignments, current presidential alignments, the electoral college, voter turnout, aggregate House election patterns, House incumbency advantage, challenger quality, career decisions, election laws, House and Senate constituencies, campaign finance, Senate elections, and divided party control. Assigned authors include R. Erikson, E. Tufte, G. Jacobson, A. Abramowitz, M. Fiorina, R. Wolfinger, E. Ladd, G. King, J. Snyder, and B. Grofman. Students are expected to read weekly assignments and write a twenty- to thirty-page research paper.

PLSC 863a^U, Bureaucratic Politics in the U.S. Rose Razaghian.

M 1.30–3.20

In this course we examine the organization of the U.S. bureaucracy in detail. We study the role of information and delegation, agency design, direct and indirect oversight, the impact on public policy, and its historical development. We pay particular attention to the choice of research questions and the methodology employed to address these questions.

PSYCHOLOGY

2 Hillhouse, 432.4500

M.S., M.Phil., Ph.D.

Chair

Kelly Brownell (432.4545, kelly.brownell@yale.edu)

Director of Graduate Studies

Marcia Johnson (432.6761, marcia.johnson@yale.edu)

Professors

Woo-kyoung Ahn, Stephen Anderson (*Linguistics*), John Bargh, Linda Bartoshuk (*Surgery; Otolaryngology*), Sidney Blatt (*Psychiatry*), Paul Bloom, Thomas Brown, Kelly Brownell, Marvin Chun, Margaret Clark, Ravi Dhar (*School of Management*), Carol Fowler (*Haskins Laboratories*), Louis Goldstein (*Linguistics*), Donald Green (*Political Science; ISPS*), Marcia Johnson, Alan Kazdin, Frank Keil, Marianne LaFrance (*Women's, Gender & Sexuality Studies*), James Leckman (*Pediatrics*), Lawrence Marks (*Epidemiology & Public Health*), Susan Nolen-Hoeksema, Donald Quinlan (*Psychiatry*), Peter Salovey, Robert Sternberg, Fred Volkmar (*Child Study Center*), Victor Vroom (*School of Management*), Allan Wagner, Karen Wynn

Associate Professors

Geoffrey Cohen, Larry Davidson (*Psychiatry*), Elena Grigorenko (*Child Study Center*), Jeannette Ickovics (*Epidemiology & Public Health*), Robert Kerns (*Veterans Administration Medical Center*), Joseph Mahoney, Linda Mayes (*Child Study Center*), Brian Scholl, Mary Schwab-Stone (*Child Study Center*), Kathleen Sikkema (*Psychiatry*)

Assistant Professors

Maria Babyonyshev (*Linguistics*), William Corbin, Richard Eibach, Karyn Frick, Walter Gilliam (*Child Study Center*), Jeremy Gray, Joan Kaufman (*Psychiatry*), Julia Kim-Cohen, Christy Marshuetz, Douglas Mennin, Nathan Novemsky (*School of Management*), Maria Piñango (*Linguistics*), Valerie Purdie-Vaughns, Laurie Santos, Mark Schaefer (*Child Study Center*), Glenn Schafe, Teresa Treat, Robin Weersing (*Child Study Center*)

Lecturers

David Armor, Marc Brackett, James Charney, Nancy Close, Carla Horwitz, Kristi Lockhart, Leonid Rozenblit, Joseph Stevens

Fields of Study

Fields include behavioral neuroscience; clinical psychology; cognitive psychology; developmental psychology; social/personality psychology; and abilities and expertise.

Special Admissions Requirement

The department requires that scores from the GRE General Test accompany an application.

Special Requirements for the Ph.D. Degree

In order to allow each student to be trained in accordance with his or her own interests and career goals, the general requirements of the department are kept to a minimum. The formal requirements are: (1) Course work selected to meet the individual's objectives with a minimum of three basic-level courses and one course in data analysis. Two of the three required basic-level courses must be in two different areas of psychology outside the student's main area of concentration. The basic-level course requirement must be completed by the end of the second year. Students must attain an Honors grade in at least two term courses by the end of the second year of study. (2) Nine units of teaching are required in years two through four. (3) Completion of a predissertation research project, to be initiated not later than the second term and completed not later than March 15 of the second year. Certification of this research project as well as performance in course work and other evidence of scholarly work at a level commensurate with doctoral study, as judged by the faculty, is necessary for continuation beyond the second year. (4) Submission of a dissertation prospectus, a dissertation area review of the literature, and a theme essay that demonstrates the candidate's comprehensive knowledge and understanding of the area of concentration. Certification of the theme essay completes the qualifying examination. (5) Approval of the dissertation by an advisory committee and the passing of an oral examination on the dissertation and its general scientific implications. The theme essay and the dissertation prospectus are completed during the third year. Students are then formally admitted to Ph.D. candidacy. The dissertation area review of the literature must be approved prior to receipt by the readers of a preliminary draft of the dissertation. There are no language requirements.

The faculty considers teaching to be an essential element of the professional preparation of graduate students in Psychology. For this reason participation in the Teaching Fellow Program is a degree requirement for all doctoral students. They are expected to serve as teaching fellows for a total of nine teaching fellow units over the course of the second through fourth years in the program. Opportunities for teaching are matched as closely as possible with students' academic interests.

Combined Ph.D. Program

A combined Ph.D. degree with African American Studies is available. Consult departments for details.

Master's Degrees

M.Phil. The academic requirements for the M.Phil. degree are the same as for the Ph.D. degree except for the submission of a prospectus, a dissertation area review, and the completion and defense of a dissertation, which define the Ph.D.

M.S. (en route to the Ph.D.). The M.S. degree is awarded upon satisfactory completion of the second year of the program leading to the Ph.D. degree and also of the departmental predissertation research requirement.

Program materials are available online at www.yale.edu/psychology.

Courses

PSYC 502b, Learning Theory. Allan Wagner.

T 9–10.15

This course is concerned with the development of Learning Theory from its beginnings in Associationism, Behaviorism, and the Darwinian revolution to its present “connectionistic,” neural-network expressions. It emphasizes the systematic implication of studies of animal learning for commenting on the theoretical representations of knowledge and the principles of behavior modification.

[PSYC 503a, Memory.]

PSYC 504b, Cognitive and Social Neuroscience. Christy Marshuetz.

Th 1.30–3.20

This course covers issues in cognitive psychology and social cognition from the perspective of cognitive and social neuroscience. The emphasis is on understanding the importance of an interplay of traditional experimental psychology, neuroimaging research, and evidence from patient populations in understanding how “brain” gives rise to “mind.” Students without a background in cognitive neuroscience are welcome.

[PSYC 507a, Health Psychology: Clinical and Social Foundations.]

[PSYC 509b, Social Cognition.]

PSYC 510b, Self and Identity. David Armor.

T 9.30–12

In-depth analysis of central issues in psychological analyses of self and identity, drawing from classic and contemporary sources. Topics include content and structure of self-knowledge, accuracy and bias in self-evaluation, and self-regulation.

[PSYC 511b, Cognitive Development.]

[PSYC 514b, Applied Developmental Science.]

PSYC 518a, Data Analysis: Quantitative Variables. Teresa Treat.

MWF 10.30–11.20

Introduction to the analysis of quantitative data from experiments — primarily the analysis of variance and contrast analyses. Some coverage of correlation and regression. Required of first-year students except with instructor’s permission.

PSYC 520b^U, Multivariate Data Analysis with Latent Variables. Teresa Treat.

MWF 10.30–11.20

This course covers multivariate data analysis techniques with latent variables. Particular techniques to be covered include factor analysis (both the component and common factor models); unidimensional scaling; metric and non-metric multidimensional scaling; and hierarchical and additive cluster analysis, as well as an introduction to structural equation modeling.

[PSYC 521b^U, Multivariate Data Analysis with Observable Variables.]

[PSYC 523b, Cognitive Neuroscience.]

PSYC 525a, Minds of Infants. Karen Wynn.

M 1.30–3.20

This course reviews theory and research in cognition and development in the first years of life, focusing on how these findings bear on our understanding of the foundation of thought, and inform us about the architecture of the human mind. Topics include understanding of the physical and social worlds, knowledge of number, concept formation, causal reasoning, language, and more.

PSYC 528a, Gender and Psychopathology. Susan Nolen-Hoeksema.

TTh 9–10.15

This course explores the differences and similarities between men and women in vulnerability to, expression of, and treatment of several forms of psychopathology, including mood disorders, anxiety disorders, substance use disorders, and personality disorders.

[PSYC 533, The Nature of Cognition.]

[PSYC 535, Foundations of Behavioral Neuroscience.]

[PSYC 539b, Psychopathology and Its Treatment.]

[PSYC 540b, Changing Behavior in Applied Settings.]

PSYC 541a, Research Methods in Psychology. Alan Kazdin.

Th 2.30–4.20

Research design, methodology, and evaluation considered in the context of clinical research. Emphasis on experimental and quasi-experimental designs, threats to validation, confounding, sources of artifact and bias, alternative assessment strategies, and data evaluation methods.

PSYC 543a, History and Development of Psychological Theory.

Valerie Purdie-Vaughns, Richard Eibach.

Th 7–9 P.M.

This seminar examines historical foundations and contemporary theory in psychology. We cover classic theories, methods, and influential research findings and relate them to contemporary psychological research and theoretical controversies. Topics include motivation, emotion, judgment and decision making, attitudes, personality, group psychology, attribution theory, interpersonal attraction, self-deception, social cognition, and cultural psychology. The primary goal is to study the historical development of psychological theory through an in-depth examination of classic and contemporary readings.

[PSYC 553a, Behavioral Decision Making.]

PSYC 554a, Behavioral Decision Making II. Ravi Dhar, Nathan Novemsky.

T 4.10–7.10

This seminar examines research on the psychology of decision making focusing on judgment. Although the normative issue of how decisions should be made is relevant, the descriptive issue of how decisions are made is the main focus of the course. Topics of discussion include judgment heuristics and biases, confidence and calibration, issues of well-being including predictions and experiences, regret and counterfactuals, and other topics. The goal of the seminar is threefold: to foster a critical appreciation of existing knowledge in behavioral decision theory, to develop the students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that knowledge. Students generally enroll from a variety of disciplines, including cognitive and social psychology, behavioral economics, finance, marketing, political science, medicine, and public health. *Also MGMT 754a.*

PSYC 556b, Developmental Psychopathology. Julia Kim-Cohen.

T 1.30–3.20

This course provides an overview of the theoretical and empirical literature in the field of developmental psychopathology. Psychopathology is studied as a series of models of atypical development that can elucidate underlying mechanisms of stability and change. Although emphasis is placed on the causes and correlates of child and adolescent psychopathology, continuities and discontinuities in psychopathology across the lifespan are also covered. Readings include epidemiological, experimental, neurobiological, psychosocial, and ecological perspectives. Theoretical, methodological, and clinical implications of empirical findings are discussed.

[PSYC 569a, Psychology's Contribution to Gender and Vice Versa.]

[PSYC 570b, Nonverbal Communication.]

[PSYC 571b, Neurophysiology.]

PSYC 572b, Neurobiology of Learning and Memory. Thomas Brown.

T 1.30–4

The goal is to comprehend the field and memory across several levels of analysis, including synapses, neurons, circuits, systems, behavior, and cognition. The emphasis is on mammalian memory systems that are sufficiently well understood to begin unifying facts and principles across these levels using suitable combinations of theoretical approaches to computational neuroscience. *Also NSCI 614b.*

[PSYC 573b, Moral Psychology.]

PSYC 574a, Psychology of Leadership. Robert Sternberg, Victor Vroom, Jeffrey Sonnenfeld.

HTBA

This course covers relevant personality, developmental, cognitive, and social psychology approaches to examine both dispositional and situational perspectives of leadership.

PSYC 603a^U, Cognitive Science of Fiction and Imagination. Paul Bloom.

T 1.30–3.20

An exploration of how people create, experience, and reason about imaginary worlds. Topics include pretend play in babies and children, pathologies of the imagination (such as autism and schizophrenia), the evolution of the imagination, the experience of fictional understanding, and the puzzling appeal of tragedy and horror.

[PSYC 605b^U, The Relation of Speech to Language.]

[PSYC 612a^U, Neuroimaging Analysis Techniques.]

[PSYC 616b^U, Psychopathology and Cognitive Processing.]

[PSYC 617b^U, Evolutionary Psychology.]

[PSYC 620, Topics in Cognitive Development.]

[PSYC 622a^U, Social Intervention.]

PSYC 625a, Emotion and Cognitive Control. Jeremy Gray.

W 1.30–3.20

This graduate seminar emphasizes individual differences in emotion and cognitive (executive) control, and how they are related. Readings are drawn widely from subdisciplines within psychology, with a few readings from related fields (e.g., philosophy, artificial intelligence). In short weekly exercises, we use SPSS (or R) to analyze real data to gain familiarity with results from papers to be discussed in class, gain experience with the procedures (including partial correlation, mediation, and moderation), and consider advantages and limitations of individual differences as a research tool.

[PSYC 627a^U, Topics in Infant Studies.]

[PSYC 630b, Graduate Seminar in Writing.]

PSYC 637b^U, Emotion Function and Dysfunction: Applications to Psychopathology. Douglas Mennin.

M 1.30–3.20

How is it that emotion can be vital for survival yet be at the heart of so many mental disorders? Focus is on understanding the role of emotion in both functional and dysfunctional contexts.

Recent cognitive, social, neurobiological, and theoretical advances in the area of affective sciences have important implications for our understanding of psychopathology. Readings, class discussion, and lecture are geared toward building a reconceptualization of major psychological disorders through the lens of emotion theory and research.

PSYC 639b^u, Interpersonal Attraction and Relationships. Margaret Clark.

HTBA

This seminar focuses on the nature and functioning of close relationships such as friendships, family relationships, and romantic relationships. Theory and research by social, personality, and clinical psychologists on this topic are covered.

PSYC 640b, Transdisciplinarity: A New Research Approach to Address Complex Scientific Problems. Suchitra Krishnan-Sarin.

W 9.30–11.20

The traditional method of addressing scientific and health problems has been to study the question within a single discipline in depth. However, the complexity of most disorders requires a more integrated approach. A new approach, transdisciplinarity, has arisen in an effort to address these complex issues from the standpoint of many disciplines at the same time. The course faculty uses a case-based approach, with examples from their own work, to illustrate and define how transdisciplinary approaches might be used to come up with a more meaningful understanding of complex problems.

PSYC 642a, Social Psychology and Social Change. Geoffrey Cohen.

W 2.30–4.20

An examination of the major ideas and theories of social psychology and their relevance to social problems and social change.

[PSYC 643a, Diagnosis and Assessment.]

[PSYC 644b^u, Neurobiology of Emotion.]

PSYC 645a, Neuropsychology of Aging. Karyn Frick.

T 1.30–3.20

A broad overview of how the brain and behavior change with age. Primary emphasis on neurobiological aspects of aging, including neurodegenerative diseases, that profoundly affect behavior in the elderly.

PSYC 648b^u, Cellular Analysis of Learning and Memory: Vertebrate Model Systems. Glenn Schafe.

Th 9.30–11.20

We focus on the brain circuitries and cellular/molecular mechanisms involved in learning and memory, with particular emphasis on vertebrate model systems. Review of work on habituation, sensitization, Pavlovian and instrumental conditioning, and declarative memory formation. *Also NSCI 648b.*

[PSYC 649b^u, Topics in Syntax: Bilingualism.]

[PSYC 650a^u, Topics in Syntax: The Mental Lexicon.]

[PSYC 651b^u, Object Cognition.]

PSYC 652a^u, Topics in Cognitive Neuroscience. Christy Marshuetz.

M 1.30–3.20

Students learn about and discuss recent developments in cognitive neuroscience. The course consists of (1) an introduction to neuroimaging techniques, (2) topics in experimental design for neuroimaging, using primary research articles as examples, (3) recent developments in cognitive neuroscience, with a focus on memory and higher-order cognitive processing.

[PSYC 654b^U, Sensory Information Processing.]**PSYC 657a, Social and Behavioral Influences on Health. Jeannette Ickovics.**

T 1-2,50

This course provides students with an introduction to social and behavioral science issues that influence patterns of health and health care delivery. The focus is on the integration of bio-medical, social, psychological, and behavioral factors that must be taken into consideration when public health initiatives are developed and implemented. This course emphasizes the integration of research from the social and behavioral sciences with epidemiology and bio-medical sciences. *Also CDE 505a.*

[PSYC 659a^U, Addictive Behaviors.]**PSYC 664a, Health and Aging. Becca Levy.**

HTBA

Since 1900, the number of individuals sixty-five years of age and older has tripled and life expectancy has increased by about thirty years. In seminar we examine some of the health issues related to this growing segment of the population. The class discussions address such questions as (1) How does the aging process differ between cultures? and (2) What kinds of interventions can best reduce morbidity in old age? This course integrates psychosocial and biomedical approaches to the study of aging. *Also CDE 531a.*

[PSYC 669b, Neurochemical and Hormonal Modulation of Learning and Memory.]**[PSYC 671b^U, Concepts and Categorizations.]****[PSYC 672, Concepts, Categories, and Word Meanings.]****[PSYC 673b^U, Clinical Cognitive Neuroscience.]****PSYC 677a, Psychology of Free Will. John Bargh.**

Th 9,30-11,20

A graduate-level seminar on the question of the existence of free will from a psychological-science perspective (cognitive, social-cognitive, and neuroscience), but including consideration of the philosophical (philosophy of mind) and legal aspects and ramifications of the issue. Research discussed focuses largely on the “social automaticity” literature, the extent to which higher-order mental processes (including behavior) can and do operate without need for conscious choice and guidance. Permission of instructor required. Enrollment limited to fifteen.

PSYC 684a, Introduction to Psychotherapy: Technique. Faculty.

HTBA

Introduction to basic clinical skills and clinical issues. Topics for discussion include developing a therapeutic relationship, barriers to effective communication, strategies for managing resistance, and developing a professional identity. Class format includes informal discussion, assigned readings, and student case presentations. Permission of instructor required. Enrollment limited to fifteen.

PSYC 684b, Introduction to Psychotherapy: Technique. Faculty.

HTBA

The focus of this seminar is on formulating and conceptualizing psychological problems from a cognitive-behavioral perspective. Special consideration is paid to individual and cultural diversity in conceptualizing cases and planning treatment. Also discussed are ways in which cognitive-behavioral perspectives can be integrated with other theoretical orientations (e.g., interpersonal theory, experiential therapy).

PSYC 689a, Psychopathology and Diagnostic Assessment. Douglas Mennin.

HTBA

Didactic practicum for first-year clinical students. Main emphasis is initial assessment. Treatment planning and evaluation of progress also covered. Students first observe and then perform initial interviews. Applicable ethics and local laws reviewed.

PSYC 690b, Ethics and Clinical Practice: Legislation and Diversity Issues. Faculty.

HTBA

Introduction to ethical and legal guidelines for clinical practice. In addition, supervision on diagnostic interview using the Structured Clinical Interview for DSM-IV is provided.

PSYC 702, Current Work in Cognition. Christy Marshuetz.

T 12-1.30

A weekly seminar in which students, staff, and guests report on their research in cognition and information processing.

PSYC 704, Current Work in Behavioral Neuroscience. Glenn Schafe [F], Allan Wagner [Sp].

Th 3-4.30

An informal student/faculty seminar in which each participant chooses, lays groundwork for, and presents some current work in behavioral neuroscience. Currently emphasizes the psychobiology of learning, but involves a variety of research approaches, designs, and methods.

PSYC 705, Current Work in Abilities and Expertise. Robert Sternberg.

M 1.30-2.30

This seminar discusses current work in abilities and expertise viewed from a multidisciplinary approach. It includes both presentations and discussions of recent readings.

PSYC 708, Current Work in Developmental Psychology. Karen Wynn.

W 12-1.30

A luncheon meeting of the faculty and graduate students in developmental psychology for reports of current research and discussion on topics of general interest.

PSYC 710, Current Work in Social Psychology and Personality. David Armor.

M 12-1.30

Faculty and students in personality/social psychology meet during lunchtime to hear about and discuss the work of a local or visiting speaker.

PSYC 711a,b, Current Work in Child Development and Social Policy.

Walter Gilliam, Edward Zigler, Sandra Bishop-Josef.

F 11.30-12.20

A series of lectures by guest speakers from academia, various levels of government, community organizations, service agencies, the business world, and the media. Speakers discuss their work and its social policy implications. Topics may include early childhood education, child care, intervention programs for children and families, education reform, mental health, child and family policies, research at the intersection of psychology and social policy, and media presentation of child and family issues, among others.

PSYC 720, Current Work in Clinical Psychology. Douglas Mennin.

Th 12-1.30

Basic and applied current research in clinical and community psychology is presented by faculty, visiting scientists, and graduate students, and examined in terms of theory, methodology, and ethical and professional implications.

PSYC 721, Research Topics in Infant Cognition. Karen Wynn.

HTBA

Investigation of various topics in infant cognition: early mechanisms for representing and reasoning about number; infants' ability to represent time; early object knowledge; foundations of intentional understanding. Permission of instructor required.

PSYC 722, Research Topics in Eating and Weight Disorders. Kelly Brownell.

HTBA

In-depth discussion and analysis of current research topics on bulimia, anorexia nervosa, and obesity. Topics include, but are not limited to, physiology, cultural influences, treatment studies, body image, binge eating, and epidemiology.

PSYC 723, Research Topics in Child and Adolescent Therapy. Alan Kazdin.

This course focuses on the development and execution of research related to child and adolescent treatment, and the factors with which clinical dysfunction and therapeutic change are associated.

PSYC 724a, Research Topics in Child Development and Social Policy.**Sandra Bishop-Josef, Edward Zigler.**

M 5-6

The course focuses on major policy issues pertaining to children and families. Particular issues are determined by course participants. Participants select and read journal articles concerning the policy issues, and the articles are discussed during class sessions. Participants gain exposure to a broad range of policy topics in the child and family area, various research literatures, and different, interdisciplinary approaches to examining policy issues. In addition to the substantive knowledge gained on the issues examined, participants also learn how to do research in the policy arena, a skill which can then be used to study other issues.

PSYC 726, Research Topics in Mood Regulation and Mental Health.**Susan Nolen-Hoeksema.**

HTBA

We discuss a range of topics related to mood regulation and psychological disorders, including models of depression, anxiety, and related disorders. We also discuss how gender impacts vulnerability to emotional problems, and how gender-related factors may serve to protect against certain types of psychopathology.

[PSYC 728, Research Topics in Prevention Research.]**PSYC 729, Research Topics in Language and Cognition. Paul Bloom.**

HTBA

Seminar focusing on ongoing research projects in language, cognition, and development. Permission of instructor required.

PSYC 730, Research Topics in Addictive Behaviors. William Corbin.

HTBA

A forum for graduate students conducting research on alcohol and drug abuse.

PSYC 731, Research Topics in Cognition and Development. Frank Keil.

HTBA

A weekly seminar discussing research topics concerning cognition and development. Primary focus on high-level cognition, including such issues as: the nature of intuitive or folk theories, conceptual change, relations between word meaning and conceptual structure, understandings of divisions of cognitive labor, and reasoning about causal patterns.

PSYC 732, Research Topics in Visual Cognitive Neuroscience. Marvin Chun.

HTBA

Examines current research in visual cognitive neuroscience, including discussion of proposed and ongoing research projects. Topics include visual attention, perception, memory, and contextual learning.

PSYC 733, Research Topics in Self and Stigma. Geoffrey Cohen.

HTBA

This laboratory course focuses on current research on self-identity and stigmatization.

PSYC 734, Research Topics in Anxiety Disorders. Douglas Mennin.

HTBA

We examine current conceptualizations of anxiety disorders, with particular emphasis on generalized anxiety disorder. Topics include the utility of an emotion-regulation perspective in understanding and treating anxiety disorders.

[PSYC 735, Research Topics in Thinking.]

PSYC 736, Research Topics in Social Judgment. Richard Eibach.

HTBA

We cover experiments in the field of social judgment and decision making, with emphasis on judgmental errors and biases, lay epistemology, and political judgment.

PSYC 737, Research Topics in Clinical Cognitive Neuroscience. Kent Kiehl.

HTBA

Discuss current methodological and theoretical issues in major psychiatric disorders. Special emphasis is paid to the role cognitive neuroscience techniques (i.e., fMRI and ERP) may play in elucidating the neural correlates of callous conduct disorder, adult psychopathy, substance abuse, bipolar disorder, and schizophrenia.

PSYC 738, Research Topics in Cultural Diversity and Social Psychology.

Valerie Purdie-Vaughns.

HTBA

Examines current research related to culture, intergroup relations, group processes, and diversity in social psychology. Discussions include proposed and ongoing research projects. Emphasis placed on building research skills for conducting empirical investigations (hypothesis testing, design, and analysis).

PSYC 739, Research Topics in Autism and Related Disorders. Fred Volkmar,

Ami Klin.

F 9-10

Focus on research approaches in the study of autism and related conditions including both psychological and neurobiological processes. This seminar emphasizes the importance of understanding mechanisms in the developmental psychopathology of autism and related conditions.

PSYC 746b, Research Topics in Developmental Psychopathology. Julia Kim-Cohen.

HTBA

This course focuses on exploring mechanisms of risk and resilience in psychosocial development, including but not limited to early life experiences, parenting, gene-environment interplay, and emotion processing. Permission of instructor required.

PSYC 747, Research Topics in Affective Neuroscience. Glenn Schafe.

HTBA

This laboratory course studies the neurobiological substrates of emotion, with particular emphasis on Pavlovian fear conditioning. We cover the current literature in fear conditioning, ranging from studies that emphasize the behavior/systems level of analysis to those that emphasize the cellular and/or molecular.

PSYC 748, Research Topics in Emotion and Cognitive Control. Jeremy Gray.

HTBA

This course covers (1) research in emotion and cognitive control, and (2) science communication skills. For research, the emphasis is on the design, conduct, and analysis of behavioral and fMRI studies, emphasizing individual differences. Once a month, we have a session on science communication skills, with topics chosen by students to meet student interests and needs (spoken research presentations, persuasive communication, graph design, Web design, and so on). Students may enroll in the course and attend only the science communication skills component.

PSYC 749, Research Topics in Memory. Marcia Johnson.

Th 2.30–4.20

Examines current research on cognition and memory, including discussion of proposed and ongoing research projects. Topics include issues in design, analysis, and interpretation of empirical studies exploring human memory.

PSYC 750, Research Topics in the Neurobiology of Learning and Memory.

Thomas Brown.

HTBA

Discussion and analysis of current work on the neurobiological foundations of learning and memory systems in mammals. Informal weekly discussions span several levels of analysis, including molecular and biophysical studies, cellular and systems neurophysiology and neuroanatomy, and contemporary behavioral neuroscience.

PSYC 751, Research Topics in Memory, Aging, and Neurobiology. Karyn Frick.

HTBA

Weekly discussion of current work on the neurobiological basis of age-related memory dysfunction, sex differences in cognition, and other memory-related processes. Participants discuss these issues in an informal seminar format.

PSYC 766, Research Topics in Perception and Cognition. Brian Scholl.

Th 1–3

A seminar-style discussion of recent research in perception and cognition, covering both recent studies from the literature and the ongoing research in the Yale Perception and Cognition Laboratory.

PSYC 767, Research Topics in Emotion, Health, and Social Behavior. Peter Salovey.

F 10.30–12.20

A forum for graduate students conducting research in the Health, Emotion, and Behavior Laboratory.

PSYC 768, Research Topics in Psychopathology and Cognitive Processing.

Teresa Treat.

HTBA

Weekly discussion and analysis of theoretical and measurement models relevant to examination of the role of cognitive processing in psychopathology. Permission of instructor required.

PSYC 769, Research Topics in Intelligence and Thinking. Robert Sternberg.

HTBA

A forum for students to discuss contemporary issues related to intelligence and thinking. Discussion of works of researchers within and outside the Yale community. Primarily consists of informal presentations by seminar members seeking to help them clarify their ideas for theory and research.

PSYC 770, Research Topics in Animal Learning. Allan Wagner.

HTBA

Students discuss the current literature, issues of experimental design, and theoretical interpretations pertinent to their own research projects in the area of animal learning.

PSYC 771, Research Topics in Nonconscious Processes. John Bargh.

HTBA

The lab group focuses on nonconscious influences of motivation, attitudes, social power, and social representations (e.g., stereotypes) as they impact on interpersonal behavior, as well as the development and maintenance of close relationships.

[PSYC 773, Research Topics in Working Memory.]

PSYC 775, Research Topics in Animal Cognition. Laurie Santos.

HTBA

Investigation of various topics in animal cognition, including what nonhuman primates know about tools and foods; how nonhuman primates represent objects and number; whether nonhuman primates possess a theory of mind. Permission of instructor required.

[PSYC 777, Research Topics in Gender and Psychology.]

PSYC 801, Clinical Internship (Child). Faculty.

Advanced training in clinical psychology with children. Adapted to meet individual needs with location at a suitable APA-approved internship setting.

PSYC 802, Clinical Internship (Adult). Faculty.

Advanced training in clinical psychology with adults. Adapted to meet individual needs with location at a suitable APA-approved internship setting.

PSYC 806, Practicum in Childhood Intervention. Faculty.

Advanced supervised work in settings where child and family policies are developed and/or implemented. Adapted to meet individual needs with location at suitable sites.

PSYC 808, Practicum in Child Psychology. Faculty.

The Yale Child Study Center offers a yearlong practicum, which includes assessment of children, psychotherapy, team meetings, supervision, and didactic experiences.

PSYC 809, Practicum in Assessment of School-Aged Children. Faculty.

An optional extension of PSYC 661. Students gain practical experience in testing with children.

PSYC 810, Practicum in Developmental Assessment. Linda Mayes.

Practicum in early childhood screening and assessment of infants and toddlers at high risk for social adaptive and emotional developmental problems.

PSYC 811, Anxiety Disorders Practicum. Douglas Mennin.

Discussion of current topics in psychopathology and treatment of anxiety disorders. Group supervision of therapy cases involving OCD, panic, social phobia.

PSYC 812, Conduct Problem Practicum. Alan Kazdin.

Provides training in the diagnosis, assessment, and treatment of aggressive and antisocial children and their families. Permission of the instructor required.

PSYC 813, Eating and Weight Disorders Practicum. Kelly Brownell, Marlene Schwartz.

Practical work for graduate students in clinical psychology on therapeutic interventions for eating and weight disorders. Assessment, diagnosis, and treatment are covered.

PSYC 815, Mood Disorders Practicum. Faculty.

HTBA

Supervised practicum in the assessment and treatment of mood disorders, with an emphasis on cognitive-behavioral perspectives.

PSYC 816b, Practicum in Developmental Disabilities and Developmental Assessment. Fred Volkmar, Ami Klin.

HTBA

An introduction to approaches in developmental assessment in infants and young children (under age five years) with a range of developmental difficulties. Students observe and/or participate in developmental assessments. Students are exposed to a range of assessment instruments including developmental tests, speech-communication assessments, and psychiatric diagnostic instruments appropriate to this age group. Permission of instructor required.

PSYC 817, Other Clinical Practica. Faculty.

For credit under this course number, clinical students register for practicum experiences other than those listed elsewhere in clinical psychology, so that transcripts reflect accurately the various practicum experiences completed.

[PSYC 821, Practicum in Clinical Child and Adolescent Treatment.]

PSYC 883, Practicum in Clinical Assessment. Donald Quinlan.

Supervised psychological assessment using measures of intellectual functioning, projective testing, and neuropsychological testing with patients.

PSYC 920, Individual Study: Dissertation Area Paper.

By arrangement with faculty.

PSYC 923, Individual Study: Theme Essay.

By arrangement with faculty.

PSYC 925, Individual Tutorial.

By arrangement with faculty and approval of director of graduate studies.

PSYC 930, Predissertation Research.

By arrangement with faculty.

RELIGIOUS STUDIES

451 College, 432.0828

M.A., M.Phil., Ph.D.

Chair

Harry Stout

Director of Graduate Studies

Phyllis Granoff

Professors

Harold Attridge (*Divinity*), Gerhard Böwering, Robert Brody (*Visiting*), Jon Butler, Adela Collins (*Divinity*), John J. Collins (*Divinity*), Carlos Eire, Margaret Farley (*Divinity*), Steven Fraade, Philip Gorski, Phyllis Granoff, Christine Hayes, Paula Hyman, Serene Jones (*Divinity*), Bentley Layton, Karen Lebacqz (*Visiting*), Ivan Marcus, Dale Martin, Thomas Ogletree (*Divinity*), Gene Outka, Holmes Rolston (*Visiting*), Harry Stout, Denys Turner, Miroslav Volf (*Divinity*), Robert Wilson

Associate Professor

Stephen Davis

Assistant Professors

Shannon Craigo-Snell, Jacob Dalton, Frank Griffel, Ludger Viefhues

Senior Lecturer

Koichi Shinohara

Lecturers

Mara Benjamin, Hugh Flick, Jr., David Lambert

Fields of Study

Students must enroll in one of the following fields of study: American Religious History, Asian Religions, Hebrew Bible/Old Testament, History of Ancient Christianity, Islamic Studies, Judaic Studies, New Testament, Religious Ethics, and Theology. (Philosophy of Religion is not admitting graduate students at this time.)

Special Admissions Requirement

The department requires the scores of the GRE General Test and previous study in areas relevant to the chosen field of study, including ancient languages where applicable.

Special Requirements for the Ph.D. Degree

Twelve term courses must be completed, in which the Graduate School Honors requirement must be met. Proficiency in two modern scholarly languages, normally French and German, must be shown, one before the end of the first year, the other before the beginning of the third; this may be done by passing an examination administered by the

department, by accreditation from a Yale Summer School course designed for this purpose, or by a grade of A or B in one of Yale's intermediate language courses. Mastery of the languages needed in one's chosen field (e.g., Chinese, Hebrew, Greek, Japanese) is also required in certain fields of study. A set of four qualifying examinations is designed for each student, following guidelines and criteria set by each field of study; these are normally completed in the third year. The dissertation prospectus must be approved by a colloquium, and the completed dissertation by a committee of readers and the departmental faculty. Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the Ph.D. This is expected before the seventh term in American Religious History, Philosophy of Religion, Religious Ethics, and Theology; before the eighth term in other fields. Students begin writing their dissertation in the fourth year and normally will have finished by the end of the sixth. There is no oral examination on the dissertation.

In the Department of Religious Studies, the faculty consider learning to teach to be an important and integral component of the professional training of its graduate students. Students are therefore required to teach as teaching fellows for at least two years during their graduate programs. Such teaching normally takes place during their third and fourth years, unless other arrangements are approved by the director of graduate studies.

A combined Ph.D. degree is available with African American Studies. Consult department for details.

Master's Degrees

M.Phil. and *M.A.* (*both en route to the Ph.D.*). See Graduate School requirements, pages 442–44. Additionally, students in Religious Studies are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

Prospective students must apply in one of the nine fields of study, and when requesting information they should specify their particular field of interest. Program materials are available upon request to the Director of Graduate Studies, Department of Religious Studies, Yale University, PO Box 208287, New Haven CT 06520-8287.

Courses

RLST 553a, Buddhist Monastic Life in Medieval Chinese Sources.

Koichi Shinohara.

M 1.30–3.20

This course is designed for students who wish to gain some experience in reading a variety of Chinese sources representing various aspects of monastic life. Classes are conducted as a close reading of original sources. Students are expected to be able to read literary Chinese; those who work on Japanese Buddhism and have learned to read Chinese sources as *kambun* may read the material using that method. For this year we focus on writings of Daoxuan (596–667), a very influential commentator on the *vinaya* or monastic rules, and his collaborator Daoshi (d.u.).

RLST 571a, Medieval Indian Religions. Phyllis Granoff.

W 1.30–3.20

This course focuses on a close reading of selected texts from India's classical religions: Buddhism, Jainism, and Hinduism. Some of the possible themes include the nature of the soul; the divine body; lineage and transmission.

RLST 573b, Sacred Place in Asia. Phyllis Granoff, Koichi Shinohara.

W 1.30–3.20

This course is intended to give students the opportunity to conduct in-depth research on a sacred place in an Asian religious tradition. The course is open to students without Asian languages. Students with Sanskrit/Chinese/Japanese read primary texts in those languages; others work with carefully selected translations. Among the possible topics to be covered are patronage and politics of sacred place; local religion; origin narratives and the process of legitimization of sacred sites; sacred biography and sacred place.

RLST 601a, Required Seminar for New Testament and Ancient Christianity: The Gospel of John in Ancient Interpretation. Harry Attridge.

W 4.30–6.20

The required seminar for doctoral students in New Testament and Ancient Christianity for the fall of 2005 explores the interpretation of the Fourth Gospel in Christian sources from the first to the seventh century. The seminar explores the ways in which the Johannine Gospel and Epistles helped to frame dogmatic and ecclesiological debates and how such debates informed the interpretation of the biblical texts.

RLST 604b^U, The Making of the Christian Bible. Stephen Davis.

MW 10.30–11.20, I HTBA

The first four centuries in the history of Christianity were the period in which the Christian Bible effectively took shape. This same period saw the development of distinctive methods of interpretation that helped shape Christian understandings of this emerging scriptural canon. This course raises questions about the various ways that early Christians read (and thereby shaped) the Bible, as well as the social and theological factors that led to the exclusion of so-called heretical or apocryphal writings.

RLST 651a^U, History of Christianity in the Ancient World: Jesus to Augustine. Stephen Davis.

MW 11.30–12.20, I HTBA

The rise of Christianity and the development of Western culture into the Middle Ages, including the creation of Christian orthodoxy, and the religious, political, social, gender, literary, and theological history of Christian religion in many forms.

RLST 652a^U, Gnostic Religion and Literature. Bentley Layton.

TR 11.30–12.45

Exploration of second- and third-century gnosticism, with emphasis on texts from the library at Nag Hammadi. Close reading of selected gnostic scriptures; examination of the organization, practices, and sources of gnostic religion.

RLST 654a, Seminar on Ancient Christianity. Bentley Layton.

T 4–5.50

Close reading in Coptic of a newly produced text of Shenoute's *Discourses*. Prerequisite: reading knowledge of Coptic.

RLST 666b, Arabic Christian Theology. Stephen Davis.

W 3.30–5.20

This course is designed to introduce students to the rich heritage of Middle Eastern Christian theology produced in the Arabic language. Special attention is paid to how medieval

Arabic Christian writers reinterpreted patristic tradition, how their theology was contextualized by liturgical practices, and how it was shaped by the Christian-Muslim encounter. Prerequisite: reading knowledge of Arabic.

RLST 673a^U, Pilgrims, Monks, and Martyrs. Stephen Davis.

W 3.30–5.20

Study of historical factors in the formation of the Christian Bible, especially the exclusion of so-called heretical or apocryphal writings, and the ways that early Christians interpreted and thereby shaped their scripture.

RLST 677a, The Catholic Reformation. Carlos Eire.

Th 3.30–5.20

A graduate seminar on the history of the Catholic Reformation of the sixteenth and seventeenth centuries, designed as an introduction to primary texts (in translation) and to the historiography. *Also HIST 563a.*

RLST 705b, Readings in Religion and American History, 1600–1990. Jon Butler.

M 9–11

This introductory graduate readings course assesses interrelations between religion and American society from 1600 to 1990. Concentration on religion's successes and failures in shaping American society from the Puritans to modern neo-conservative fundamentalism. Readings in primary and secondary sources; development of bibliographical skills. *Also AMST 705b, HIST 720b.*

RLST 705b, Fakhr al-Din al-Razi's Life and Thought. Frank Griffel.

W 10.30–12.20

Fakhr al-Din al-Razi (d. 606/1210) is one of the most important figures of post-classical Muslim thought and one of the initiators of the "Avicennan turn" in Ash'ari theology. We read Arabic sources on his biography, his works, and his teachings.

RLST 717a^U, Islamic Theology. Frank Griffel.

TTh 10.30–11.20

Historical survey of major themes in Muslim theology and doctrine from the Koran to contemporary Muslim thinkers. Emphasis on the systematic character of Muslim thought and the arguments given by thinkers; reason vs. revelation, the emergence of Sunnism in the tenth and eleventh centuries, the reaction of Muslim theology (from 1800) to the challenges of the West, and contemporary Muslim thought.

RLST 751b^U, Midrash Seminar: Mekilta Neziqin. Steven Fraade.

Th 9.30–11.20

Close study of the earliest rabbinic commentary to the Book of Exodus. We focus on the commentary to the laws of Exodus 21–22, mainly civil and criminal. The course introduces students to the language and methods of rabbinic scriptural interpretation, with particular attention to the interplay of legal interpretation, semantics, rhetoric, and religious ideology. We also consider the relation of midrashic legal commentary to other, intersecting forms of early rabbinic legal discourse. Prerequisite: reading knowledge of Hebrew. *Also JDST 728b^U.*

RLST 756b, The Required Second Temple Judaism Seminar. David Lambert.

W 1.30–3.20

We consider the benefits of broadly tracing the origin and development of key Western religious concepts from the Hebrew Bible into ancient Judaism and early Christianity. Examination of multiple epochs can serve as a control in the analysis of the religious worldview of particular cultures and help overcome the interpretive difficulty of understanding the prehistory of concepts that have since become commonplace in formative religion. Class time is split between the instructor's presentation of his own research into the history of the concept of

repentance and student presentations around topics pertinent to their individual research interests. *Also* *J DST* 756b.

RLST 762b^u, Memory, Memoirs, and Modern Jewish History. Paula Hyman.

T 1.30–3.20

Exploration of how memoir writers from the seventeenth to the twentieth century understand their own experience against the backdrop of Jewish history. Focus on the construction of identity and the relation of personal and collective memory, with special attention to the interaction of minority status, gender, and class in a variety of historical contexts. *Also* *HIST* 951b^u, *J DST* 784b^u.

RLST 763a, Liturgy in Jewish Late Antiquity. Robert Brody.

M 10.30–12.30

An investigation of central topics in the liturgical history of the Geonic period (mid-sixth to mid-eleventh century C.E.). Special attention to the competition between Jewish centers in Palestine and Babylonia for cultural hegemony. Prerequisite: reading proficiency in Hebrew. *Also* *J DST* 731a.

RLST 765b^u, The Earliest Rabbinic Literature. Robert Brody.

TTH 11.30–12.45

An introduction to the major genres of the earliest rabbinic literature produced in Palestine from the late first to the mid-third century C.E. Primary sources dealing with diverse topics in family law are analyzed in English translation. No language prerequisite. *Also* *J DST* 730b^u.

RLST 768a^u, Holocaust in Historical Perspective. Paula Hyman.

MW 10.30–11.20, I HTBA

A survey of the major issues raised by the Holocaust, including the roots of Nazism; different theoretic perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. *Also* *HIST* 979a^u, *J DST* 788a^u.

RLST 773a^u, History of Jewish Culture to the Reformation. Ivan Marcus.

TTH 11.30–12.45

A broad introduction to the history of Jewish culture from its beginnings until the late Middle Ages, with the main focus on the formative period of classical rabbinic Judaism and on the symbiotic relationship among Judaism, Christianity, and Islam. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. *Also* *HIST* 535a^u, *J DST* 761a^u.

RLST 774b^u, History of Jewish Culture, 1500 to the Present. Paula Hyman.

TTH 10.30–11.20

A broad introduction to the history of Jewish culture from the late Middle Ages until the present. Emphasis on the changing interactions of Jews with the larger society as well as the transformation of Judaism in its encounter with modernity. *Also* *HIST* 566b^u, *J DST* 781b^u.

RLST 776b, Jews in Christian and Muslim Lands from the Fourth to the Sixteenth Century. Ivan Marcus.

T 1.30–3.20

Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; the Jews in the Ottoman Empire. *Also* *HIST* 541b.

RLST 777b^u, Jews in Muslim Lands from the Seventh to the Sixteenth Century. Ivan Marcus.

TTH 11.30–12.45

Introduction to Jewish culture and society in Muslim lands from the Prophet Muhammad to Suleiman the Magnificent. Topics include Islam and Judaism; Jerusalem as a holy site; rabbinic

leadership and literature in Baghdad; Jewish courtiers, poets, and philosophers in Muslim Spain; the Jews in the Ottoman Empire. *Also JDST 764b^{II}.*

RLST 795a^{II}, Women and Judaism. Paula Hyman.

M 1.30–3.20

An exploration of the roles and representation of Jewish women in the modern period. Special attention to the role of gender in Judaism; the social, cultural, and political activity of women; and the development and impact of feminism. *Also HIST 950a^{II}, JDST 787a^{II}.*

RLST 801b, Hebrew Bible Seminar: Problems in the History of Israelite Religion.

Robert Wilson.

Th 1.30–3.20

An intensive study of important features of ancient Israelite religion, including the origins of monotheism, the priesthood, prophecy, and apocalyptic. Prerequisites: two years of Biblical Hebrew and previous work in biblical interpretation.

RLST 805b, History and Methods of the Interpretation of the Old

Testament/Hebrew Bible. John Collins, Robert Wilson.

M 1.30–3.20

Discussion of classic secondary literature on the Hebrew Bible from Wellhausen to the present. Extensive reading, class presentations, and research paper required.

RLST 813a, The Book of Ben Sira. John Collins.

M 1.30–3.20

Detailed examination of the Hebrew and Greek text of Ben Sira. Discussion of historical, philosophical, and literary context. Ability to read Greek and unpointed Hebrew required. Class presentation and research paper required.

RLST 852b, *Agape* and Special Relations. Gene Outka.

Th 1.30–3.20

This seminar addresses a range of inquiries generated by a larger question: How should we relate an understanding of the commandment to love one's neighbor as oneself as universal in scope to the demands of special relations? Authors read include historical and contemporary works, mainly in the Christian tradition.

RLST 866a, Theories of Love. Gene Outka.

W 1.30–3.20

Accounts of love in the Christian tradition, especially of *agape*, *philia*, and *eros*, and considerations of certain philosophical accounts. Historical and contemporary authors include Augustine, Aquinas, Kierkegaard, Nygren, Outka, O'Donovan, Vacek, and Jackson. Topics include love for God, neighbor-love, and self-love.

RLST 868a, Communicative Ethics in a Multicultural Democracy.

Thomas Ogletree.

Th 3.30–5.20

This course is offered as an advanced seminar for Ph.D. students in religious ethics. Students in other programs are admitted by permission only, with a limit of ten. The seminar examines philosophical and religious resources that address prospects for meaningful public discourse about basic social and political issues in contemporary U.S. society. The seminar takes account of relevant Constitutional principles, especially the First Amendment. Yet common readings primarily deal with philosophical analyses of ethical principles that should regulate and guide public debates among people with diverse, even incompatible, values about the basic moral requisites of a well-ordered society.

RLST 869a^U, Critical Issues in Bioethics. Karen Lebacqz.

TTH 11.30–12.20, 1 HTBA

Using case studies, this introduction to bioethics explores cutting-edge issues in bioethics such as cloning and stem cells, but also provides a foundation for ethical decision making in health care and research. *Also REL 873a.*

RLST 870b, Alternative Approaches to Bioethics. Karen Lebacqz.

M 1.30–3.20

For almost twenty years, the field of bioethics was dominated by the “principles” approach popularized by Beauchamp and Childress and supported as well by the work of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. But even as the principles became solidified, there were grumblings in the field. A number of serious challenges have arisen. This seminar aims to review the dominant, “principled” approach and then examine a range of important challenges and alternative approaches. In doing so, we explore both the field of bioethics and the issue of method in ethics more generally. Readings are chosen both to reflect “classic” sources and to locate important but lesser-known emendations. Objectives for the course include: (1) learning a range of methods in ethics; (2) seeing how those methods are today incorporated into bioethics; (3) exploring the implications of different methods for the structure and delivery of health care; and (4) examining the strengths and weaknesses of different approaches. Students are encouraged to develop an approach to bioethics that incorporates the best of each alternative view considered. Prerequisite: RLST 869a^U. *Also REL 872b.*

RLST 871b, Genetic Bioethics: Scientific and Religious Perspectives.**Holmes Rolston.**

W 3.30–5.20

Philosophical, ethical, and religious issues interpreting genetic natural history, and genetic accounts of biological nature and human culture. Evolutionary explanations of the genesis of values in nature and human society, whether and how far such creativity remains open to religious, especially monotheistic, interpretation. *Also REL 878b.*

RLST 903a,b, The Doctrine of God in Some High and Late Medieval Christian Theologians in the Latin West. Denys Turner.

TTH 4–5.20

This course consists of seminars on texts relating to the doctrine of God. In the first term the texts are Bonaventure, *The Soul's Journey into God*; Thomas Aquinas, selected texts from *Summa Theologiae*; selected texts from Duns Scotus, *Reportata Parisiensia*. In the second term the texts are Marguerite Porete, *A Mirror of Simple Souls*; Meister Eckhart, selected sermons; and Nicholas of Cusa, *On Learned Ignorance*. All the texts may be studied in English translation. A reading knowledge of the relevant languages would be a help, but is not required.

RLST 906b^U, Four Atheist Critiques of Christian Theism. Denys Turner.

TTH 10.30–11.20

An exploration of four styles of atheistic rejection of “classical” Christian theism, those of Feuerbach, Marx, Nietzsche, and Derrida, and of how far there are rational means of settling the question of the existence of the “classical” Christian God.

RENAISSANCE STUDIES

53 Wall, Rm 310, 432.0672

M.A., M.Phil., Ph.D.

Chair and Director of Graduate Studies

Keith Wrightson

Executive Committee

Edwin Duval, Carlos Eire, Roberto González Echevarría, Lawrence Manley, John Matthews, Giuseppe Mazzotta, David Quint, John Rogers, Ellen Rosand, Paolo Valesio, Christopher Wood

Faculty Associated with the Program

Rolena Adorno, Leslie Brisman, Judith Colton, Anne Dunlop, Paul Freedman, Karsten Harries, Olivia Holmes, Blair Hoxby, K. David Jackson, Maija Jansson, James Kearney, Lee Patterson, Kristen Phillips-Court, Francesca Trivellato, Keith Wrightson

Lecturer

Robert Babcock

Fields of Study

Renaissance Studies offers a combined Ph.D. degree that integrates concentration in a departmental field with interdisciplinary study of the broader range of culture in the Renaissance and early modern periods. The program is designed to train Renaissance specialists who are firmly based in a traditional discipline but who can also work across disciplinary boundaries. Departmental areas of concentration available are Classics, Comparative Literature, English, History, History of Art, History of Music, Italian, and Spanish and Portuguese.

Special Admissions Requirements

Only candidates wishing to proceed to a doctorate should apply. *Application should be made to the department of concentration, with an indication that the candidate seeks nomination to the combined degree in Renaissance Studies.* Applications should be accompanied by scores from the GREs and one research or critical paper.

Special Requirements for the Ph.D. Degree

Students are subject to the combined Ph.D. supervision of the Renaissance Studies program and the relevant participating department. The student's program will be decided in consultation with an adviser, the director of graduate studies in Renaissance Studies, and the director of graduate studies in the participating department. Requirements for the combined degree will vary slightly to accommodate the requirements of the participating departments, but all candidates for the combined degree are expected to meet, at a minimum, the following requirements. Students must demonstrate a reading knowledge of Latin, Italian, and a third language, which will vary according to departmental

requirements. At the minimum, an examination in Latin or Italian should normally be passed upon entrance; a second language should be passed before the third term; and a third language by the end of the second year. Each student is required to take sixteen term courses (in History of Art, fifteen). The normal pattern is to have completed fifteen courses during the first two years of study, no more than two of which may be individual reading and research. A two-term core seminar, designed to present a wide range of topics concerned with Renaissance and early modern culture, is required of all combined degree candidates. This course, offered every other year, is open to students from other departments.

Students concentrating in modern language and literature departments (including Comparative Literature, English, Italian, and Spanish and Portuguese) are required to complete three courses in at least two disciplines outside of literature, three courses in the Renaissance literature of the primary department, and two courses in Renaissance literatures outside of the primary department. The remaining courses will be taken in other periods and topics as required by the department of concentration. Students concentrating in History or Music are required to complete four courses dealing with Renaissance culture in disciplines outside of the primary department and four courses in the Renaissance period within the department; the remaining courses are to be taken in other periods and topics as required by the department of concentration. Students concentrating in History of Art are required to take four courses within the department and three courses outside the department dealing with the Renaissance period. Students concentrating in Classics are required to take six courses outside the department in the Renaissance period. Training in teaching, through teaching fellowships, is considered an important part of every student's program. Most students teach in their third and fourth years.

The scheduling of the oral examination and the dissertation prospectus follows the practice of the primary department, but in every case the two requirements must be completed not later than September of the fourth year. The oral examination, varying in length from two hours to two hours and fifteen minutes, will include a standard fifteen-minute question on the bibliographical resources for Renaissance Studies across the disciplines and three fifteen-minute questions (in the case of English two fifteen-minute questions) in Renaissance topics outside the primary discipline. The remainder of the examination will be devoted to the primary discipline, including (except in the case of Classics) some further coverage of the Renaissance period. Students take additional written examinations as required by the primary departments.

Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the combined Ph.D. degree. Admission to candidacy must be completed by the beginning of the fourth year. The dissertation will be advised and completed according to departmental guidelines, but one of the readers will normally be a member of the Renaissance Studies Executive Committee.

Master's Degrees

M.Phil. The combined M.Phil. degree may be requested after all requirements but the dissertation are met.

M.A. (en route to the Ph.D.). The M.A. degree is awarded upon completion of eight term courses, taken in at least three disciplines, and with at least three grades of Honors. The examination in Latin or Italian must have been passed.

Program materials are available upon request to the Chair, Renaissance Studies Program, Yale University, PO Box 208298, New Haven CT 06520-8298.

Course

**RNST 500a,b, Introduction to Renaissance Studies. David Quint [F],
Lawrence Manley [Sp].**

T 10.30–12.20 [F], W 3.30–5.20 [Sp]

An introduction to the major texts, issues, bibliography, and methods in the interdisciplinary study of the Renaissance. Emphasis in the first term on Italy and in the second on northern Europe. *Also CPLT 501a,b, ENGL 565a,b.*

SLAVIC LANGUAGES AND LITERATURES

2704 Hall of Graduate Studies, 432.1300, slavic.department@yale.edu
M.A., M.Phil., Ph.D.

Chair

Vladimir Alexandrov

Director of Graduate Studies

Katerina Clark (451 College, Rm 203, 432.0712, katerina.clark@yale.edu)

Professors

Vladimir Alexandrov, Katerina Clark, Laura Engelstein (*History*), Harvey Goldblatt, Robert Greenberg (*Adjunct*), Benjamin Harshav (*Comparative Literature*), Tomas Venclova

Associate Professors

Hilary Fink, John MacKay

Assistant Professors

Kate Holland, Ilya Kliger

Senior Lector

Irina Dolgova

Fields of Study

Fields include Russian literature, medieval Slavic literature and philology (by special arrangement), Polish literature (by special arrangement).

Special Admissions Requirement

An advanced-level command of the Russian language is required.

Special Requirements for the Ph.D. Degree

All entering graduate students must pass departmental proficiency examinations in Russian. During their residence, students specializing in Russian literature take a minimum of sixteen term courses (including three required courses) and are expected to acquire a comprehensive knowledge in all periods of Russian literature, a familiarity with medieval Slavic literature, a thorough command of the Russian language, and a mastery of a field of concentration within Russian literature. The student's course work, with the approval of the director of graduate studies, may be selected from the offerings of the department and (if relevance can be demonstrated) any other department of the University. In addition, the student will be responsible for developing a minor field of specialization in one of the following: (1) a Western or non-Western literature; (2) film studies; (3) a topic in intellectual history; (4) one of the other arts; (5) another Slavic literature; (6) Slavic linguistics. A special curriculum may be arranged for students wishing to specialize in either medieval Slavic literature and philology or Polish literature. A reading examination in

either French or German, administered and evaluated by the department, must be passed by all graduate students by the beginning of the fifth term of study. The qualifying examinations should be passed by the end of the sixth term of study. A dissertation prospectus must be submitted no later than September 15 of the seventh term of study. For additional details, see the director of graduate studies and the departmental Web site: www.yale.edu/slavic. Upon completion of all predissertation requirements, including the prospectus and its defense, students are admitted to candidacy for the Ph.D.

The faculty considers teaching to be an important part of the professional preparation of graduate students. Students in Slavic normally teach in their third and fourth years.

Joint Ph.D. Program with Film Studies

The Department of Slavic Languages and Literatures also offers, in conjunction with the Program in Film Studies, a joint Ph.D. in Slavic Languages and Literatures and Film Studies. For further details, see Film Studies. Applicants to the joint program must indicate on their application that they are applying both to Film Studies and to Slavic Languages and Literatures. All documentation within the application should include this information.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in Slavic Languages and Literatures are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

Master's Degree Program. The Department of Slavic Languages and Literatures does not admit students for the terminal M.A. degree, nor does it award an M.A. en route to the Ph.D. degree. If, however, a student admitted for the Ph.D. leaves the program prior to completion of the doctoral degree, he or she may be eligible to receive a terminal master's degree. He or she must have completed at least fifteen term courses in Russian literature and linguistics, chosen in consultation with the director of graduate studies. A grade of Honors in at least two term courses and an average of High Pass in the remaining courses must be attained. A reading knowledge of French or German is required, and candidates must pass departmental proficiency examinations in Russian.

Program materials are available upon request to the Chair, Slavic Languages and Literatures, Yale University, PO Box 208236, New Haven CT 06520-8236.

Courses

RUSS 605b, Topics in Russian Literature: From the Origins of East Slavic Writing to 1750. Harvey Goldblatt.

W 10.30–12.20

Representative works, selected from both “old” Russian “bookish writing” and the “new” Russian literature of the seventeenth and first half of the eighteenth century, are examined against a broad comparative background to illustrate the development of various literary types and writing techniques. Special attention is devoted to (1) diverse historiographic and methodological approaches, (2) traditional and innovative theories of literary expression, and (3) the

connections between writing activity and ideological trends.

RUSS 669a, Russian Literary Culture in the Age of Reform. Kate Holland.

T 1.30–3.20

An examination of the shape of Russian literary culture in the years 1861–1881. Focuses on questions of genre, literary polemics, the forging of authorial identity, and the role of institutions such as the thick journals in the development of literary culture. Readings include journalistic genres such as the *feuilleton* and *ocherk* as well as literary criticism, poetry, drama, ethnography, novels, and short stories. Authors include Turgenev, Chernyshevsky, Nekrasov, Ostrovsky, Leskov, Shchedrin, Tolstoy.

RUSS 690a, Pasternak. Tomas Venclova.

W 1.30–3.20

Investigation of Pasternak's place in the history of Russian literature in the twentieth century. Special attention is given to close analysis of Pasternak's poetry.

RUSS 695b, Soviet Literature of the 1920s and 1930s. Katerina Clark.

W 1.30–3.20

The 1920s were both the most fertile and the most fateful years in Soviet literature. The period ended in 1932 with the imposition of Socialist Realism, but that resolution represented only a small fraction of the possibilities that had emerged during the decade. This course pre-sents an historical overview, incorporating some of the main landmarks of the 1920s and 1930s including works by Pilnyak, Bakhtin, the Formalists, Eisenstein, Platonov, Mayakovsky, Bulgakov, and Zoshchenko.

RUSS 700b, Russian Emigré Culture between the Wars. Vladimir Alexandrov.

Th 3.30–5.20

A seminar on the literature (Bunin, Nabokov, Gazdanov, Evreinov, Ivanov, Adamovich, Khodasevich, etc.) and other forms of cultural production (theater, film, painting, cabarets, publishing) of the interwar Russian emigration, primarily in Western Europe.

RUSS 713b^U, Soviet and Post-Soviet Film. John MacKay.

Th 7–8.50 P.M.

Close, contextualized examination of major films produced in the former Soviet Union after 1945, and in Russia since 1991. We consider films by such directors as Kalatozov, Muratova, Tarkovsky, Paradzhanov, Abuladze, German, and Sokurov. Open to graduate and undergraduate students. No knowledge of Russian necessary. *Also* FILM 774b^U.

RUSS 746a, Alternative Cultures in Communist Central and Eastern Europe.

Katerina Clark, Katie Trumpener.

M 7–9 P.M.

Exploring a range of texts — from film and media culture, literary and visual culture, to youth culture and popular music — from across Communist (and post-Communist) Europe, this course examines a range of dissident cultures, subcultures, and countercultures. Topics to include the relationship between official and experimental modes of culture, transnational circuits of influence, the construction of subcultural worlds, and the range of dissident ideologies (nationalist, liberal, religious, and reform-Marxist). *Also* CPLT 928a, FILM 824a, GMAN 611a.

RUSS 747b, Comparative Study of Lyric. John MacKay.

M 7–8.50 P.M.

Detailed consideration of a variety of models for interpreting lyric poetry across languages, cultures, and periods. The issue of the “translatability” of lyric is also addressed. The choice of poets discussed depends in large part on the linguistic abilities and interests of the seminar participants. We also read methodological and theoretical works by such authors as Auerbach, Curtius, Benjamin, Frye, Jakobson, Riffaterre, Lentricchia, and Jameson. *Also* CPLT 587b.

RUSS 834b, Aspects of Russian Grammar and Teaching Methodologies.**Irina Dolgova.**

T 12.30–2.20

The course examines various aspects of Russian grammar and the use of different teaching methodologies. Special emphasis is placed on the connection between linguistic knowledge and its application for teaching Russian in an English-speaking classroom. Different types of language learners, diverse teaching strategies, and existing resources for teaching Russian are discussed.

RUSS 851a, Proseminar in Russian Literature. Vladimir Alexandrov.

Th 3.30–5.20

Introduction to the graduate study of Russian literature. Topics include literary theory, methodology, introduction to the profession.

SLAV 752a^U, The Slavic Peoples and Their Languages: From Unity to Diversity.**Robert Greenberg.**

T 3.30–5.20

Examination of the linguistic and cultural history of the Slavs from the period of the earliest Slavic migrations up to modern times. Emphasis on the Slavic national awakenings, formation of their languages and literatures, and an introduction to contemporary Slavic cultures.

SLAV 754a^U, Old Church Slavic. Harvey Goldblatt.

M 1.30–3.20

The study of OCS and its place in the history of Church Slavic. The main features and the grammar of OCS. The Glagolitic and Cyrillic writing systems. Close readings from the “canon” of OCS literary monuments. OCS in relation to modern Slavic languages (especially Russian).

SLAV 785b^U, Language, Nationalism, and Ethnic Conflict in the Balkans.**Robert Greenberg.**

T 3.30–5.20

An exploration of the role of linguistic controversies in the polarization of ethnic relations within the former Yugoslavia. Topics include language and nationalism, the integration and disintegration of Yugoslavia, and the Balkans in the context of other charged ethno-linguistic controversies from the United States to India.

SLAV 900, Directed Reading.

By arrangement with faculty.

SOCIOLOGY

140 Prospect, 432.3323

M.A., M.Phil., Ph.D.

Chair

Karl Ulrich Mayer

Director of Graduate Studies

Ron Eyerman

Professors

Julia Adams, Jeffrey Alexander, Scott Boorman, Deborah Davis, Ron Eyerman, Philip Gorski, Karl Ulrich Mayer, Ivan Szelenyi

Associate Professors

Lawrence King, Christopher Rhomberg

Assistant Professors

Jennifer Bair, Hannah Brueckner, Averil Clarke, Alondra Nelson (*African American Studies*), Rachel Sherman, Philip Smith

Lecturers

Ulrich Schreiterer, Peter Stamatov

Fields of Study

Fields include Comparative Sociology/Macrosociology, Cultural and Historical Sociology, Life Course/Social Stratification, Mathematical Sociology, Methodology (Qualitative and Quantitative Approaches), Networks, Political Sociology, Race/Gender/Ethnic/Minority Relations, Social Change, Social Movements, Theory (General, Critical, Hermeneutic), Urban Sociology.

Special Requirements for the Ph.D. Degree

Qualification for admission to candidacy for the Ph.D. will take place during the student's first three years of study at Yale. A student who has not been admitted to candidacy will not be permitted to register for the seventh term of study. To qualify for candidacy the student must take twelve seminars to be completed in years 1 and 2, four required courses, and eight electives, including at least one workshop. After completion of courses, students prepare a research paper and one field exam and defend a dissertation prospectus.

Teaching is an important part of the professional preparation of graduate students in Sociology. Students teach therefore in the third and fourth years of study.

Combined Ph.D. Degree in Sociology and African American Studies

The Department of Sociology offers, in conjunction with the program in African American Studies, a combined Ph.D. degree in Sociology and African American Studies.

Students accepted to the combined Ph.D. program must meet all of the requirements of the Ph.D. in Sociology with the exception that, excluding the courses required to demonstrate competence in sociological theory, statistics, research methods, and comprehensive examination in two substantive fields, combined-degree students may substitute African American Studies courses for six of the fourteen term courses required to qualify for the Ph.D. in Sociology. For further details see African American Studies.

Master's Degrees

M.Phil. See Graduate School requirements, page 442.

M.A. (en route to the Ph.D.). Eight term courses are required for the M.A. degree. Two of these courses must include statistics and theory. A grade of High Pass or Honors must be achieved in five of the eight required courses. A student may petition for the M.A. degree in the term *following* the one in which he/she completes the course requirements.

Program materials are available at www.yale.edu/socdept.

Courses

[SOCY 504a, Research Methods: Design and Data Collection.]

[SOCY 506b, Research Methods: Applied Data Analysis.]

SOCY 509b, Advanced Methods of Ethnographic Field Research. Rachel Sherman.

T 4–6

This seminar is a practicum in participant observation. We begin with readings on ethnical and methodological issues pertaining to ethnographic fieldwork, but the bulk of the course focuses on workshop-style discussion of students' experience in their field sites. Participants are required to spend four hours per week in a field site and to write and share field notes, as well as hand in a final paper. Participants should think about a field placement before the term begins.

SOCY 511a^U, Building Social Theory for Empirical Analysis. Richard Breen.

M 1.30–3.20

This course examines the main approaches to developing explanatory theories in contemporary sociology. These approaches are rational choice; agent based models; social interaction models; and "the new science of social networks." The aim of the course is to give students some familiarity with the way in which contemporary sociologists go about building models to explain empirical phenomena. The emphasis throughout is on applications: that is to say, the construction of explanatory models and their testing against empirical data.

[SOCY 525a, Cultural Sociology: Theory and Research Programs.]

SOCY 527a^U, Fabrication and Uses of Knowledge. Uli Schreiterer.

T 1.30–3.20

Post-industrial societies are said to rely deeply on knowledge-based economies, the production and distribution of new knowledge, research and information. The course examines the social foundations of knowledge regimes, epistemic cultures, and the "value" of knowledge: discursive orders and disciplines; expertise and scientific capital; academic research and economic development; property rights and the governance of knowledge.

[SOCY 529b, Legislation.]

SOCY 542a, Sociological Theory. Julia Adams.

W 2–4

Sociology 542a seeks to convey a sense of what doing sociological theory is all about. We trace the lineaments and genealogies of major theoretical approaches in contemporary sociology, including Marxism, cultural structuralism, utilitarianism, Weberian perspectives, and so on. We also explore various ways that sociologists and social theorists have contended with these approaches as they have confronted the central questions of the discipline. Many of these questions developed as an effort to understand the processes by which social structures and social actors were created and transformed during the transition from so-called traditional societies to some distinctively modern form of social life. This course remains deliberately open-ended — not only because, at one term long, it must be so, but because sociologists are still engaged in the intellectual project of deciphering modernity. The course seeks to give graduate students the basic tools to build their own reconstructive encounters with sociological theory and practice.

[SOCY 544b, Social Movements.]**SOCY 546b^U, Institutional Features and Policies in Higher Education.**

Uli Schreiterer.

Th 1.30–3.20

Bird's-eye view of the development from elite to mass education. Peculiarities of the city of intellect disciplines, organizational saga, the academic profession, power, and institutional governance. Changes reflecting new populations of students and educational services, the rise of vocationalism, and market competition.

[SOCY 548a, The Sociology of the Arts: Classical and Contemporary Perspectives.]**SOCY 551b, Comparative and Historical Methods. Philip Gorski.**

T 10–12

This course provides a hands-on introduction to the craft of comparative and historical analysis. Through a series of small-scale individual and group projects, students learn how to frame researchable problems, how to use comparisons to address them, how to work with different types of primary sources, how to transform them into “data,” and how to manage this data. In order to create a substantive focus for the course, and to exploit the strengths of Yale's libraries and archives, the readings and assignments are centered on English history and historiography. The course is designed for graduate students in history and the social sciences, but is also open to undergraduates with a strong interest in research.

SOCY 553a^U, Empires and Imperialism. Peter Stamatov.

M 1.30–3.20

A study of empire as a territorial organization of political power. Comparison of empire in different historical periods, from antiquity to European overseas expansion in the fifteenth through twentieth century, and in different geographic contexts in Africa, Asia, and Europe. Review of economic, political, and cultural theories of imperialism, colonialism, and decolonization.

SOCY 557a, Current Debates in Political Sociology. Christopher Rhomberg.

T 3.30–5.20

Examination of current topics in the sociology of the state and politics. Initial consideration of issues in political philosophy; primary focus then turns to recent debates, including globalization and neoliberalism, war and violence, restructuring of the welfare state, relations between state and civil society, mass media and democracy, and collective actors and social movements, among other topics.

SOCY 560a, Comparative Research Workshop. Ivan Szelenyi, Karl Ulrich Mayer,
Julia Adams.
w 6–8

This workshop is a weekly interdisciplinary seminar at which work-in-progress by distinguished visiting scholars, Yale graduate students, and faculty from various social science disciplines is discussed. Papers are distributed a week ahead of time and also posted at the Web site of the Center for Comparative Research. Students who take the course for a letter grade have to present a paper the term they are enrolled for credit. *Also PLSC 734a.*

SOCY 560b, Comparative Research Workshop. Ivan Szelenyi, Karl Ulrich Mayer,
Philip Gorski.
w 6–8

Please see SOCY 560a for course description. This term's workshop has an additional focus on recent developments in comparative methodology. *Also PLSC 734b.*

SOCY 561b^u, Topics in Contemporary Chinese Society. Deborah Davis.
T 1.30–3.20

Discussion of the social and political consequences of China's entry into the global economy with a focus on patterns of inequality and the success of individuals and communities seeking greater social autonomy and political freedoms. In addition to the weekly seminar meeting, there is an optional discussion section conducted entirely in Chinese. Knowledge of modern Chinese desirable but not necessary. Prerequisite: at least one course focused on China after 1911.

[SOCY 567b^u, Cultural Performances. The Whitney Seminar on New Perspectives in the Social Sciences and Humanities.]

[SOCY 577a, Topics in Multivariate Data Analysis.]

SOCY 578a, Logic of Inquiry. Karl Ulrich Mayer.
M 4–6

The seminar is an intensive introduction into the methodology of the social sciences. It covers such topics as concepts and indicators, propositions and theory, explanation and understanding, observation and measurement, methods of data collection, types of data, units of analysis and levels of variables, research design: experiments and quasi-experiments, description and causal modeling, verification and falsification, testing and inference, longitudinal analysis. The seminar also addresses methodological issues raised by qualitative and hermeneutic approaches. Besides the discussion of selected texts, we re-analyze classical studies as well as recent research papers.

SOCY 585b, Life Course Research: Theoretical Foundations and Empirical Approaches. Karl Ulrich Mayer.
M 4–6

This course has been designed to provide a comprehensive introduction to the current state of life course research. The first part of the course covers methods of cohort and event history analysis. The second part addresses substantive problems and examples of current research on work and family lives and their interconnections. How do societies structure human lives? What are universal features of age differentiation and what are historically emergent patterns of life courses? How do advanced societies differ in the ways they organize life transitions, life phases, and life trajectories? How are life course regimes and the stratification of life chances related to each other?

SOCY 597a,b, Special Topics in Sociology. Faculty.

Students enroll in Special Topics if they wish to retake a course for credit when there is a new instructor and a substantially different syllabus from the first time they took the course. Only with the permission of the DGS.

SOCY 598a, 599b, Independent Study.

By arrangement with faculty. Directed Reading Course Selection Form should be completed.

SOCY 610b^U, Race, Gender, and the African American Experience. Averil Clarke.

M 1.30–3.20

This course explores how the social constructs of race and gender impact individual and collective black experiences within major social institutions (i.e., education, family, criminal justice, media and entertainment, and politics and the economy). It also analyzes the ways in which these institutions produce and are constituted by race and gender inequality. Attention is paid to theories of discrimination and to social movements that both differentiate and unite the black experience along gender lines. Enrolled students are required to present the oral and written results of research on race and gender in one such social institution. *Also WGSS 745b.*

SOCY 625a, Analysis of Social Structure. Scott Boorman.

M 10–12

This course develops and integrates a variety of the most promising contemporary approaches to the study of social structure and social organization. Building in part on research viewpoints articulated by Kenneth J. Arrow in *The Limits of Organization* (1974), by Janos Kornai in an address at the Hungarian Academy of Sciences published in 1984, and by Harrison C. White in *Identity and Control* (1992), four major types of social organization are identified as focal: (1) social networks, (2) competitive markets, (3) hierarchies/bureaucracy, (4) collective choice. Study of each of the four types has its own scholarly traditions and lineage of key contributors; its own species of, and approaches to, data; its own concepts and theoretical viewpoints; and its own major scientific findings. Contemporary complex social structure contains densely packed multiple levels and expressions of all four types. This lecture course uses mathematical and related models – and comparisons of their scientific styles and contributions – as analytical vehicles of choice in synchronized development of the four areas.

[SOCY 627a, Sociology of the Welfare State.]

[SOCY 627b, Gender and Society.]

SOCY 628a, Workshop in Cultural Sociology. Ron Eyerman, Bernhard Giesen.

F 12–2

This workshop is designed to be a continuous part of the graduate curriculum. Meeting weekly throughout both the fall and spring terms, it constitutes an ongoing, informal seminar to explore areas of mutual interest among students and faculty, both visiting and permanent. The core concern of the workshop is social meaning and its forms and processes of institutionalization. Meaning is approached both as structure and performance, drawing not only on the burgeoning area of cultural sociology but on the humanities, philosophy, and other social sciences. Discussions range widely between methodological, theoretical, empirical, and normative issues. Sessions alternate between presentations by students of their own work and by visitors. Contents of the workshop vary from term to term, and from year to year. Enrollment is open to auditors who fully participate and for credit to students who submit written work.

SOCY 628b, Workshop in Cultural Sociology and Civil Society. Philip Smith.

F 12–2

Continuation of SOCY 628a; see 628a for course description.

SOCY 631a^U, Economic Sociology. Lawrence King.

W 1.30–3.20

An introduction to the field of economic sociology intended to expand understandings of economic institutions and processes, with a concentration on the work of the discipline's founding fathers, Karl Marx and Max Weber. We contrast neoclassical economic theories with neo-classical sociological theories of various economic, political, and ideological outcomes, including processes of globalization and racial identity formation. Permission of instructor required.

[SOCY 637b, The Transition to Democracy and Capitalism in Eastern Europe.]

SOCY 643b^U, Transitions and Transformation in Eastern Europe and China.

Lawrence King.

Th 9.30–11.20

A comparative discussion of the political economy of reform and restructuring in Eastern Europe and China. Processes of institutional and social transformation in each region are examined, with particular attention paid to the effectiveness of different transition policy packages.

SOCY 647b, Social Processes. Scott Boorman.

M 10–12

Focus is on identifying and exploring robust alternatives/complements to the rational choice models that have come to dominate so much of the analysis of social (including organizational) processes in recent years. Specifically, emphasis is placed on a range of mathematical models and related analytic approaches originating outside of the rational choice literature — in fields such as social network analysis, evolutionary biology, organization theory, and the law. Possible starting points include the Boorman-Levitt network matching model (see, e.g., Scott A. Boorman and Paul R. Levitt, “The network matching principle: A model of efficient resource allocation by informal social networks in non-profit and other non-market social structures,” *Economics Letters*, 1982, 10, 1–7) and its applications to non-profits and complex statues; weak ties models of job information transmission and other information transfer in elite social networks; “garbage can” models of the internal problem-solving dynamics of complex organizations.

SOCY 656a, Professional Seminar. Ron Eyerman and faculty.

T 10–12

This seminar aims at introducing incoming sociology graduate students to the department and the profession. Members of the department are invited to discuss their research. There are minimum requirements, such as writing a book review. No grades are given. The Sociology DGS is responsible for the seminar. Held biweekly, beginning on Tuesday, September 6, 2005.

COUNCIL ON SOUTH ASIAN STUDIES

Yale Center for International and Area Studies (YCIAS)

Luce Hall, 34 Hillhouse Avenue, Ste. 232, 432.5596

Chair

Thomas Blom Hansen

Associate Chair

Dhooleka Sarhadi Raj

FACULTY ASSOCIATED WITH THE COUNCIL ON SOUTH ASIAN STUDIES

Professors

Akhil Amar (*Law*), Paul Bracken (*School of Management; Political Science*), William Burch (*Forestry & Environmental Studies*), Ravi Dhar (*School of Management*), Michael R. Dove (*Forestry & Environmental Studies*), Sara Suleri Goodyear (*English*), Phyllis Granoff (*Religious Studies*), Thomas Blom Hansen (*Anthropology*), Stanley Insler (*Linguistics*), Ravindran Kannan (*Computer Science*), Bernard Lytton (*Emeritus, School of Medicine*), Gustav Ranis (*Economics*), Subrata Sen (*School of Management*), T. N. Srinivasan (*Economics*), Shyam Sunder (*School of Management*), Jacob Thomas (*School of Management*), Christopher Udry (*Economics*)

Associate Professors

Nihal deLanerolle (*School of Medicine*), William Deresiewicz (*English*), David Graeber (*Anthropology*), Sudhir Karunakaran (*School of Management*), Rohini Pande (*Economics*)

Assistant Professors

Tanya Agathocleous (*English*), J. Bernard Bate (*Anthropology*), S. Shameem Black (*English*), Mayur Desai (*Psychiatry/VAMC*), El Mokhtar Ghambou (*English*), Sanda Lwin (*English; American Studies*), Ganapathi Narayanamoorthy (*School of Management*), Priyamvada Natarajan (*Astronomy*), Diana Paulin (*English; Theater Studies*), Mridu Rai (*History*)

Lecturers

Elayaperumal Annamalai (*Anthropology; Linguistics; Tamil/YCIAS*), Carol Carpenter (*Forestry & Environmental Studies*), Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*), Hugh Flick (*Religious Studies*), Dhooleka Sarhadi Raj (*Anthropology*)

Senior Lector

Seema Khurana (*Hindi/YCIAS*)

Students with an interest in South Asian Studies should apply to one of the University's degree-granting departments, such as Anthropology, History, Political Science, Economics, or Religious Studies. The Council on South Asian Studies is part of the Yale Center for International and Area Studies. It has been organized to provide guidance to

graduate students who desire to use the resources of the departments of the University that offer South Asia-related courses.

The council brings together faculty and students sharing an interest in South Asia by sponsoring conferences, discussions, films, and lectures by scholars from Yale as well as visiting scholars. It provides information concerning grants, fellowships, research programs, and foreign study opportunities.

Language instruction is offered in Hindi and Tamil. Students planning to undertake field research or language study in South Asia may apply to the council for summer fellowship support.

For information and program materials, contact the Council on South Asian Studies, Yale University, PO Box 208206, New Haven, CT 06520-8206; or see our Web site, www.yale.edu/ycias/southasia.

Courses

HNDI 515^U, Elementary Hindi. Seema Khurana.

M HTBA, TTh 1–2.15, W 2.30–3.45

An in-depth introduction to modern Hindi, including the Devanagari script. Through a combination of graded texts, written assignments, audiovisual material, and computer-based exercises, the course provides cultural insights and increases proficiency in understanding, speaking, reading, and writing Hindi. Emphasis placed on spontaneous self-expression in the language. No prior background in Hindi assumed.

HNDI 530^U, Intermediate and Advanced Hindi. Seema Khurana.

M HTBA, TTh 2.30–3.45, W 4–5.15

Extensive use of cultural documents including feature films, radio broadcasts, and literary and nonliterary texts to increase proficiency in understanding, speaking, reading, and writing Hindi. Focus on cultural nuances and various Hindi literary traditions. Emphasis on spontaneous self-expression in the language. After HNDI 515 or satisfactory placement test.

TAML 515^U, Introductory Tamil. Elayaperumal Annamalai.

MTWThF 9.30–10.20

An in-depth introduction to modern Tamil, focusing on comprehension, speaking, reading, and writing skills as well as on cultural understanding. Course work includes graded texts, written assignments, audiovisual material, and computer-based exercises. No prior background in Tamil assumed.

TAML 530^U, Intermediate Tamil. Elayaperumal Annamalai.

MTWThF 10.30–11.30

At end of course, student should be able to converse in Tamil about specific topics of interest, to understand programs in the visual media including lyrics, to be able to start conducting field work in Tamil, to read and understand texts, including newspapers and magazines, about current events, to read and appreciate modern fiction and poetry, to read and understand public communications including pamphlets, advertisements, and government announcements, and to write personal letters and short essays on current topics.

TAML 550^U, Advanced Tamil. Elayaperumal Annamalai.

MW 2–3.30

The goals are to understand speech from the public platform, to conduct interviews in Tamil, to read texts critically, to discuss those texts, to write the summary and assessment of those texts, and to translate such texts into English. The texts may be of creative literature of the

modern periods, of special subjects like cultural or political writings, historical inscriptions, and so on. They are specified depending on the interest of the students in the course.

LING 648b^U, Structure of Tamil. Elayaperumal Annamalai.

MW 2.30–3.45

The course on the structure of Tamil is divided into selected grammatical topics such as constituent structure, argument dropping, nominal predicates, non-nominative subjects, relative clauses, non-nominative predicates, finiteness, complex predicates, and co-reference. The analytical problems these raise for questions of typology and theory are discussed. Prerequisite: LING 153a or permission of instructor.

COUNCIL ON SOUTHEAST ASIA STUDIES

Luce Hall, 34 Hillhouse, 432.3431, seas@yale.edu

Chair

J. Joseph Errington

Professors

William Burch (*Forestry & Environmental Studies*), Michael Dove (*Forestry & Environmental Studies*), J. Joseph Errington (*Anthropology*), Robert Evenson (*Economics*), William Kelly (*Anthropology*), Benedict Kiernan (*History*), James Scott (*Political Science*), Mimi Yiengpruksawan (*History of Art*)

Associate Professor

Lisa Curran (*Forestry & Environmental Studies*)

Lecturers and Lectors

Carol Carpenter (*Forestry & Environmental Studies*), Amity Doolittle (*Forestry & Environmental Studies*), Saroja Dorairajoo (*Anthropology*), Quang Phu Van (*Southeast Asian Languages*), Indriyo Sukmono (*Southeast Asian Languages*)

Yale does not offer higher degrees in Southeast Asia Studies. Instead, students apply for admission to one of the regular degree-granting departments and turn to Southeast Asia Studies for guidance regarding the development of their special area interest, courses outside their department, and instruction in Southeast Asian languages related to their research interest. The Council aims to bring together faculty and students sharing an interest in Southeast Asia and supplements the graduate curriculum with an annual seminar series, periodic conferences, and special lectures.

Yale offers extensive library and research collections on Southeast Asia in Sterling Memorial Library, the Economic Growth Center, the Peabody Museum of Natural History, and the Human Relations Area Files. Further information on library resources is available from Rich Richie, Curator, Southeast Asia Collection, Sterling Memorial Library (432.1858, rich.richie@yale.edu).

Language instruction is offered in two Southeast Asian languages, Indonesian and Vietnamese. The Council supports language tables and tutoring in the other Southeast Asian languages by special arrangement. Students planning to undertake field research or language study in Southeast Asia may apply to the Council for summer fellowship support.

For information and program materials, contact the Council on Southeast Asia Studies, Yale University, PO Box 208206, New Haven CT 06520-8206; or see our Web site, www.yale.edu/seas.

Courses

INDN 520^U, Elementary Indonesian. Indriyo Sukmono.

5 HTBA

An introductory course in Standard Indonesian with emphasis on developing communicative skills through systematic survey of grammar and graded exercises. Introduction to reading in the second term, leading to mastery of language patterns, essential vocabulary, and basic cultural competence.

INDN 527^U, Intermediate Indonesian. Indriyo Sukmono.

3 HTBA

Continues practice in colloquial Indonesian conversation and reading and discussion of texts.

INDN 560, Readings in Indonesian. Indriyo Sukmono.

For students with advanced Indonesian language skills working on modern Indonesian literature.

VIET 515^U, Elementary Vietnamese. Quang Phu Van.

MTWThF 9.30–10.20

Students acquire basic working ability in Vietnamese including sociocultural knowledge. Attention paid to integrated skills such as speaking, listening, writing (Roman script), and reading. No previous knowledge of or experience with Vietnamese language required.

VIET 530^U, Intermediate Vietnamese. Quang Phu Van.

MTWThF 10.30–11.20

An integrated approach to language learning aimed at strengthening students' listening, speaking, reading, and writing skills in Vietnamese. Students are thoroughly grounded in communicative activities such as conversations, performance simulation, drills, role playing, and games. Discussion of aspects of Vietnamese society and culture. Prior knowledge of Vietnamese required.

VIET 560, Readings in Vietnamese. Quang Phu Van.

For students with advanced Vietnamese language skills who wish to engage in concentrated reading and research.

SPANISH AND PORTUGUESE

82–90 Wall Street, 432.1150, 432.5439

M.A., M.Phil., Ph.D.

Chair

Rolena Adorno

Director of Graduate Studies

Iván Fernández Peláez

Director of the Language Program

María Martino Crocetti

Professors

Rolena Adorno, Roberto González Echevarría (*on leave*), K. David Jackson, María Rosa Menocal, Noël Valis

Associate Professor

Lidia Santos

Assistant Professors

Iván Fernández Peláez, Óscar Martín, Fernando Rosenberg (*on leave*)

Senior Lector

María Martino Crocetti

Fields of Study

Fields include Spanish Peninsular literature, Latin American literature, Portuguese and Brazilian literatures.

The doctoral program offers: (1) a Spanish major concentrating in a single field of study (medieval, Renaissance/Golden Age, modern Spanish Peninsular, colonial Spanish American, contemporary Spanish American); (2) a combined major in Spanish and Portuguese offering the student the opportunity to work in both the Luso Brazilian and Spanish/Spanish American fields. In addition, the department participates in: (1) a combined Ph.D. program in Spanish and Portuguese and African American Studies offered in conjunction with the African American Studies program and (2) a combined Ph.D. program in Spanish and Portuguese and Renaissance Studies offered in conjunction with the Renaissance Studies program.

Special Admissions Requirements

Thorough command of the language in which the student plans to specialize and a background in its literature, as well as command of at least one of the three additional languages in which the student will need to fulfill requirements.

Application must include GRE scores, a personal statement, and an academic writing sample in the language of the proposed specialization not to exceed twenty-five pages in length. Students whose native language is not English must submit scores of the Test of English as a Foreign Language (TOEFL).

Special Requirements for the Ph.D. Degree

The department requires two years of course work, sixteen term courses with a grade of Honors in at least two courses. Course work includes two required courses, SPAN 500, History of the Spanish Language, and SPAN 790, Methodologies of Modern Foreign Language Teaching, and two courses taken outside the department. Also required are a reading knowledge of Latin and a second language, as well as a third language-literature minor. In the third year, the student is expected to pass the qualifying examination (oral and written components) and submit and receive approval of the dissertation prospectus. Upon completion of all predissertation requirements, including the prospectus, students are admitted to candidacy for the Ph.D. The entire program, including the dissertation, can be completed in five years.

Participation in the department's teaching and pedagogy program is a degree requirement. It consists of taking the required course SPAN 790 in the second year and teaching one section per term of a course in the beginning language sequence during the third and fourth years of study. Viewed as an integral part of the course of study for the doctorate, this program includes supervision by the director of the language program and course directors.

Combined Ph.D. Programs

SPANISH AND PORTUGUESE AND AFRICAN AMERICAN STUDIES

The Department of Spanish and Portuguese also offers, in conjunction with the African American Studies program, a combined Ph.D. in Spanish and Portuguese and African American Studies. For further details, see African American Studies.

SPANISH AND PORTUGUESE AND RENAISSANCE STUDIES

The Department of Spanish and Portuguese also offers, in conjunction with the Renaissance Studies program, a combined Ph.D. in Spanish and Portuguese and Renaissance Studies. For further details, see Renaissance Studies.

Master's Degrees

M.Phil. See Graduate School requirements, page 442. Additionally, students in Spanish and Portuguese are eligible to pursue a supplemental M.Phil. degree in Medieval Studies. For further details, see Medieval Studies.

M.A. (en route to the Ph.D.). The M.A. en route is awarded upon the satisfactory completion of eight term courses and two of the three language requirements (Latin and one other language).

Courses

PORT 962a^U, Modern Portuguese and Brazilian Fiction. K. David Jackson.

MW 1–2.15

This course is a general critical and historical perspective on major works of fiction in Portuguese and Brazilian literatures from the late nineteenth century to the present. Interpretation of dominant critical and thematic currents is stressed. Major authors form the core of the readings, with accompanying essays in criticism and theory.

PORT 960b^u, World Cities and Narratives. K. David Jackson.

Th 9.30–11.20

World cities and narratives that best describe, belong to, or represent them, from the European/Iberian capitals that gave rise to the urban novel to the fictional worlds of postcolonial, Brazilian, and Spanish American cities. In English. Texts available in original languages.

PORT 970a, Latin American Essay. Lidia Santos.

W 4–6

A reading of Brazilian and Spanish American essays in a comparative way, focusing on the similarities and oppositions on which Brazilians, Spanish Americans, and Caribbeans have constructed and deconstructed their cultural identities. Texts, among others, by José de Alencar y Jose Marti; Euclides da Cunha and Sarmiento; Bomfim and Rodó; José Vasconcelos and Oswald de Andrade; Fernando Ortiz and Gilberto Freyre and Nisia Floresta; Roberto Schwarz and Garcia Canclini. Taught in Spanish. *Also SPAN 939a.*

PORT 991a, Tutorial.

By arrangement with faculty.

PORT 991b, Tutorial.

By arrangement with faculty.

SPAN 500a, History of the Spanish Language. Oscar Martín.

Th 4–6

This course explores the origin and development of philology as the foundational discipline of literary studies, the history of the Spanish language in the context of intellectual developments in the twentieth century, the rise of linguistics as a positivist field, the separation of linguistic from literary studies, and the fracturing of Romance studies into separate language and culture fields. In Spanish.

SPAN 550a, The Medieval Canon, According to Borges. María Rosa Menocal.

T 1.30–3.20

This course tackles the question of how we conceive of the medieval canon and its relationship to the rest of literary history if we make Jorge Luis Borges our guide. Readings of Borges include selected works of both fiction and nonfiction. The course also functions as a meditation on the nature of literary history, and an introduction to a series of the varied medieval works from that literary universe assumed and constructed by Borges; e.g., everything from the Cordoban poetry he read in the histories of Asín Palacios to the Conde Lucanor (parts of which he “rewrote”), and much between and beyond, including the *Divine Comedy* and the *Thousand and One Nights*. *Also CPLT 620a, ITAL 553a.*

SPAN 633b, Early Modern Spanish Drama. Iván Fernández Peláez.

Th 1.30–3.20

This seminar presents the main features and conventions of Early Modern Spanish drama, as well as its chronological development. Besides careful reading and analysis of some of the canonical texts, the course focuses on the ways in which social and political issues interact with drama.

SPAN 747b, Generación del '27. Noël Valis.

M 1.30–3.20

This course examines the theory and art of vanguard writing. Selected poetry of Guillén, Salinas, Lorca, Cernuda, Alberti, and others, along with Ortega y Gasset's influential *Deshumanización del arte*, are read. *Also ITAL 747b.*

SPAN 765a, El barroco de Indias. Rolena Adorno.

Th 1.30–3.20

We explore the Baroque in colonial Spanish America in its literary and artistic practices at the time and through the theories that have come to characterize it today. We consider how the Spanish American Baroque is related to its European counterparts and how it differs from them. Principal readings include Góngora, Quevedo, and Calderón de la Barca, as well as Carlos de Sigüenza y Góngora, Sor Juana Inés de la Cruz, Bernardo de Balbuena, Juan del Valle y Caviedes, and Juan de Espinosa Medrano. The visual dimensions of viceregal art and literature orient our work thematically, and writings by Picón-Salas, Lezama Lima, Paz, Sarduy, and González Echevarría, among others, offer theoretical and critical assessments by which to evaluate the content and place of the Baroque in Latin American literary and cultural tradition. *Also ITAL 764a.*

SPAN 790b, Methodologies of Modern Language Teaching.

María Martino Crocetti.

M 3.30–5.20

Preparation for a teaching career through readings, lectures, classroom discussions, and presentations on current issues in foreign/second language acquisition theory and teaching methodology. Classroom techniques at all levels. An additional ninety-minute practicum meets immediately afterward. In Spanish.

SPAN 910b, The Latin American Dictator Novel. Moira Fradinger.

w 4–6

A reading of six major dictator novels in light of questions pertaining to literary theory, political philosophy, and the Latin American literary canon of the nineteenth and twentieth centuries. We analyze the figure of the “dictator” as a literary theme, dictators and dictatorship in Latin American novels with reference to their historical context, and the tradition of dictator novels in Latin America. We also consider broader questions posed by literary figurations of political power, including issues of sovereignty and the formation of the political sphere so central to the Western discipline of political philosophy. In Spanish. *Also CPLT 961b.*

SPAN 939a, Latin American Essay. Lidia Santos

w 4–6

A reading of Brazilian and Spanish American essays in a comparative way, focusing on the similarities and oppositions on which Brazilians, Spanish Americans, and Caribbeans have constructed and deconstructed their cultural identities. Texts, among others, by José de Alencar y Jose Martí; Euclides da Cunha and Sarmiento; Bomfim and Rodó; José Vasconcelos and Oswald de Andrade; Fernando Ortiz and Gilberto Freyre and Nisia Floresta; Roberto Schwarz and Garcia Canclini. Taught in Spanish. *Also PORT 970a.*

SPAN 975a, Language Loyalty in Anglo-Hispanic Literature. Gustavo Pérez-Firmat.

M 4–6

Through a consideration of the poetics and the practice of bilingualism, latent and overt, in selected Spanish, Spanish American, and Latino writers, the seminar seeks to understand the intellectual, political, and erotic ties that bind individuals to their languages. Authors to be discussed include María Luisa Bombal (*La última niebla* and *House of Mist*); Guillermo Cabrera Infante (*Holy Smoke*); Calvert Casey (selections); Luis Cernuda (*Variaciones sobre tema mexicano*); Rosario Ferré (Language Duel/Duelo del lenguaje); Judith Ortiz Cofer (selections); Pedro Salinas (*Aprecio/defensa del lenguaje* and *El contemplado*); George Santayana (selections); Richard Rodríguez (*Hunger of Memory*).

SPAN 991a, Tutorial.

By arrangement with faculty.

SPAN 991b, Tutorial.

By arrangement with faculty.

STATISTICS

24 Hillhouse, 432.0666

M.A., Ph.D.

Chair

Andrew Barron

Director of Graduate Studies

John Hartigan (Rm 207, 24 Hillhouse, john.hartigan@yale.edu)

Professors

Donald Andrews (*Economics*), Andrew Barron, Joseph Chang, John Hartigan, Theodore Holford (*Epidemiology & Public Health; Biostatistics*), Peter Phillips (*Economics*), David Pollard, Edward Tufte (*Political Science; Computer Science*)

Associate Professor

Heping Zhang (*Epidemiology & Public Health; Biostatistics*)

Assistant Professors

John Emerson, Hannes Leeb, Harrison Zhou, Mokshay Madiman

Lecturer

Jonathan Reuning-Scherer

Fields of Study

Fields comprise the main areas of statistical theory (with emphasis on foundations, Bayes theory, decision theory, nonparametric statistics), probability theory (stochastic processes, asymptotics, weak convergence), information theory, econometrics, classification, statistical computing, and graphical methods.

Special Admissions Requirements

GRE scores for the General Test and for the Subject Test in the area of the undergraduate major should accompany an application. All applicants should have a strong mathematical background, including advanced calculus, linear algebra, elementary probability theory, and at least one course providing an introduction to mathematical statistics. An undergraduate major may be in statistics, mathematics, computer science, or in a subject in which significant statistical problems may arise. For those whose native language is not English, the Test of English as a Foreign Language (TOEFL) scores are required.

Special Requirements for the Ph.D. Degree

There is no foreign language requirement. Normally during the first two years, fourteen term courses in this and other departments are taken to prepare students for research and practice of statistics. These include courses devoted to case studies and practical work, for which students prepare a written report and give an oral presentation. The qualifying examination consists of three parts: a written report on an analysis of a data set, a

written examination on theoretical statistics, and an oral examination. The examination is taken not later than when scheduled by the department in the middle of the second year, with provision for one subsequent reexamination of one or more parts in the event that a student does not pass the first time. All parts of the qualifying examination must be completed before the beginning of the third year. A prospectus for the dissertation should be submitted no later than the first week of March in the third year. The prospectus must be accepted by the department before the end of the third year if the student is to register for a fourth year. Upon successful completion of the qualifying examination and the prospectus (and meeting of Graduate School Requirements), the student is admitted to candidacy.

Master's Degree

M.A. (en route to the Ph.D.). This degree may be awarded upon completion of eight term courses and two terms of residence.

Master's Degree Program. Students are also admitted directly to a terminal master's degree program. To qualify for the M.A., the student must successfully complete eight term courses, chosen in consultation with the director of graduate studies. Full-time students must take a minimum of three courses per term. Part-time students are also accepted into the master's degree program. See page 443.

Program materials are available upon request to the Director of Graduate Studies, Department of Statistics, Yale University, PO Box 208290, New Haven CT 06520-8290; e-mail, amy.mulholland@yale.edu.

Courses

STAT 501–506, Introduction to Statistics.

A basic introduction to statistics, including numerical and graphical summaries of data, probability, hypothesis testing, confidence intervals, and regression. Each course focuses on applications to a particular field of study and is taught jointly by two instructors, one specializing in statistics and the other in the relevant area of application. The first seven weeks are attended by all students in STAT 501–506 together as general concepts and methods of statistics are developed. The course separates for the last six and a half weeks, which develop the concepts with examples and applications. Computers are used for data analysis. These courses are alternatives; they do not form a sequence and only one may be taken for credit.

STAT 501a^U, Introduction to Statistics: Life Sciences. Jonathan Reuning-Scherer, Günter Wagner.

TTH 1–2.15

Statistical and probabilistic analysis of biological problems presented with a unified foundation in basic statistical theory. Problems are drawn from genetics, ecology, epidemiology, and bioinformatics. *Also E&EB 510a^U.*

STAT 502a^U, Introduction to Statistics: Political Science.

Jonathan Reuning-Scherer, Donald Green.

TTH 1–2.15

Statistical analysis of politics, elections, and political psychology. Problems presented with reference to a wide array of examples: public opinion, campaign finance, racially motivated crime, and public policy.

STAT 503a^U, Introduction to Statistics: Social Sciences. John Hartigan,
Jonathan Reuning-Scherer.

TTH 1–2.15

Descriptive and inferential statistics applied to analysis of data from the social sciences. Introduction of concepts and skills for understanding and conducting quantitative research.

[STAT 504a^U, Introduction to Statistics in Psychology.]**STAT 505a^U, Introduction to Statistics: Medicine.** Jonathan Reuning-Scherer and
staff.

TTH 1–2.15

Statistical methods relied upon in medicine and medical research. Practice in reading medical literature competently and critically, as well as practical experience performing statistical analysis of medical data.

STAT 506a^U, Introduction to Statistics: Data Analysis. Jonathan Reuning-Scherer,
Andrew Barron.

TTH 1–2.15

An introduction to probability and statistics with emphasis on data analysis.

STAT 530b^U, Introductory Data Analysis. Hannes Leeb.

MW 2.30–3.45

Survey of statistical methods: plots, transformations, regression, analysis of variance, clustering, principal components, contingency tables, and time series analysis. S-PLUS and Web data sources are used. After STAT 501a.

STAT 538a^U, Probability and Statistics for Scientists. Joseph Chang.

MWF 2.30–3.20

Fundamental principles and techniques of probabilistic thinking, statistical modeling, and data analysis. Essentials of probability: conditional probability, random variables, distributions, law of large numbers, central limit theorem, Markov chains. Statistical inference with emphasis on the Bayesian approach: parameter estimation, likelihood, prior and posterior distributions, Bayesian inference using Markov chain Monte Carlo. Introduction to regression and linear models. Computers are used throughout for calculations, simulations, and analysis of data. After MATH 118a or b or 120a or b. Some acquaintance with matrix algebra and computing assumed.

STAT 541a^U, Probability Theory. David Pollard.

MWF 9.30–10.20

A first course in probability theory: probability spaces, random variables, expectations and probabilities, conditional probability, independence, some discrete and continuous distributions, central limit theorem, Markov chains, probabilistic modeling. After or concurrent with MATH 120a or b or the equivalent.

STAT 542b^U, Theory of Statistics. Harrison Zhou.

MWF 9.30–10.20

Principles of statistical analysis: maximum likelihood, sampling distributions, estimation; confidence intervals; tests of significance; regression; analysis of variance; and the method of least squares. Some statistical computing. After STAT 541a and concurrently with or after MATH 222a or b or 225a or b or the equivalent.

STAT 551b^U, Stochastic Processes. Mokshay Madiman.

MW 1–2.15

Introduction to the study of random processes, including Markov chains, Markov random fields, martingales, random walks, Brownian motion, and diffusions. Techniques in probabil-

ity such as coupling and large deviations. Applications to image reconstruction, Bayesian statistics, finance, probabilistic analysis of algorithms, genetics, and evolution. After STAT 541a or the equivalent.

STAT 600b^U, Advanced Probability. David Pollard.

TTTh 2.30–3.45

Measure theoretic probability, conditioning, laws of large numbers, convergence in distribution, characteristic functions, central limit theorems, martingales. Some knowledge of real analysis is assumed.

[STAT 603a, Stochastic Calculus.]

[STAT 605a, Foundations of Statistics.]

STAT 606b, Markov Processes and Random Fields. David Pollard.

Markov chains on general state spaces; diffusions; Markov random fields; Gibbs measures; percolations. After STAT 600.

[STAT 607b, Inequalities for Probability and Statistics.]

STAT 610a, Statistical Inference. Harrison Zhou.

HTBA

A systematic development of the mathematical theory of statistical inference covering methods of estimation, hypothesis testing, and confidence intervals. An introduction to statistical decision theory. Undergraduate probability at the level of STAT 541a assumed.

STAT 612a^U, Linear Models. Hannes Leeb.

TTTh 9–10.15

The geometry of least squares; distribution theory for normal errors; regression, analysis of variance, and designed experiments; numerical algorithms (with particular reference to S-plus); alternatives to least squares. Generalized linear models. Linear algebra and some acquaintance with statistics assumed.

STAT 625a, Case Studies. John Emerson, David Pollard.

Statistical analysis of a variety of problems including the value of a baseball player, the fairness of real estate taxes, how to win the Tour de France, energy consumption in Yale buildings, and interactive questionnaires for course evaluations. We emphasize methods of choosing data, acquiring data, and assessing data quality. Computations use R.

STAT 626b, Practical Work. John Emerson.

Individual one-term projects, with students working on studies outside the department, under the guidance of a statistician.

STAT 627b, Statistical Consulting. John Emerson.

Statistical consulting and collaborative research projects often require statisticians to explore new topics outside their area of expertise. This course exposes students to real problems, requiring them to draw on their expertise in probability, statistics, and data analysis. Students complete the course with individual projects supervised jointly by faculty outside the department and by one of the instructors.

STAT 636b, Monte Carlo Methods. Joseph Chang.

Theory and practice of Monte Carlo methods, with emphasis on Markov chain Monte Carlo and statistical applications. Generation of random variables, importance sampling, Metropolis-Hastings, Gibbs sampling, variable dimension methods and model selection, multilevel and population-based methods, convergence diagnostics. Markov chains in general state spaces and rates of convergence. Applications in Bayesian inference, simulation, and optimization.

STAT 645b, Statistical Methods in Genetics and Bioinformatics. Joseph Chang.

HTBA

Stochastic modeling and statistical methods applied to problems such as mapping quantitative trait loci, analyzing gene expression data, sequence alignment, and reconstructing evolutionary trees. Statistical methods include maximum likelihood, Bayesian inference, Monte Carlo Markov chains, and some methods of classification and clustering. Models introduced include variance components, hidden Markov models, Bayesian networks, and coalescent. Recommended background: STAT 541a, STAT 542b. Prior knowledge of biology is not required. Times to be arranged at organizational meeting. *Also CB&B 645b.*

STAT 653a, Bayes Theory. John Hartigan.

Axioms and interpretations of probability. Construction of probability distributions. Optimality of Bayes procedures. Martingales. Asymptotics. Markov sampling. Robustness against violations in the assumed distributions. Choice among models.

STAT 660b, Multivariate Statistical Methods for the Social Sciences.**Jonathan Reuning-Scherer.**

HTBA

An introduction to the analysis of multivariate data. Topics include principal components analysis, factor analysis, cluster analysis (hierarchical clustering, k-means), discriminant analysis, multidimensional scaling, and structural equations modeling. Emphasis is placed on practical application of multivariate techniques to a variety of examples in the social sciences. Students complete extensive computer work using either SAS or SPSS. Prerequisites: knowledge of basic inferential procedures, experience with linear models (regression and ANOVA). Experience with some statistical package and/or familiarity with matrix notation is helpful but not required. Requirements: regular assignments and a final project.

STAT 661a^U, Data Analysis. John Hartigan.

MW 2.30–3.45

By analyzing data sets using the S-plus statistical computing language, a selection of statistical topics are studied: linear and nonlinear models, maximum likelihood, resampling methods, curve estimation, model selection, classification, and clustering. Weekly sessions are held in the Social Sciences Statistical Laboratory. After STAT 542a and MATH 222a or b or 225a or b or the equivalents.

STAT 664b^U, Information Theory. Andrew Barron.

TTh 9–10.15

Foundations of information theory in communications, statistical inference, statistical mechanics, probability, and algorithm complexity. Quantities of information and their properties: entropy, conditional entropy, divergence, mutual information, channel capacity. Basic theorems of data compression and coding for noisy channels. Applications in statistics, communication networks, and finance. After STAT 541a. *Also ENAS 954b^U.*

STAT 665b^U, Data Mining and Machine Learning. Hannes Leeb.

MW 11.30–12.45

Techniques for data mining and machine learning from both statistical and computational perspectives, including support vector machines, bagging, boosting, neural networks, and other nonlinear and nonparametric regression methods. Discussion includes the basic ideas and intuition behind these methods, a more formal understanding of how and why they work, and opportunities to experiment with machine learning algorithms and to apply them to data. After STAT 542b.

STAT 668a, Information and Probability. Andrew Barron, Mokshay Madiman.

HTBA

Study of several key results in probability using ideas and methods from information theory. Topics include entropy and its relationship to Fisher information, the law of large numbers, central limit theorem (normal approximation), law of small numbers (Poisson approximation), large deviations, martingales, Markov chains, and information projection. The approach we take quantifies the increase in entropy or more generally the drop in information distance from an approximating distribution. Interpretations from statistics, physics, and finance.

[STAT 674a^U, Analysis of Spatial and Time Series Data.]

STAT 680b, Nonparametric Statistics. Harrison Zhou.

Introduction to nonparametric methods such as kernel estimation, Fourier basis estimation, wavelet estimation. Optimal minimax convergence rates and constants for function spaces, with connections to information theory. Adaptive estimators (e.g., adaptive shrinkage estimation). If time permits: high dimensional function estimation, functional data estimation, classification, or nonparametric asymptotic equivalence. Applications to real data. Some knowledge of statistical theory at the level of STAT 610a is assumed.

STAT 695a, Internship in Statistical Research. John Hartigan.

The internship is designed to give students an opportunity to gain practical exposure to problems in the analysis of statistical data, as part of a research group within industries such as: medical and pharmaceutical research, finance, information technologies, telecommunications, public policy, and others. The internship experience often serves as a basis for the Ph.D. dissertation. Students work with the director of graduate studies and other faculty advisers to select suitable placements. Students submit a one-page description of their internship plans to the DGS by May 1, which will be evaluated by the DGS and other faculty advisers by May 15. Upon completion of the internship, students submit a written report of their work to the DGS, no later than October 1. The internship is graded on a Satisfactory/Unsatisfactory basis, and is based on the student's written report and an oral presentation. This course is an elective requirement for the Ph.D. degree. Prerequisites: completion of one semester of the Ph.D. program.

STAT 700, Departmental Seminar.

Important activity for all members of the department. See weekly seminar announcements.

WOMEN'S, GENDER, AND SEXUALITY STUDIES

315 WLH, 100 Wall, 432.0845

Chair

Laura Wexler

Professors

Julia Adams (*Sociology*), Linda Bartoshuk (*Psychology*), Kelly Brownell (*Psychology*), Jill Campbell (*English*), Hazel Carby (*African American Studies; American Studies*), Kang-i Sun Chang (*East Asian Languages & Literatures*), Deborah Davis (*Sociology*), Kathryn Dudley (*American Studies; Anthropology*), Glenda Gilmore (*History; American Studies; African American Studies*), Sara Suleri Goodyear (*English*), Dolores Hayden (*Architecture; American Studies*), Margaret Homans (*English; Women's, Gender & Sexuality Studies*), Paula Hyman (*History; Religious Studies*), Matthew Jacobson (*History; American Studies*), Serene Jones (*Divinity; Women's, Gender & Sexuality Studies*), Marianne LaFrance (*Psychology; Women's, Gender & Sexuality Studies*), Joanne Meyerowitz (*History*), Charles Musser (*Film Studies; American Studies*), David Musto (*Child Study Center*), Frances Rosenbluth (*Political Science*), Cynthia Russett (*History*), Harold Scheffler (*Anthropology*), Vicki Schultz (*Law*), William Summers (*Molecular Biophysics & Biochemistry*), Laura Wexler (*American Studies; Women's, Gender & Sexuality Studies*), Robert Wyman (*Molecular, Cellular & Developmental Biology*)

Associate Professors

Kamari Clarke (*African American Studies; Anthropology*), Elizabeth Dillon (*English; American Studies*), Laura Frost (*English*), Nora Groce (*Epidemiology & Public Health*), Janet Henrich (*School of Medicine*), Jonathan D. Katz (*Larry Kramer Initiative for Lesbian & Gay Studies; Adjunct, History of Art; Women's, Gender & Sexuality Studies*), Linda-Anne Rebhun (*Anthropology*), Naomi Rogers (*History of Medicine & Science; Women's, Gender & Sexuality Studies*), Lidia Santos (*Spanish & Portuguese*), Eric Worby (*Anthropology*)

Assistant Professors

Jennifer Bair (*Sociology; Women's, Gender & Sexuality Studies*), Bernard Bate (*Anthropology*), Jessica Brantley (*English*), Hannah Brueckner (*Sociology*), Alicia Schmidt Camacho (*American Studies; Ethnicity, Race & Migration*), Averil Clarke (*Sociology*), Moira Fradinger (*Comparative Literature*), Mary Lui (*History*), Sanda Lwin (*English; American Studies*), Michael Mahoney (*History*), Hala Nassar (*Near Eastern Languages & Civilizations*), Alondra Nelson (*Sociology; African American Studies*), Naomi Pabst (*African American Studies*), Diana Paulin (*English; American Studies*), Kristin Phillips-Court (*Italian*), Nicole Rice (*English*), Rachel Sherman (*Sociology*)

Lecturers

David Agruss (*Women's, Gender & Sexuality Studies*), Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*), Megan Sinnott (*Women's, Gender & Sexuality Studies; Visiting*), Rebecca Tannenbaum (*History*)

Graduate Studies Council for the WGSS Graduate Qualification

Alicia Schmidt Camacho (*American Studies; Ethnicity, Race & Migration*), Hazel Carby (*African American Studies; American Studies*), Kamari Clarke (*African American Studies; Anthropology*), Elizabeth Dillon (*English; American Studies*), Moira Fradinger (*Comparative Literature*), Margaret Homans (*English; Women's, Gender & Sexuality Studies*), Serene Jones (*Divinity; Women's, Gender & Sexuality Studies*), Jonathan D. Katz (*Larry Kramer Initiative for Lesbian & Gay Studies; Adjunct, History of Art; Women's, Gender & Sexuality Studies*), Marianne LaFrance (*Psychology; Women's, Gender & Sexuality Studies*), Jill Lane (*Theater Studies; American Studies*), Alondra Nelson (*Sociology; African American Studies*), Naomi Rogers (*History of Medicine & Science; Women's, Gender & Sexuality Studies*), Laura Wexler (*American Studies; Women's, Gender & Sexuality Studies*), DGS

Fields of Study

The program in Women's, Gender, and Sexuality Studies establishes gender and sexuality as fundamental categories of social and cultural analysis and offers critical perspectives upon them as a basis from which to study the diversity of human experience. Gender (the social and historical meanings of the distinction between the sexes) and sexuality (sexual practices, identities, discourses, and institutions) are studied as they intersect with class, race, ethnicity, and nationality. The introduction of these perspectives into all fields of knowledge necessitates new research, criticism of existing research, and the formulation of new paradigms and organizing concepts.

Graduate students who wish to receive the Qualification in Women's, Gender, and Sexuality Studies must complete the specified course work at the graduate level, assist in teaching in appropriate courses, and demonstrate capacity to pursue independent research in Women's, Gender, and Sexuality Studies. Students who fulfill these expectations will receive a letter from the chair, indicating that they have completed the work for the Qualification. The Qualification in Women's, Gender, and Sexuality Studies is open by application to students enrolled in selected Ph.D. programs at Yale.

Applications and program information are available on request from Linda Anderson, Women's, Gender, and Sexuality Studies Program.

Courses

WGSS 591a^U, Introduction to Modern Middle Eastern Studies. Hala Nassar.

Survey of debates in the modern and contemporary Arab world concerning heritage, secularism, religion, language, gender equality, modernization, and tradition. Resources in translation include a cross-section of Arab and Western writings from the late nineteenth century to the present. Focus on gender identities in relation to nationalism, Islamism, and the "West," and how they are reflected in different genres. *Also NELC 891a^U.*

WGSS 614b, Globalization and Sexuality. Megan Sinnott.

W 7–9 P.M.

This class provides an introduction to theories of globalization within anthropology and the social sciences in general, focusing on the gendered and sexual dimensions of globalization.

Topics include capitalist processes (such as global labor, consumption, and commodity circulation), transnational discourses and social movements, processes of modernity and development, identity politics, sex work, and militarization. Particular attention is paid to the intersections between local and global sex/gender orders. Substantial Southeast Asian content.

WGSS 615b, Gender and Media in India. J. Bernard Bate.

T 1.30–3.20

Examination of narratives of gender in India. Folkloristic and anthropological approaches to gendered performance in story, song, and theater. Recent feminist examinations of television, film, advertising, and literature. Topics include classical epic (*Ramayana*, *Shilapathigaram*). Also ANTH 548b.

WGSS 730a, Health Politics, Body Politics. Naomi Rogers.

W 1.30–3.20

A reading seminar on struggles to control, pathologize, and normalize human bodies, with a particular focus on science, medicine, and the state, both in North America and in a broader global health context. Topics include colonialism and prostitution; repression and regulation of birth control; the teaching of sex education; the public celebration and denial of sexual differences; politics of sexually transmitted diseases, including HIV/AIDS; public health and legal efforts to define and restrict abortion; the pathologizing and identity politics of transgendered people; and the development and regulation of artificial insemination and other methods of reproductive technology. Also HIST 943a, HSHM 736a.

WGSS 745b, Race, Gender, and the African American Experience. Averil Clark.

M 1.30–3.20

This course explores how the social constructs of race and gender impact individual and collective black experiences within major social institutions (i.e., education, family, criminal justice, media and entertainment, and politics and the economy). It also analyzes the ways in which these institutions produce and are constituted by race and gender inequality. Attention is paid to theories of discrimination and to social movements that both differentiate and unite the black experience along gender lines. Enrolled students are required to present the oral and written results of research on race and gender in one such social institution. Also SOCY 610b^{II}.

WGSS 747a, Hot Art/Cold War. Jonathan D. Katz.

M 7–9 P.M.

This course uses feminist, queer, and other social historical approaches to analyze the culture of the Cold War period. Heavily art historical, it considers some film, music, and dance of the period. A central concern is the transition from Abstract Expressionism to post-Abstract Expressionism, which is also a transition from a largely heterosexual artistic culture to a largely queer one. In the midst of perhaps the most reactionary chapter in American history, we examine how it came to pass that marginalized, even demonized, social groups came to represent America to itself. Also HSAR 707a.

WGSS 750b, Research on Gender and Sexuality. Joanne Meyerowitz.

W 1.30–3.20

Students conduct research in primary sources and write original monographic essays on the history of gender and sexuality. Readings include key theoretical works as well as journal articles that might serve as models for student research projects. Also AMST 770b, HIST 770b.

WGSS 760b, Gender, Religion, and Globalization: Practices, Texts, and Contexts. Elizabeth Dillon.

T 1.30–3.20

This course examines constructions and practices of gender in a multi-religious, transnational, and global framework. Focusing specifically on the practices, narratives, and religious

beliefs that inform the lived experience of gender in different locations around the world, the course aims to understand the variety of ways in which gender is a structuring aspect of culture, politics, religion, and economics in the developing global system. We look, in particular, at the production of narratives of the self in a variety of colonial and post-colonial contexts and at the practices of adornment, rest (Sabbath), and marriage. Taught from an interdisciplinary perspective, this course includes methodologies from literary studies, religious studies, visual culture, and, more broadly, gender theory and the study of globalization. As a graduate-level course in the Women's, Gender, and Sexuality Studies program, it fulfills the feminist theory requirement for the program qualification. *Also REL 827b.*

WGSS 765b, Philosophy and Politics in Hannah Arendt's Thought. Seyla Benhabib.

W 1.30–3.20

This course examines mainly Arendt's posthumous work on *The Life of the Mind*. We focus on her readings of Kant, Nietzsche, and Heidegger; her theories of judgment and of the will; action, narrative, and interpretation. Readings from Arendt, Heidegger, Kant (*Third Critique*), and Nietzsche. *Also PHIL 701b, PLSC 616b.*

WGSS 766b, Literature and Empire: Gender, Sexuality, and Colonial Citizenship.

David Agruss.

T 7–9 P.M.

In this course we investigate the ways in which nineteenth-century British childhood and young adulthood and British national identity are persistently imagined and produced in relation to colonial and racial desires and anxieties. Through an examination of public school fiction, island-stranding fiction, and colonial adventure fiction, we work in particular to elucidate the mechanisms by which nineteenth-century metropolitan purity and normativity are intimately bound up with colonial difference.

WGSS 770b, Women and Literature in Traditional China. Kang-i Sun Chang.

TRH 1–2.15

A study of women poets in traditional China, with some attention to representation of women in male poetry as well. Issues include literary canon and traditions, feminine voice and allegory, the abandoned woman, women in exile, the dichotomy of “yin” and “yang,” gender and genre, body and sexuality, notions of love, aesthetics of illness, and the function of memory. All readings in translation; no knowledge of Chinese assumed. Chinese texts provided from time to time for students who read Chinese. *Also CHNS 501b^H.*

WGSS 820b, American Legal History: The Law of Slavery and Anti-Slavery.

Kathleen Cleaver.

Th 2.30–4.20

This seminar focuses on the way legal institutions adapted to the institution of human slavery in North America during the eighteenth and nineteenth centuries, and prompted the evolution of legal support for resistance to slavery. Students investigate the tension slavery generated in a republican society by examining federal and state statutes, proclamations, constitutions, and judicial opinions, as well as historical scholarship and autobiographical writings by slaves. Topics examined include the African slave trade, the colonial rejection of slavery in Georgia, the catalyst of slavery in New England's economy, women in the abolitionist movement, fugitives and maroon communities, gradual emancipation, and the impact of territorial expansion on the law of slavery, with particular emphasis on the 1856 *Dred Scott* decision in the U.S. Supreme Court. Course requires a journal and a research paper. Classes begin on Thursday, January 19, 2006. *Also AFAM 815b, LAW 21483, WGSS 820b.*

[WGSS 848b, African American Studies Graduate Research Seminar in Diasporic Cultural Studies.]

Related Courses

AMST 675b, Performativity. Diana Paulin.

Also AFAM 747b.

AMST 731b, Methods and Practices in U.S. Cultural History. Matthew Jacobson.

Also AFAM 763b, HIST 780b.

AMST 922b, Gender, Territory and Space. Dolores Hayden.

Also ARCH 922b.

ANTH 626b, Anthropological Perspectives on Gender and Health.

Linda-Anne Rebhun.

HIST 924a, Bodies and Machines in Medicine and the Mind Sciences.

Susan Lanzoni.

Also HSHM 626a.

HIST 941b, Making the Modern Body. Susan Lederer.

HIST 950a, Women and Judaism. Paula Hyman.

HSAR 582a, EClavdia: Women in Ancient Rome. Diana Kleiner.

Also CLSS 873a.

Research Institutes

THE COWLES FOUNDATION

30 Hillhouse, 432.3702

Director

Philip Haile

The Cowles Foundation for Research in Economics at Yale University seeks to foster the development of theoretical, mathematical, and statistical methods of analysis for use in economics and related social sciences. All members of the professional research staff have faculty appointments in the Department of Economics or a related department at Yale. The foundation sponsors a working paper series and a seminar series. It also maintains a library of materials related to its special areas of research activity.

THE ECONOMIC GROWTH CENTER

27 Hillhouse, 432.3610

Director

Christopher Udry

The Economic Growth Center is a research organization within the Yale Department of Economics that was created in 1961 to analyze, both theoretically and empirically, the process of economic growth and the economic relations between low and high income countries. The research program emphasizes the search for regularities in the process of growth and changes in economic structure by means of cross-sectional and intertemporal studies and the analysis of policies that affect that process. An increasing share of the research involves statistical study of the behavior of households and firms as revealed in sample surveys by the application of microeconomic theory. Current projects include research on technology development, choice and transfer, household consumption, investment and demographic behavior, agricultural research and productivity growth, labor markets and the returns to education of women and men, labor markets and migration, income distribution, and international economic relations, including monetary and trade policies. The Center's research faculty hold appointments in the Department of Economics and other departments at Yale, and accordingly have teaching as well as research responsibilities.

The Center administers, jointly with the Department of Economics, the Yale master's degree training program in International and Development Economics, in which most students have experience as economists in foreign central banks, finance ministries, and public and private development agencies. It presents a regular series of workshops on trade and development, on the microeconomics of labor and population, and on economic history and includes among its publications book-length studies, reprints by staff members, and discussion papers.

The Economic Growth Center Collection, housed in a separate facility at the Social Science Library, is a special collection focused on the statistical, economic, and planning documents of developing countries, including government documents.

INSTITUTION FOR SOCIAL AND POLICY STUDIES

77 Prospect, 432.3234

Director

Donald P. Green

Executive Committee

Stephanie Spangler (*ex officio*), Jeffrey Alexander, Andrew Barron, Alvin Klevorick, David G. Pearce, Peter Salovey, Ian Shapiro

The Institution for Social and Policy Studies (ISPS) facilitates interdisciplinary inquiry in the social sciences and research on important public policy subjects. Recognizing that important social problems cannot be studied adequately by a single discipline, the Yale Corporation established the Institution for Social and Policy Studies in 1968 in order to stimulate interdisciplinary collaboration within the University. Faculty and students from many departments in the Faculty of Arts and Sciences and from Yale's graduate and professional schools are involved in a variety of activities. These include numerous interdisciplinary faculty seminars, research publications, postdoctoral programs, and the undergraduate major in Ethics, Politics, and Economics. Through these activities, ISPS seeks to shape public policies of local, national, and international significance.

Among the major programs at ISPS are: the *Agrarian Studies Program*, James Scott, director; the *Program in Ethics, Politics, and Economics*, Seyla Benhabib, director; the *Yale University Interdisciplinary Bioethics Project*, Robert Levine and Margaret Farley, directors; and the *Center for the Study of American Politics*, Alan Gerber, director.

For more information, refer to the *ISPS Bulletin* and the Web site, www.yale.edu/isps.

INTERNATIONAL SECURITY STUDIES

31 Hillhouse, 432.6242

Director

Paul Kennedy

International Security Studies (ISS) supports interdisciplinary research and teaching in grand strategy, international history, and security studies, with particular reference to diplomatic and military history. Its goals are to fill the critical national need for trained leaders; to discover flexible and fruitful ways to recognize, define, and analyze security issues; and to provide a forum for independent critiques of policy thinking and policy making on these issues. United Nations Studies at Yale (UNSY), directed by Bruce Russett, exists under the umbrella of ISS. UNSY is a policy-relevant think-tank on key issues concerning the future of the United Nations. Neither ISS nor UNSY are degree-

granting programs: they facilitate the work and welcome the participation of students from all academic departments and the professional schools.

ISS offers research grants and internship support for Yale graduate and undergraduate students. Like UNSY, it sponsors conferences, lectures, seminars, and workshops. Current or recent projects at UNSY include a collaborative study with the World Bank on *The Political Economy of Civil Wars*; an analysis of *Democracy, Interdependence, International Organizations, and Peace*; the *Yale-United Nations Oral History Project*, which collected over ninety interviews with United Nations personnel; and *The Public Papers of Secretary-General Boutros Boutros-Ghali*, which has recently published a three-volume edition of Dr. Boutros-Ghali's public papers.

ISS's focus is on its *Grand Strategy Project*. The Project seeks to revive the study and practice of grand strategy by preparing students to be leaders by teaching them to appreciate and apply the principles of grand strategy; by devising methods to teach grand strategy at the graduate and undergraduate levels; and by promoting a broader recognition of the centrality of grand strategy to successful leadership. The Project, launched in January 2000, combines historical depth and analytical range with the belief that training future leaders is the best long-term investment ISS can make in the future.

ISS and UNSY's *Annual Report* is available at www.yale.edu/iss, as is ISS's *Grand Strategy Project Review*. Inquiries should be directed to International Security Studies, Yale University, PO Box 208353, New Haven, CT 06520-8353. Further information on ISS can also be found at www.yale.edu/iss; on UNSY at www.yale.edu/unsy.

YALE CENTER FOR INTERNATIONAL AND AREA STUDIES

Luce Hall, 34 Hillhouse, 432.3410
www.yale.edu/ycias

Henry R. Luce Director
 Ian Shapiro

Executive Committee:

Nancy L. Ruther (*Secretary; Associate Director, YCIAS*), Deborah Davis (*Sociology*), Michael Donoghue (*Ecology & Evolutionary Biology*), Daniel Esty (*Law; Forestry & Environmental Studies*), Paul Freedman (*History*), Harvey Goldblatt (*Slavic Languages & Literatures*), Michael Graetz, (*Law*), Daniel Junior (*Associate Director, YCIAS*), Stathis Kalyvas (*Political Science*), Richard Kane (*Associate Director, YCIAS*), William Kelly (*Anthropology*), Charles Long (*Deputy Provost*), Mary Miller (*History of Art*), Douglas Rae (*School of Management*), Christopher Udry (*Economics*), Susan Stokes (*Political Science*), Derek Yach (*Epidemiology & Public Health*).

The Yale Center for International and Area Studies (YCIAS) is Yale University's principal agency for encouraging and coordinating teaching and research on international affairs, societies, and cultures around the world. YCIAS seeks to make understanding the world outside the borders of the United States, and America's role in the world, an integral part of the liberal education and professional training at Yale University.

YCIAS includes more than twenty research and educational affiliates, specializing in interdisciplinary and problem-oriented, comparative studies of different world regions. All support and welcome students from all academic departments and professional schools. They include African Studies Council; Canadian Studies Committee; East Asian Studies Council; European Studies Council; International Affairs Council; Latin American and Iberian Studies Council; Middle East Studies Council; South Asian Studies Council; Southeast Asia Studies Council; Center for the Study of Globalization; Central Asia Initiative; European Union Studies Program; Fox International Fellowships Program; Genocide Studies Program; Georg Walter Leitner Program in International and Comparative Political Economy; Gilder Lehrman Center for the Study of Slavery, Resistance, and Abolition; Global Migration Program; Globalization and Self-Determination Program; Hellenic Studies Program; Program in Agrarian Studies; and Program on Order, Conflict, and Violence. For details and faculty leadership, please consult the YCIAS Web site.

The Center provides opportunities for scholarly research and intellectual innovation; awards nearly four hundred fellowships and grants each year; encourages faculty/student interchange; sponsors more than five hundred lectures, conferences, workshops, seminars, and films each year (most of which are free and open to the public); produces a range of working papers and other academic publications; and contributes to library collections (exclusive of Europe) comprising 1.4 million volumes in the languages of various areas. Through Programs in International Educational Resources (PIER), it brings international education and training to educators, K-12 students, the media, businesses, and the community at large.

YCIAS provides ten degree programs. The six undergraduate majors include African Studies; East Asian Studies; Ethnicity, Race, and Migration; International Studies; Latin American Studies; and Russian and East European Studies. The four graduate degree programs include African Studies; East Asian Studies; International Relations; and European and Russian Studies. There are several joint-degree programs with YCIAS M.A.s and the schools of Law, Management, Forestry & Environmental Studies, and the Department of Epidemiology and Public Health.

Graduate Certificates of Concentration

Open to all graduate and professional students at Yale, YCIAS sponsors six graduate certificates of concentration. The councils on African, European, Latin American and Iberian, and Middle East Studies provide three regionally focused certificates. The International Affairs Council provides one in International Development Studies and a second in International Security Studies.

Students may pursue the certificates in conjunction with graduate degree programs in the Graduate School of Arts and Sciences and the professional schools. Admission is contingent on the candidate's acceptance into a Yale graduate degree program. To complete the certificate, candidates must demonstrate expertise in the area through their major graduate or professional field, as well as show command of the diverse interdisciplinary, geographic, cultural, and linguistic approaches associated with expertise in the area of

concentration. Award of the certificate, beyond fulfilling the relevant requirements, is contingent on the successful completion of the candidate's Yale University degree program. Students who complete the required additional work will receive the relevant certificate from YCIAS.

While the general requirements for the graduate certificate of concentration are consistent across all councils of YCIAS, the specific requirements of each council may vary according to the different expertise required for its area and are reflected in their application, monitoring, and award forms. Guidelines, detailed rules, and application forms can be picked up at the relevant council or downloaded from the YCIAS Web site at www.yale.edu/ycias. Applications may be submitted by students admitted to a graduate program at Yale or during their program of study but no later than the beginning of the penultimate term of study. Each council may set limits on the number of candidates for their program in any given year.

General Requirements

1. Six courses in the area of concentration (in at least two different fields).
2. Language proficiency in at least one language of the region beyond proficiency in English. For some councils and for some individual circumstances, proficiency in two languages beyond English is required.
3. Interdisciplinary research paper.

Details on General Requirements

COURSE WORK

Students must complete a total of six (6) courses focused on the area of concentration from at least two different fields including the Foundations Course (as designated by the council). Of the remaining five courses only two may be "directed readings" or "independent study." Please note:

- No more than four courses may count from any one discipline or school.
- Courses from the home field of the student are eligible. Courses may count toward the student's degree as well as toward the certificate.
- Literature and advanced language courses at the graduate level may count toward the six-course requirement but not elementary or intermediate language offerings.
- Course work must demonstrate broad comparative knowledge of the region rather than focus on a specific country.
- Course work must demonstrate a grasp of the larger thematic concerns affecting the region, e.g., environment, migration, or global financial movements.
- Only those courses listed on the "Graduate Course Listings" provided by the Area Council may be used to fulfill course requirements. For courses not listed there, please consult with the certificate/qualification adviser.
- A minimum grade of HP must be obtained or the course will not be counted toward the certificate.

LANGUAGE PROFICIENCY

In the major area language targeted for meeting the proficiency requirement, students must demonstrate the equivalent ability of two years of language study at Yale with a grade of HP or better. Language proficiency must encompass reading, writing, speaking, and listening skills plus grammar. Students may demonstrate proficiency through completing course work, by testing at Yale, or by other means as approved by the council adviser. When a second major language of the region beyond English is required, the relevant council will specify the target level.

Normally, when the candidate is a native speaker of one of the area's major languages, he/she will be expected to develop language proficiency in a second major area language.

INTERDISCIPLINARY RESEARCH PAPER

A qualifying research paper is required to demonstrate field-specific research ability focused on the area of concentration. After they have completed substantial course work in the area, students must seek approval from the council faculty adviser for the research project they propose as the qualifying paper. Normally, the students will submit their request no later than the fourth week of the term in which they plan to submit the qualifying paper.

The interdisciplinary research paper may be the result of original research conducted under the supervision of a faculty member in a graduate seminar or independent readings course or in field research related to their studies. An M.A. thesis or Ph.D. prospectus or thesis may also be acceptable if it is interdisciplinary as well as focused on the area. The qualifying paper should examine questions concerning the region in a comparative and/or interdisciplinary context. It should also use resource materials from the region and/or resource materials in the language(s) of the region. Normally the paper should incorporate at least two of the following elements:

- Address more than one country of the region of the area.
- Draw on more than one disciplinary field for questions or analytic approaches.
- Address a trans-regional or transnational theme relevant to the area.

The paper will be read by two faculty members selected by the council adviser. The readers will be evaluating the paper for the quality of research, knowledge of the relevant literature, and the depth of analysis of the topic. The qualifying paper must be fully footnoted and have a complete bibliography.

Progress Reports and Filing for the Award of the Graduate Certificate of Concentration

Students should submit a progress report along with a copy of their unofficial transcript to the council faculty adviser at the end of each term.

A student who intends to file for the final award of the certificate/qualification should contact the council no later than the end of the term prior to award. No later than the fourth week of the term of the expected award, the candidate should demonstrate how he/she has or will have completed all the requirements in a timely fashion.

YALE CENTER FOR THE STUDY OF GLOBALIZATION

Betts House, 393 Prospect Street, 432.1900, globalization@yale.edu

YaleGlobal Online Magazine: www.yaleglobal.yale.edu

Center Website: www.ycsg.yale.edu

Director

Ernesto Zedillo

The Yale Center for the Study of Globalization (YCSG) is devoted to examining the impact of our increasingly integrated world on individuals, communities, and nations. The Center's purpose is to support the creation and dissemination of ideas for seizing the opportunities and overcoming the challenges presented by globalization. It is focused on producing practical policies to enable the world's poorest and weakest citizens to share in the benefits brought by globalization. YCSG also explores solutions to problems that, even if they do not result directly from integration, are global in nature and can therefore be effectively addressed only through international cooperation. The Center draws on the rich intellectual resources of the Yale community, scholars from other universities, and experts from around the world.

On campus, the Center supports teaching and research on the many facets of globalization, while helping to enrich debate through workshops, conferences, and public programs. Faculty as well as graduate and undergraduate students receive support for research projects and activities that enhance the study of globalization, have policy implications, or further the following goals: (1) to produce and disseminate ideas that will help nations take advantage of globalization's opportunities and overcome its challenges, or (2) to explore solutions to problems that, even if they do not result directly from international integration, are global in nature and can therefore be effectively addressed only through international cooperation.

The Center furthers its mission through collaboration with a variety of institutions across the globe. Projects resulting from these collaborations provide the means by which YCSG can contribute toward influencing the attitudes and actions of policy makers, academics, and institutions. Natural opportunities exist to present the results of this work at Yale through seminars, colloquia, and public lectures. These collaborations include the following projects:

- International Task Force on Trade and Finance for the U.N. Millennium Development Project

- International Task Force on Global Public Goods

- Commission on the Private Sector and Development

- The World Bank

- Ethical Globalization Initiative

- Center for Global Development

In order to multiply the effects of the internal and external dimensions of the Center's strategy, YCSG has developed a global media instrument. *YaleGlobal Online* magazine

(www.yaleglobal.yale.edu), the Center's flagship publication, explores the growing interconnectedness of the world and aims to analyze and promote debate on all aspects of globalization. The magazine posts three original articles per week, re-publishes and archives articles from around the globe, and offers video recordings of the Center's events at Yale.

Policies and Regulations

ADMISSIONS

www.yale.edu/graduateschool/admissions/

Application for admission to any of the Graduate School's programs should begin in the summer or fall of the academic year prior to the one in which the applicant proposes to matriculate. Application can be made to only one department or program. The Graduate School utilizes an online application. Access to this application as well as application procedures, guidelines, requirements, fees, deadline dates, and all other information that an applicant will need are available at the Web site listed above.

Students who seek a professional degree from Yale University should identify and contact the appropriate school as identified on pages 483–84. Holders of American Ph.D. or Sc.D. degrees, or their foreign equivalents, are not eligible for admission to the Graduate School in the field in which they have already earned a degree. They may, however, apply in other fields and are also eligible to apply for admission to the Division of Special Registration as special students for nondegree study (please see Nondegree Study on pages 432–33 for more information or visit the Web site listed above).

Individual program descriptions, prerequisites, special admissions requirements, and links to these programs are available via the Admissions Web site. Although programs may have varying prerequisites and special requirements for admission, all programs will require, in addition to an application and the application fee, three letters of recommendation, official transcripts from each academic institution previously attended, and the results of the Graduate Record Examinations (GRE) General Test, which is administered in the United States and abroad by Educational Testing Service (ETS). This examination, in addition to any GRE Subject Tests which may be required by your program of study, should be taken as early as possible to ensure that official scores are released and received no later than the stated deadline of the program for which you are applying.

Applicants whose native language is not English must present evidence of proficiency in English by satisfactorily completing the Test of English as a Foreign Language (TOEFL), which is administered by ETS, or the International English Language Testing System (IELTS). The examination should be taken as early as possible to ensure that official scores are released and received no later than the stated deadline of the program for which you are applying.

Students who do not demonstrate sufficient proficiency in English may be retested or asked to take courses in English for speakers of other languages. A higher level of proficiency will be required in order for students to serve as teaching fellows.

All applicants who accept offers of admission to Ph.D. programs and whose native language is not English must present acceptable scores on the Test of Spoken English (TSE) or SPEAK test before being appointed as teaching fellows with instructional responsibilities. The TSE is also administered in the United States and abroad by ETS. The SPEAK

test is administered by Yale's English Language Institute on campus only.

International applicants who accept offers of admission will be required to give appropriate evidence of necessary financial support for one or two academic years, depending on their program of study, before the University will be able to issue visa documents.

Applicants are typically notified of decisions regarding their applications during the month of March. Official notification is sent from the Graduate School of Arts and Sciences only. All entering students must have obtained the bachelor's degree or its foreign equivalent. Offers of admission are contingent on students' providing official evidence of having completed the bachelor's degree or foreign equivalent prior to registration. Students who are not able to provide such evidence will not be permitted to register. Those who have been engaged in graduate work at Yale or another university must also present an official transcript giving evidence of degree(s) awarded and/or satisfactory completion of the previous year's work.

Applicants who have been previously denied admission three times will not be allowed to apply again.

PROGRAMS OF STUDY

Full-Time Degree Candidacy

Most students enrolled in the Graduate School are registered for full-time study as they pursue a Ph.D. or master's degree program. These students devote their full effort to course work, preparation for qualifying examinations, gaining teaching experience, and the research and writing leading to the completion of the dissertation.

Part-Time Study

In rare circumstances, qualified individuals who are unable to devote their full time to graduate study may apply and be admitted as part-time students in either doctoral or terminal master's programs. For more complete information about part-time study, please turn to page 437.

Nondegree Study

Qualified individuals who wish to study at the graduate level as nondegree candidates may be admitted to the Division of Special Registration (DSR). Admission to the DSR is for one term or for one year only and carries with it no commitment by the Graduate School for further study. Students admitted for the academic year must demonstrate satisfactory academic performance in the first term in order to register for the second term. Students in the DSR are issued transcripts indicating the appropriate credit for work completed.

Application procedures for the DSR are similar to those for students seeking admission to regular degree programs. In addition, applicants to the DSR must provide evidence of health care for the duration of their studies at Yale at the time of application.

DSR students engaged solely in course work are identified as special students. Special students admitted for part-time study are charged tuition on a per-course basis, whether for credit or audit. See page 460 for a schedule of tuition and fee charges. Students admitted to the DSR as special students are not eligible for financial aid, including federal and most nonfederal student loans.

More advanced graduate students who are degree candidates at other universities and who wish to do full-time dissertation-level research or a combination of research and course work at Yale may be admitted to the DSR as Visiting Affiliated Research Graduate Students. Such students are charged full tuition. A limited amount of tuition assistance based on need may be available, but students in this category must always pay at least \$1,756 of their tuition per term. Students enrolling for the summer only are charged \$878. Applicants for admission as Visiting Affiliated Research Graduate Students should complete the Applicant's Financial Statement and must submit any other documentation that would clearly establish their need for tuition assistance. Support beyond tuition in the form of fellowship stipends, teaching fellowships, or research assistantships is not available.

In certain circumstances, advanced graduate students who are degree candidates at another university and who have made arrangements with a specific Graduate School faculty member for a research project under his or her direct supervision may be admitted to the DSR as Visiting Assistants in Research. Any proposal for the admission of a visiting assistant in research must be discussed by the relevant departmental director of graduate studies and the appropriate associate dean. Such students hold standard graduate student assistantship in research appointments in the faculty member's department. The appointment is funded by the faculty member. The tuition charge for students enrolled as Visiting Assistants in Research is \$1,756 per term. Students enrolling for the summer only are charged \$878.

Some departments at Yale have formal exchange agreements with universities in other countries that have been approved by the Graduate School. Graduate students who are admitted to Yale under such approved exchange agreements may be registered as Visiting International Exchange Students. Visiting International Exchange Students normally are not charged a tuition fee.

Cumulative enrollment in the DSR is limited to two years. Students enrolled in the DSR who are subsequently admitted to degree programs may receive academic and tuition credit for work done while enrolled in the DSR, provided that the department recommends such credit and the appropriate associate dean approves.

Interdisciplinary Study

All graduate students are formally associated with one department or program but students may be encouraged to take one or more courses in a related department. Students are often advised by faculty members from more than one department during their dissertation research. Students in the Graduate School, with permission of the director of graduate studies and the relevant school, may take advantage of particular course or research opportunities in Yale College and in Yale's professional schools.

Combined and Joint-Degree Programs

Students interested in African American Studies, Film Studies, and Renaissance Studies pursue a combined Ph.D. with departments in related fields. In addition to these academic programs, there are several formal interdisciplinary Ph.D. programs in the Graduate School listed under the appropriate departmental entries of this bulletin. Ad hoc programs may also be approved. A student who is interested in an ad hoc program should prepare a written proposal for review and approval by the relevant departments and associate deans.

Students are encouraged to contact the appropriate directors of graduate studies about specific opportunities for interdisciplinary study throughout the Graduate School and the University.

The Graduate School also participates in the following formal joint-degree programs with the professional schools: the J.D./M.A. and J.D./Ph.D. programs in cooperation with the Law School; the M.D./Ph.D. program in cooperation with the School of Medicine; the M.A./M.B.A. programs in cooperation with the School of Management; and the M.A./M.F.S. and M.A./M.E.S. programs in cooperation with the School of Forestry & Environmental Studies. For all joint-degree programs except the M.D./Ph.D., students are required to submit formal applications to both the professional school and the Graduate School indicating their interest in enrolling in the joint program. Individuals interested in the M.D./Ph.D. program apply directly to the School of Medicine (see page 445).

Exchange Scholar Program

www.yale.edu/graduateschool/academics/exchange.html

Graduate students in Yale Ph.D. programs may petition to enroll full- or part-time for a term or for an academic year as exchange scholars at a number of other institutions, including the University of California at Berkeley, Brown, Chicago, Columbia, Cornell, Harvard, Princeton, and Stanford Universities, and at MIT and the University of Pennsylvania. The Exchange Scholars Program enables students to take advantage of special educational opportunities not available at their home institutions. For applications, contact Assistant Dean Edward Barnaby (edward.barnaby@yale.edu), Room 134, Hall of Graduate Studies (HGS). Applications must be received at least three weeks prior to the beginning of the term for which the student is applying.

International Graduate Student Exchange Agreements

All international exchange agreements must be approved in advance by the Graduate School to ensure that they meet University policy and Graduate School guidelines. Departments interested in establishing an exchange program must prepare a statement that demonstrates that there is a clear academic and reciprocal need for such a program, and that the program will conform to the established guidelines for all such exchange agreements.

INTERNATIONAL EXCHANGE PROGRAMS

Center for International and Area Studies

Fox International Fellowship Program (Moscow State University; University of Cambridge; Free University, Berlin; Fudan University, Shanghai; University of Tokyo)

Council on East Asian Studies

Inter-University Center for Japanese Language Studies, Yokohama; Inter-University Board for Chinese Language Studies, Tsinghua University, Beijing; International Chinese Language Program, National Taiwan University, Taipei Tokyo University

Economic Growth Center

Research Institute for Economics and Business Administration (Kobe University, Japan)

Engineering

Ecole Normale Supérieure de Cachan (ENSC), France

Epidemiology and Public Health

Many internship opportunities in numerous countries across the world

Graduate School

Royal Holloway College, University of London, England; The Connecticut Department of Education and the State of Baden-Württemberg Exchange, Germany; University of Konstanz, Germany

French

Ecole Normale Supérieure, Paris

German

Free University, Berlin, Germany

History of Science and Medicine

Ecole Normale Supérieure, Paris, France

Linguistics

Tokyo Metropolitan University, Japan

Molecular, Cellular, and Developmental Biology

Peking University, Beijing, China

Political Science

Nuffield College, University of Oxford, England

Sociology

University of Copenhagen, Denmark

PROGRAMS IN DEVELOPMENT

Agrarian Studies

Amsterdam School for Social Science Research, Netherlands

History of Science and Medicine

Ecole des Hautes Etudes en Sciences Sociales, Paris, France

Summer Study

www.yale.edu/summer

Many graduate students remain in New Haven during the summer for independent study and research (see Summer Registration, page 451). Although the Graduate School does not offer courses in the summer, a program of undergraduate courses is available, as well as an intensive program of instruction in languages, and graduate students may wish to take advantage of those programs while in New Haven. For further details on summer offerings at Yale, please contact Yale Summer and Special Programs, PO Box 208282, New Haven CT 06520-8282.

DEGREE REQUIREMENTS

The requirements set forth in the pages that follow are the minimum Graduate School degree requirements and apply to all degree candidates. Students should consult the listings of individual departments and programs on pages 24–422 for additional specific departmental requirements.

Requirements for the Degree of Doctor of Philosophy

LENGTH OF STUDY

In most fields of study, six years should normally be sufficient for the completion of the Ph.D., although it is understood that seven years may be needed by students in fields requiring extensive field work or the mastery of difficult foreign languages. Departments and programs make every effort to design a course of study and to provide advice and guidance to make it possible for students to complete their work within six years. Normally three, or at most three and one-half, years are devoted to the completion of pre-dissertation requirements (courses, examinations, selection of a dissertation topic). The remaining time, typically two to three years, is devoted to conducting research and writing the dissertation. Advanced standing that has been granted for work done in a Yale M.A./M.S. program is counted as part of the six years (for further information, please see Transfer Credit and Advanced Standing on page 438).

Students must register each term until the dissertation is submitted or until six years (twelve terms) of study have been completed. Students who have not completed the dissertation by the end of the sixth year of study may request a period of extended registration by submitting the petition for extended registration, which includes the standard dissertation progress report that is required annually of all students admitted to candidacy. Before a period of extended registration is approved, the student's adviser and director of graduate studies must certify that the student is making good progress on the dissertation, will be working full-time on it during the year, and has a reasonable prospect of completing it by the end of the registration period. Students who receive extended registration must register online each term, may not be employed more than twenty hours per week, and should be at Yale or in another location conducive to writing the dissertation.

Part-Time Study

Students in Ph.D. programs are expected to register for full-time study. In extraordinary circumstances a student may petition the Graduate School for permission to register as a half-time student for a limited period. Students may not register for half-time study for more than three of the first four academic years they are enrolled. Thereafter, they must register full-time until the four-year tuition obligation has been satisfied. Any Ph.D. student who registers half-time at any point in his or her graduate program must fulfill the four-year tuition obligation to receive the Ph.D. (see pages 437–38). Students may not register less than half-time.

Students who wish to study part-time should consult with their director of graduate studies and the appropriate associate dean to develop a proposed plan of study, so that both the student and the Graduate School have a common understanding about the time by which the requirements leading to admission to candidacy must be completed. Such a plan of study may be modified with the consent of the director of graduate studies and the associate dean.

Noncumulative Registration

In certain areas of study, it may be necessary for a registered student to acquire an academic skill (typically, knowledge of a foreign language) that is essential for a degree requirement or for research in a particular field and for the overall progress of the dissertation but is not an inherent part of the dissertation itself. A student in this situation may request up to one year of “noncumulative registration.” It is important to note that general study in a field related to or parallel with the topic of the dissertation is *not* appropriate for noncumulative registration.

A student who wishes to have a specific period of study designated as “noncumulative” should discuss the reasons for such a period of study with and secure prior approval from his or her associate dean. If prior authorization has been given by the Graduate School, the period of time spent in acquiring the necessary academic skill will not be counted as part of the student’s six-year period of candidacy. The Continuous Registration Fee (CRF) is charged during the period of noncumulative registration. Noncumulative registration does not change the four-year full-tuition obligation. The tuition charge and any University Fellowship aid will be postponed if a student registers noncumulatively before the four-year full-tuition obligation has been satisfied.

RESIDENCE REQUIREMENT

Students seeking the Ph.D. degree are required to be in residence in the New Haven area during at least three academic years. This is an academic requirement, distinct from and independent of the tuition requirement described below. The residence requirement must normally be met within the first four years of study. Any exception to the residence requirement must be approved by the department and by the appropriate associate dean.

TUITION REQUIREMENT AND THE CONTINUOUS REGISTRATION FEE

All Ph.D. candidates are charged four years (eight terms) of full tuition, or proportionately less if all degree requirements, including submission of the dissertation, are

completed in less than four continuous years of full-time study from the date of matriculation in the Ph.D. program.

Once the full-tuition obligation has been completed, registered students are charged the Continuous Registration Fee (CRF).

TRANSFER CREDIT AND ADVANCED STANDING

The Graduate School does not award transfer credit for graduate work completed before matriculation at Yale. A department may, with the approval of the Graduate School, waive a portion of the Ph.D. course requirement in recognition of previous graduate-level work done at Yale or elsewhere. Such a waiver does not affect the full-tuition requirement. Courses taken previous to matriculation at Yale will not appear in the student's Graduate School transcript.

With the approval of the department, a student who is currently enrolled may petition for advanced standing in the Graduate School of up to one year for work completed in a Yale master's or professional doctoral program that is relevant to the student's Ph.D. program. This petition must be received by the appropriate associate dean in the Graduate School before the end of the student's first year of study in the Ph.D. program. Such students may also be offered admission with advanced standing by the department and the Graduate School. Such advanced standing will reduce the four-year tuition requirement and eligibility for Graduate School fellowship aid accordingly. The normal six-year period of registration will be similarly reduced.

LANGUAGE REQUIREMENT

Language requirements are set by individual departments and programs. Specific language requirements are explained in the individual departmental listings on pages 24–422. All departmental requirements are subject to initial approval by the Executive Committee of the Graduate School and are monitored by the divisional degree committees. A department cannot make exceptions to its own requirements without authorization by the appropriate degree committee.

The required level of proficiency in foreign languages, and the method for demonstrating it, are determined by the individual departments. Most give their own examinations. A few permit the requirement to be satisfied by passing particular courses. Students are urged to be prepared to meet language requirements at the beginning of their first year of study.

COURSE AND HONORS REQUIREMENTS

The course requirements for the Ph.D. degree are set individually by each department or program. Although departments may set more stringent requirements, to meet the minimum Graduate School quality requirement for the Ph.D., students must achieve the grade of Honors in at least one full-year or two full-term graduate courses, taken after matriculation in the Graduate School and during the nine-month academic year. The Honors requirement must be met in courses other than those concerned exclusively with dissertation research and preparation.

A student who has not met the Honors requirement at the end of the fourth term of full-time study will not be permitted to register for the fifth term. In exceptional circumstances, the director of graduate studies may petition the degree committee, through the appropriate dean, that a student who has not met the Honors requirement be permitted to continue study. Such a petition should be made before the end of the fourth term of study in time to be considered by the degree committee at its meeting that term.

QUALIFYING EXAMINATION

Each Ph.D. student must pass a general examination, separate from course examinations, in the major subject offered and in such subordinate subjects as may be required by the department. Such examinations are described in the individual departmental listings on pages 24–422. Students should consult with the director of graduate studies for further information about this requirement.

PROSPECTUS

The prospectus should be viewed as a preliminary statement of what the student proposes to do in his or her dissertation and not as an unalterable commitment. The appropriate form and typical content of a prospectus inevitably vary from field to field. In most cases, however, a prospectus should contain the following information:

1. A statement of the topic of the dissertation and an explanation of its importance. What in general might one expect to learn from the dissertation that is not now known, understood, or appreciated?
2. A concise review of what has been done on the topic in the past. Specifically, how will the proposed dissertation differ from or expand upon previous work? A basic bibliography should normally be appended to this section.
3. A statement of where most of the work will be carried out—for example, in the Yale library or another library or archive, in the laboratory of a particular faculty member, or as part of a program of field work at specific sites in the United States or abroad.
4. If the subject matter permits, a tentative proposal for the internal organization of the dissertation—for example, major sections, subsections, sequence of chapters.
5. A provisional timetable for completion of the dissertation.

Although it is difficult to prescribe a standard length for the prospectus, it should be long enough to include essential information for all proposed topics but concise enough to focus clearly on the subject. About seven pages, including bibliography, should be sufficient in most cases.

ADMISSION TO CANDIDACY

Admission to candidacy indicates that the department and the Graduate School consider the student prepared to do original and independent research. Students will be admitted to candidacy when they have completed all predissertation requirements, including the dissertation prospectus. Admission to candidacy will normally take place by the end of

the third year of study. Any programmatic variations from this pattern that have been approved by the Executive Committee of the Graduate School are described in the individual department statements beginning on page 24. Teaching is required in some departments and is an expectation in all. A student who has not been admitted to candidacy at the expected time will not be permitted to register for the following term. At the time of advancement to candidacy, students who have not petitioned for or received en route degrees (e.g., M.A., M.S., M.Phil.) will automatically be considered for such degrees. If a student advances to candidacy after the deadline to submit a petition for the degree in that term, the student will be considered for a degree in the following term.

TRAINING IN TEACHING

The Teaching Fellow Program (TFP) is the principal framework at Yale in which graduate students learn to become effective teachers. Learning to teach and to evaluate student work is fundamental to the education of graduate students. Teaching is required in some departments and is an expectation for all doctoral students. The TFP provides opportunities for graduate students to develop teaching skills, under faculty guidance, through active participation in the teaching of Yale undergraduates. Teaching fellows who encounter problems or difficulties related to their teaching appointments are encouraged to meet with the director of the TFP (Judith Dozier Hackman) or their associate dean (Richard Sleight for the natural sciences and Anthropology, Linguistics, Psychology, and Statistics; Pamela Schirmeister for the humanities and Economics, Political Science, and Sociology). A student must be registered in the Graduate School to be appointed as a teaching fellow (TF) or as a part-time acting instructor (PTAI). TFs assist faculty in teaching relatively large undergraduate courses. PTAIs are responsible for small undergraduate courses, subject to guidance and advice by department faculty. For a more detailed description of these types of appointments, see “Teaching Fellow Levels” (on pages 465–66).

Faculty should clearly communicate to students and teaching fellows their expectations about evaluation of work, feedback to students, and grading policies. Faculty are expected to prepare course syllabi, homework assignments, and examinations. Typically, they should not ask teaching fellows to give lectures when they are unable to attend class although they are encouraged to offer occasional opportunities for student lectures when they can attend and advise. While on rare occasions teaching fellows may be asked to assist with administrative activities (such as placing course material on library reserve or online, making photocopies for class, ensuring that audiovisual resources are available and working, and the like), in general such activities should not be done by students.

Graduate students may occasionally serve as graders for graduate-level courses, but only in highly quantitative courses with grading demands for frequent homework assignments. Even there, the grading may not count toward final grades and the students may not grade exams. In courses that are double titled with both graduate and undergraduate numbers, the same guidelines hold for the grading of homework; all other grading of graduate students should be done by the faculty member.

The Graduate School requires that all students who teach be in good academic standing. In addition, they must be fluent in English, except for those who solely grade. Grad-

uate students whose native language is not English are required to meet the oral English proficiency standard before they may begin teaching. The standard may be met by (1) passing the SPEAK test, (2) passing the Test of Spoken English (TSE), or (3) having received a degree from an institution where the principal language of instruction is English. (Degrees awarded en route to the Ph.D. at Yale will not satisfy this requirement.) In some instances, a student's director of graduate studies (DGS) may require that students with degrees from English-speaking institutions also pass the SPEAK test to satisfy the language requirement.

DEFERRAL OF TEACHING YEAR

In the humanities and social sciences, students in a teaching year, normally years three and four, may request to defer a teaching year or semester into the fifth year for compelling academic reasons. Such reasons include but are not limited to a need to do research in absentia or insufficient preparation for teaching.

A student who wishes to defer a teaching year must make arrangements to do so no later than the beginning of the fourth year. At the time the deferral is requested, the student and DGS should agree on the teaching the student will do in the fifth year. The assignment should be at the level normally expected in a regular teaching year, that is, a TF 3.5 or 4, depending on the department.

The deferral must be approved by the DGS and the associate dean. If the deferral is approved, the student will receive a supplemental University fellowship to bring the amount of the fifth-year teaching fellowship up to the standard departmental stipend. Under no circumstances may a student defer a teaching year beyond the fifth year, and all students must still complete the Dissertation Fellowship by the end of the sixth year.

DISSERTATION

The dissertation should demonstrate the student's mastery of relevant resources and methods and should make an original contribution to knowledge in the field.

The originality of a dissertation may consist of the discovery of significant new information or principles of organization, the achievement of a new synthesis, the development of new methods or theories, or the application of established methods to new materials.

Normally, it is expected that a dissertation will have a single topic, however broadly defined, and that all parts of the dissertation will be interrelated. This does not mean that sections of the dissertation cannot constitute essentially discrete units. Dissertations in the physical and biological sciences, for example, often present the results of several independent but related experiments.

Given the diverse nature of the fields in which dissertations are written and the wide variety of topics that are explored, it is impossible to designate an ideal length for the dissertation. Clearly, however, a long dissertation is not necessarily a better one. The value of a dissertation ultimately depends on the quality of its thought and the clarity of its exposition. In consultation with their faculty advisers and directors of graduate studies, students should give serious thought to the scale of proposed dissertation topics. There should be a reasonable expectation that the project can be completed in two to three years.

In accordance with general University policy, classified or restricted research is not acceptable as part of the dissertation. Exceptions must be approved in advance by the appropriate Degree Committee.

For information about submission of the dissertation, please see pages 446–47. Students should also consult the booklet entitled *Preparation and Submission of the Doctoral Dissertation*, available at the Student Information Office, Room 140, Hall of Graduate Studies (HGS).

Requirements for the Degree of Master of Philosophy

The Master of Philosophy is awarded en route to the Ph.D. in many departments. The minimum general requirements for this degree are that a student shall have completed all requirements for the Ph.D. except the prospectus and dissertation. Students will not generally have satisfied the requirements for the Master of Philosophy until after two years of study, except where graduate work done before admission to Yale has reduced the student's graduate course work at Yale. In no case will the degree be awarded for less than one year of residence in the Yale Graduate School.

Not all departments offer the M.Phil. degree. Information regarding special departmental requirements for the degree, if any, are stated in the individual department listings on pages 24–422.

Requirements for the Degree of Master of Arts or Master of Science

Except in the case of programs listed below under terminal M.A./M.S. Degrees, students are not admitted as candidates for the Master of Arts or Master of Science degree. However, students in most doctoral departments may be awarded the M.A. or M.S. en route to the Ph.D. degree.

Although departments may set more stringent requirements, the minimum general requirements that must be met for award of the M.A. or M.S. en route are (1) completion of the first year of the program leading to the Ph.D., with grades that satisfy departmental requirements; (2) completion of one academic year in full-time residence, or the equivalent, at Yale; (3) recommendation by the department for award of the degree, subject to final review and approval by the appropriate degree committee. In no case may courses taken prior to matriculation in the Graduate School, or in Yale College or other summer programs, be applied toward the requirements for the Master of Arts or Master of Science degree.

Some departments do not offer the M.A. or M.S. en route to the Ph.D., or award it only to students who are withdrawing from the Ph.D. program. For information about this or any special departmental requirements additional to the general requirements stated above, see the departmental listings, pages 24–422.

Students enrolled in a Ph.D. program may receive a master's degree from another department provided that it is in a related field of study and the director of graduate studies in both departments and the appropriate associate dean agree on the student's program of study prior to enrollment in courses. Courses taken toward a master's degree in another department must be part of the student's course requirement for the Ph.D., as

approved by the director of graduate studies in both departments. However, such course work cannot also be counted toward a master's degree in the department to which the student was admitted. Students who wish to obtain a master's degree in a field that is not directly related to the doctoral degree must apply for a personal leave from the Ph.D. program and submit an application for admission to the master's program. Any financial aid offered to the student for a Ph.D. program may not be transferred to a master's degree course of study. Students enrolled in combined programs normally receive combined en route degrees as well.

TERMINAL M.A./M.S. DEGREES

The M.A./M.S. degrees are offered as terminal degrees in twenty-two departments and programs: African Studies, American Studies, Applied Mathematics, Archaeology, Biostatistics (Epidemiology and Public Health), Computational Biology and Bioinformatics, Computer Science, East Asian Studies, Engineering and Applied Science, English, European and Russian Studies, Germanic Languages and Literatures, History, History of Medicine and Science, International and Development Economics (IDE), International Relations, Mathematics, Medieval Studies, Molecular Biophysics and Biochemistry, Music, Near Eastern Languages and Civilizations, Slavic Languages and Literatures, Statistics, and Urban Education Studies.

The residence and tuition requirements for a terminal M.A./M.S. degree are: a minimum of one year of full tuition and course work in residence in one-year programs, or a minimum of two years of full tuition and course work in residence in two-year programs. For information about which departments offer one-year programs and which offer two-year programs, see departmental listings on pages 24–422.

With the approval of the department and the appropriate associate dean, a student may be admitted for part-time study toward the master's degree. In that case, tuition will be charged on a per-course basis. Part-time study does not change the one- or two-year full-tuition obligation described above. Part-time students must complete all degree requirements within five years of continuous registration.

Individual departments establish the specific course and language requirements for these degrees. Although departments may set more stringent requirements, the minimum Graduate School requirement for students admitted for M.A./M.S. degrees is an overall grade average of High Pass, including a grade of Honors in at least one full-term graduate course (for students enrolled in one-year programs), or in at least two full-term graduate courses (for students enrolled in two-year programs). In order to maintain the minimum average of High Pass, each grade of Pass on the student's transcript must be balanced by one grade of Honors. Each grade of Fail must be balanced by two grades of Honors. If a student retakes a course in which he or she has received a failing grade, only the newer grade will be considered in calculating this average. The initial grade of Fail, however, will remain on the student's transcript. A grade awarded at the conclusion of a full-year course in which no grade is awarded at the end of the first term would be counted twice in calculating this average.

No credit will be awarded toward the M.A./M.S. degree for courses taken prior to matriculation in the Graduate School, or taken in Yale or other summer programs. Students in one of Yale's professional schools who matriculate in the Graduate School to complete a joint master's degree may, however, with the permission of their director of graduate studies, count courses already completed in their professional school program toward the joint degree. See the individual program or department listings.

The master's degree may also be earned jointly with the B.A./B.S. in certain departments by students enrolled in Yale College. For further information, please see *Yale College Programs of Study*, available from the Office of the Dean of Yale College.

Requirements for Joint-Degree Programs

Students who are candidates for degrees in any of the joint programs sponsored by the Graduate School and Yale's professional schools must meet the requirements established by each school for the degree they are seeking. Degree requirements in the Graduate School include both the Graduate School's general requirements and any special requirements set by the relevant department or program. In all cases, the Honors requirement must be fulfilled in non-research courses offered primarily for Graduate School students, taken after matriculation in the Graduate School.

In addition to the J.D./Ph.D., J.D./M.A., and M.D./Ph.D. programs described below, joint-degree programs with other professional schools have been approved for students in European Studies, International Relations, and International and Development Economics. These programs are described in the departmental statements on pages 182–87 and 255–70.

J.D./PH.D. AND J.D./M.A. PROGRAMS

Admission to the Graduate School joint-degree programs with the Law School, described below, requires separate admission to both schools as well as approval by the appropriate associate dean in each school, and by the director of graduate studies in the student's Graduate School department. Students must apply for admission to a joint program no later than their first year of study in a J.D., Ph.D., or two-year M.A. program, and must matriculate in the joint program no later than the beginning of their second year. Students wishing to pursue a J.D./M.A. in a one-year M.A. program must apply for admission no later than their first year of study in the J.D. program and must matriculate in the M.A. program as a joint-degree candidate.

In the J.D./Ph.D. program, the first year of study is spent principally in the Law School. The second and third years are combined according to the interest of the student. As many as six term courses, designated by the student at the beginning of the term, may be counted toward both degrees. During this time all course work and language requirements for the Ph.D. program are normally completed. The J.D. should be completed by the end of the fourth year. During the fifth year the student is expected to complete all remaining predissertation requirements and be admitted to candidacy. The teaching requirement for the Ph.D. will normally be completed by this time. Any exception to this pattern of study must be approved by the appropriate associate dean.

The minimum residence requirement in the J.D./Ph.D. program is four years. The tuition requirement is two and one-half years in the Law School and three and one-half years in the Graduate School. Financial aid is provided by each school according to its own criteria, typically for two and one-half years in the Law School and three and one-half years in the Graduate School, and is awarded by each school during the terms in which the student pays tuition in that school. Students are not eligible for financial aid from the Graduate School during terms in which they are registered at another school.

In the J.D./M.A. program, the J.D. and M.A. degrees are awarded simultaneously at the end of the fourth year of study in one-year M.A. programs and at the end of four and one-half years of study in two-year M.A. programs. The Graduate School tuition requirement for J.D./M.A. students in one-year M.A. programs is one year of tuition; students in two-year M.A. programs have a one and one-half year tuition requirement in the Graduate School. In all cases students pay three years of tuition in the Law School. Students in J.D./M.A. programs, like other students in M.A. programs, are not ordinarily eligible for University Fellowship aid through the Graduate School. Students usually enroll in the Law School during the first year of study. The pattern of enrollment in subsequent years depends on whether the M.A. program is a one-year or a two-year program. No more than two Law School courses may be counted toward the M.A.

M.D./PH.D. PROGRAM

This program is sponsored jointly by the Graduate School and the School of Medicine. Applications for admission to the joint program are reviewed by a committee composed of faculty members and deans from both schools. Normally, admission to the program includes simultaneous admission to both schools. However, students may apply to the joint program by October 15 of their second year of study in either the M.D. or Ph.D. program, and they must matriculate in the joint program no later than the beginning of the following year.

Students request affiliation with a particular department or program in the Graduate School by the middle of their third year of study in the joint program, after their course and research interests have been defined. Although students usually pursue their research in one of the biological sciences, those interested in earning the Ph.D. through work in another department may do so under certain circumstances, with the approval of the M.D./Ph.D. committee.

The residence requirement in this program is seven years. The full-tuition requirement is three and one-half years in the Medical School and two and one-half years in the Graduate School. To qualify for the M.D. and Ph.D. degrees, students must satisfy all degree requirements of both schools. Normally, a student admitted to this joint program must satisfy the Graduate School Honors requirement by the end of the second year of study and must complete all remaining predissertation requirements within four terms of affiliation with the Ph.D. department. This schedule may be adjusted for students who have been enrolled in either the Medical School or the Graduate School before admission to the M.D./Ph.D. program.

Petitioning for Degrees

Graduate School degrees are awarded twice each year, at Commencement in May and in the fall (normally in December, depending on the schedule of the Yale Corporation). Degrees are not granted automatically. Students must file a petition for each degree by the appropriate date (see Schedule of Academic Dates and Deadlines on pages 485–88). Petitions that have received favorable recommendations from the student's department are reviewed by the appropriate degree committee. When the degree committee has given its approval, the petition is forwarded to the Faculty of the Graduate School and then to the Yale Corporation. If the petition is successful, the student will be notified in writing by the dean of the Graduate School.

Students enrolled in Ph.D. programs should not petition for M.A./M.S. and M.Phil. degrees until the end of the term in which requirements for the degree are completed (e.g., students completing degree requirements during the spring term should petition for award of the degree the following fall). Students in terminal M.A./M.S. programs may petition for their degrees in the term in which they expect to complete them.

Dissertation Submission

In accord with the traditional scholarly ideal that the candidate for a doctorate must make a contribution to knowledge, all dissertations that have been accepted by the Graduate School are made available in the University library and published on microfilm (UMI Company). The only required fee associated with submission is \$20 for binding of the library copy of the dissertation. UMI charges authors \$45 if they wish to register a copyright. Publication on microfilm does not prevent the author from publishing the dissertation in another format at any time. Fees are subject to change.

Students must register continuously until either they have submitted the dissertation or six years have elapsed since matriculation, whichever comes first. During the first six years, students must be registered through the term of dissertation submission. Registration beyond the sixth year is not required. Registered students who submit dissertations will remain registered until the end of the term and will retain all privileges of registration (for example, library privileges, health care coverage, and e-mail accounts). Students who complete all Ph.D. requirements within four continuous years of full-time study in the Ph.D. program will be registered and charged full tuition only through the term in which the dissertation is submitted. Students who have registered part time or taken a leave of absence must complete the four-year, full-tuition obligation, regardless of when they submit the dissertation.

Dissertations must be written in and submitted in English except in some disciplines where there are strong academic reasons for the submission of a dissertation in a foreign language. At the time of the submission of their prospectus, students must petition for permission to submit all or a portion of their dissertations in a foreign language. The petition should be submitted in the form of a letter explaining the academic reasons for using a foreign language and will be evaluated by the DGS and the appropriate associate dean. Petitions for writing and submitting a dissertation in a foreign language will not be accepted after students have advanced to candidacy.

The Graduate School does not require departments to evaluate the dissertations of degree candidates who are no longer registered. In practice, however, departments normally agree to evaluate these dissertations.

Commencement

www.yale.edu/commencement

GScommencement@yale.edu

There is only one University Commencement ceremony each year, on a Monday in late May. All degrees awarded for both December and May of each academic year are presented at the May ceremony. The Graduate School Diploma Ceremony takes place at noon on Monday in Woolsey Hall, following the University Ceremony in the morning. However, students receiving master's degrees from the Yale Center for International and Area Studies (YCIAS) and the Economic Growth Center receive their diplomas in a separate ceremony held at Luce Hall, 34 Hillhouse Avenue. Included are master's candidates in African Studies, East Asian Studies, International and Development Economics, International Relations, and Russian and East European Studies.

All degree candidates for the M.A., M.S., M.Eng., and M.Phil., whether terminal or en route, or the Ph.D. are encouraged to march at Commencement and receive their diploma from the dean. If the student does not attend the ceremony, the diploma may also be mailed. Tickets are not required for degree candidates or their guests, but degree candidates who march are responsible for the rental or purchase of their own academic regalia, or cap and gown; details are listed on the Web site above. Degree candidates will receive information on Commencement each year, but they should also see the information on the Commencement Web site. The Office of Graduate Student Life of the McDougal Center coordinates Commencement for the Graduate School.

ACADEMIC REGULATIONS

Registration

Only registered students may attend classes, receive financial aid, or use the facilities of the University. Students must register every term for the duration of their degree program (normally six years or less for Ph.D. programs and one or two years for students in M.A./M.S. programs). This regulation applies to all students, whether engaged in course work, preparation for qualifying examinations, or dissertation research and, in the case of students in Ph.D. programs, whether study is in residence or in absentia. Students who do not register for any term for which they have not been granted a leave of absence (see pages 451–54) will be considered to have withdrawn from the Graduate School. Privileges associated with registered status (i.e., library privileges, health care coverage, and e-mail accounts) will likewise be withdrawn.

No student may register for any term unless he or she is making satisfactory progress toward the degree and has been cleared by the Office of Student Financial Services to register. In compliance with Connecticut state law, no student will be allowed to register

unless satisfactory evidence of immunity to measles and rubella has been presented to the Yale University Health Service (see page 475).

Satisfactory progress means that the student has met all Graduate School and departmental requirements normally expected for each stage of the student's program. For Ph.D. students before admission to candidacy and for M.A./M.S. students, this includes satisfactory completion of courses from the preceding term(s). As indicated on pages 438–39 (Course and Honors Requirements and Admission to Candidacy), students in Ph.D. programs must satisfy the Honors requirement before beginning the fifth term of study and must be admitted to candidacy by the appropriate time. In addition to satisfying these general Graduate School requirements, students must meet any additional requirements specified by their departments. Ph.D. students who have been admitted to candidacy must continue to demonstrate satisfactory progress toward the degree in the annual dissertation progress report. Students who fail to meet departmental or Graduate School requirements by the designated deadlines, and students who have been admitted to candidacy who fail to submit the annual dissertation progress report, will be administratively withdrawn.

Course Enrollment

Any student who wishes to enroll in courses during a term must register through the Online Course Selection (OCS) process. The deadlines for registration each term are listed in the Schedule of Academic Dates and Deadlines on pages 485–88. Students who submit course enrollment forms after the appropriate deadline will be assessed a \$25 fee.

No student may attend any class unless officially registered in the course. No credit will be given for work done in any course for which a student is not officially registered, even if the student entered the course with the approval of the instructor and the director of graduate studies. Students enrolling in courses offered by a Yale professional school are subject to all policies and deadlines of both the professional school and the Graduate School.

A student who wishes to audit a course must receive permission from the instructor before enrolling as an auditor, as not all faculty permit auditors in their classes. The minimum general requirement for auditing is attendance in two-thirds of the class sessions; instructors may set additional requirements for auditing their classes.

COURSE CHANGES

Once the course enrollment form has been submitted to the registrar, all changes must be approved by the student's director of graduate studies and then filed with the registrar. If a student is enrolled in a professional school course, all changes in enrollment status must be reported to the registrar of that school as well as to the Graduate School. Forms for reporting changes to the Graduate School are available at the Graduate School Student Information Office, 140 HGS, as well as from the student's department.

The dates for changing enrollment in a course from credit to audit or audit to credit and for withdrawing from a course are listed in the Schedule of Academic Dates and Deadlines on pages 485–88. If a student stops attending a course in which he or she is

enrolled for credit but does not file a course change form with the registrar, a permanent “Incomplete” will be recorded on the student’s record for that course. Similarly, if a student attends a course, for credit or audit, that was not listed on the student’s approved course enrollment form for that term, the course will not be entered in the student’s record and credit for the course will not be given. A fee of \$25 per course will be charged for changes made after midterm (fall term: October 24; spring term: March 5).

Grades

The grades assigned in the Graduate School are:

- H = Honors
- HP = High Pass
- P = Pass
- F = Fail
- TI = Temporarily Incomplete
- I = Incomplete
- NM = No Mark Submitted

A mark of “FY” is assigned as the grade for the first term of a full-year course and can be converted to a standard grade once both terms are completed depending on the number of credits the course fulfills.

Marks of Satisfactory/Unsatisfactory may be assigned only when the department sponsoring the course has designated such marks. In such cases, all students enrolled in the course must receive these marks; individual students may not receive grades for the course.

The Graduate School does not calculate grade-point averages nor does it assign numerical or letter equivalents to Graduate School grades. Grades assigned according to grading scales other than those described above will be returned to the instructor for conversion.

The Schedule of Academic Dates and Deadlines on pages 485–88 indicates the dates on which grades are due for the current year. Instructors have the responsibility for assigning dates for submission of course work to meet these grade deadlines. If a student and instructor have agreed that an extension is appropriate, the student must submit a request for the Temporary Incomplete (TI) with the intended completion date, signed by the instructor and the director of graduate studies. The instructor will indicate the mark of TI on the grade sheet, which is to be submitted to the Office of the Registrar by the appropriate grade submission deadline. Only one TI for courses taken in a single term is permitted. Temporary Incompletes received in an academic year must be converted to final grades by October 1 of the following academic year. If a grade is not received by the registrar by this date, the TI will be converted to a permanent Incomplete (I) on the student’s record.

In certain extraordinary circumstances, such as serious illness or a family emergency, and on the recommendation of the student’s department, the associate dean may grant an additional extension. A written request for such an extension must be made by the

director of graduate studies on the student's behalf within two weeks of the grade submission deadline. The request should indicate the special circumstances and suggest a date by which the student will complete the work. If the request is approved, the associate dean will inform the student and instructor. If the grade is submitted to the registrar by the new deadline approved by the associate dean, it will replace the Temporary Incomplete. If a grade is not received by the registrar by this date, a Temporary Incomplete (TI) will be converted to a permanent Incomplete (I) on the student's record. Courses for which no mark is submitted (NM) will be converted to a permanent Incomplete (I) after one term.

"Provisional" or "temporary" grades (as opposed to Incompletes) are not permitted. Once submitted to the Office of the Registrar, a grade may be changed *only* in cases of arithmetical or clerical error on the part of the instructor and *only* with the approval of the appropriate associate dean.

Students are reminded that the policies stated above are the Graduate School minimum general requirements. Departments or individual instructors may have more stringent policies and students should consult their departmental handbooks or directors of graduate studies about such requirements.

Registration Status and Leaves of Absence

REGISTRATION IN RESIDENCE

Students who are studying on campus, attending classes, and using University facilities are considered to be in residence. All M.A./M.S. and nondegree (DSR) students must register in residence each term, as do most students in Ph.D. programs (see also Registration in Absentia and Continuous Registration Fee, below). Students who will be in residence during any term are required to register through the Online Course Selection process during the normal registration period at the beginning of that term (see the Schedule of Academic Dates and Deadlines on pages 485–88).

A fee of \$25 will be charged to students who register in residence after the close of the registration period but within the first ten days of the term. Registration after the tenth day of the term requires the permission of the director of graduate studies, the registrar, and, in some instances, of the appropriate associate dean. Additional fees may be imposed for registration after the tenth day of the term. Late fees may be waived only if the registrar receives written notification from the student or director of graduate studies before the start of the registration period that the student will register late because of participation in an academic program, such as a summer language course or professional meeting, that coincides with the registration period. A student who cannot register during the registration period because of a sudden serious illness or family emergency should contact the deputy registrar (142 HGS) as soon as possible.

REGISTRATION IN ABSENTIA

Ph.D. students who have not yet completed the four-year full-tuition requirement and whose program of study requires full-time dissertation research, full-time field work, or

full-time study at another academic institution outside the New Haven area, may request to be registered in absentia. Such registration requires the recommendation of the director of graduate studies and the approval of the appropriate associate dean. Forms for requesting registration in absentia may be obtained at the Graduate School Student Information Office reception desk and should be filed at least one month before the beginning of the term during which the student expects to be studying away from New Haven. A student who has not completed the three-year residence requirement will be permitted to register in absentia for compelling academic reasons only, and normally only if the student has completed all other predissertation requirements. Registration in absentia does not reduce the four-year full-tuition or three-year residence requirements. After four years of registration, students are no longer required to register in absentia when studying away from New Haven. They must, however, complete a continuous registration form. For additional information, see Eligibility for Fellowships on page 468.

Students who are enrolled in the Yale Health Plan and are registering in absentia should consult the staff of the Member Services department at the University Health Services about the policies governing coverage while they are away from New Haven.

CONTINUOUS REGISTRATION FEE

Ph.D. students who have completed the tuition and residence requirements described on pages 437–38 above must continue to register each term through the sixth year whether in residence or in absentia, or until they submit the dissertation, whichever occurs first. Students who have met these requirements are charged a Continuous Registration Fee (CRF). Students who are granted permission to register beyond the sixth year are also charged this fee. Forms for continuing registration are available at the Registrar's Office and in the departments and must be submitted by the end of the registration period for that term.

SUMMER REGISTRATION

Most Ph.D. students and many M.A./M.S. students continue full- or half-time independent study or research during the summer. Students who were registered during the preceding spring term and are engaged in degree-related activities at least half-time may register for the summer research term, approximately June 1 through August 31.

LEAVES OF ABSENCE

Students who wish or need to interrupt their study temporarily may request a leave of absence. There are three types of leave, personal, medical, and parental, all of which are described below. The general policies that apply to all types of leave are:

1. All leaves of absence must be approved by the appropriate associate dean on the recommendation of the department. Medical leaves also require the recommendation of a Yale Health Plan (YHP) physician, as described below; see Medical Leave of Absence.

2. Students in Ph.D. programs may be granted a leave for one term or one academic year. A leave extends the eligibility for fellowship aid by a time equal to the duration of the leave, but not for partial terms. The expected last date of registration will be adjusted by one term for each term of the leave.

Students in one-year M.A./M.S. programs may be on leave for a maximum of one term. Students in two-year M.A./M.S. programs may be on leave for a maximum total of one year.

In exceptional circumstances renewal of one term or one year, to a maximum total of two years of leave, may be granted for students in Ph.D. programs. Leaves of absence for students in M.A./M.S. programs are not renewable. Students who fail to register for the term following the end of the approved leave will be considered to have withdrawn from the Graduate School.

3. Students on leave may complete, *by the appropriate deadline for the term in which the course was taken*, outstanding work in courses for which they have been granted approved incompletes. They may *not*, however, fulfill any other degree requirements during the time on leave. (Students who intend to work toward the degree while away from the University must request registration in absentia.) Students who in fact make progress toward the degree while on leave will have their registration changed retroactively to in absentia for the period of the leave.
4. A leave of absence does not exempt the student from meeting the tuition requirement (payment of eight terms of full tuition in Ph.D. programs, or the appropriate established tuition charge in M.A./M.S. programs) or from paying the Continuous Registration Fee (if appropriate), but merely postpones the required charges.
5. Students on leave of absence do not have to file a formal application for readmission. However, they must notify the registrar in writing of their intention to return. Such notification should be given at least six weeks prior to the end of the approved leave.

Personal Leave of Absence

A student who is current with his or her degree requirements and who wishes to interrupt study temporarily because of personal exigencies may request a personal leave of absence. The general policies governing leaves of absence are described above. Students are eligible for personal leaves after satisfactory completion of at least one term of study. Normally, students in Ph.D. programs are not eligible for personal leaves after the fourth year of study. In certain exceptional cases, however, personal leaves may be granted to students beyond the fourth year of study. Personal leaves cannot be granted retroactively and normally will not be approved after the tenth day of a term.

To request a personal leave of absence, the student must write to the appropriate associate dean before the beginning of the term for which the leave is requested, explaining the reasons for the proposed leave and stating both the proposed start and end dates of the leave and the address at which the student can be reached during the period of the leave. If the dean finds the student to be eligible and the department approves, the leave

will be granted. In any case the student will be informed in writing of the action taken. Students who do not apply for a leave of absence, or who apply for a leave but are not granted one, and who do not register for any term, will be considered to have withdrawn from the Graduate School.

Students on a personal leave of absence are not eligible for financial aid, including loans, or for the use of University facilities normally available to registered students. Students granted a personal leave may continue to be enrolled in the Yale Health Plan (YHP) by purchasing coverage through the Student Affiliate Coverage plan. In order to secure continuous YHP coverage, enrollment in this plan must be requested prior to the beginning of the term in which the student will be on leave or, if the leave commences during the term, within thirty days of the date when the leave is granted. Coverage is not automatic; enrollment forms are available from the Member Services department of the Yale Health Service, 17 Hillhouse Avenue, 203.432.0246.

Medical Leave of Absence

A student who must interrupt study temporarily because of illness or injury may be granted a medical leave of absence with the approval of the appropriate associate dean, on the written recommendation of a physician on the staff of the University Health Services and of the student's department. Final decisions concerning requests for medical leaves will be communicated to students from their associate dean in writing.

The Graduate School reserves the right to place a student on a medical leave of absence when, on the recommendation of the director of the University Health Services or the chief of the Division of Mental Hygiene, the dean of the Graduate School determines that the student is a danger to self or others because of a serious medical problem.

The general policies governing all leaves of absence are described above. A student who is making satisfactory progress toward his or her degree requirements is eligible for a medical leave any time after matriculation. Students who are placed on a medical leave during any term will have their tuition adjusted according to the same schedule used for withdrawals (please see Schedule of Academic Dates and Deadlines). Before re-registering, a student on medical leave must secure written permission to return from a physician at the University Health Services. Advanced Ph.D. students may return at any time, with the permission of the Yale Health Plan. Forms for requesting a medical leave of absence are available at the Graduate School Student Information Office.

Students on medical leave of absence are not eligible for financial aid, including loans, or for the use of University facilities normally available to registered students. Health coverage options during a leave of absence are described on page 448. Eligible Ph.D. students will receive a Health Award from the Graduate School to cover the cost of the Student Affiliate Coverage Plan for the remainder of the term in which the leave is started, if they apply for this coverage through the Yale Health Plan within thirty days of the start of their leave. Coverage is not automatic; enrollment forms are available from the Member Services department of the Yale University Health Services, 17 Hillhouse Avenue, 203.432.0246.

Leave of Absence for Parental Responsibilities

A student who is making satisfactory progress toward his or her degree requirements and wishes to, or must, interrupt study temporarily for reasons of pregnancy, maternity or paternity care, may be granted a leave of absence for parental responsibilities. Any student planning to have or care for a child is encouraged to meet with his or her director of graduate studies and appropriate associate dean to discuss leaves and other short-term arrangements. For many students short-term arrangements, rather than a leave of absence, are possible. The general policies governing all leaves of absence are described above, including information about health coverage. A student who is making satisfactory progress toward his or her degree requirements is eligible for a leave of absence for parental responsibilities any time after matriculation.

Students on leave of absence for parental responsibilities are not eligible for financial aid, including loans, or for the use of University facilities normally available to registered students. Health coverage options during a leave of absence are described on page 448. Eligible Ph.D. students will receive a Health Award from the Graduate School to cover the cost of the Student Affiliate Coverage Plan for the remainder of the term in which the leave is started, if they apply for this coverage through the Yale Health Plan within thirty days of the start of their leave. Coverage is not automatic; enrollment forms are available from the Member Services department of the Yale Health Service, 17 Hillhouse Avenue, 203.432.0246.

Students living in University housing units are encouraged to review their housing contract and the related policies of the Graduate Housing Office before applying to the Graduate School for a leave of absence. Students granted Parental Leave may continue to reside in University Housing to the end of the academic term for which the leave was first granted, but no longer.

WITHDRAWAL AND READMISSION

A student who wishes to terminate his or her program of study should confer with the director of graduate studies and the appropriate associate dean regarding withdrawal; their signatures on an official withdrawal form are required for withdrawal in good standing. The associate dean will determine the effective date of the withdrawal, upon consultation with the department. The University identification card must be submitted with the approved withdrawal form in order for withdrawal in good standing to be recorded. Withdrawal forms are available at the Graduate School Student Information Office.

Students who fail to meet departmental or Graduate School requirements by the designated deadlines will be administratively withdrawn, unless an extension or exception has been granted by the appropriate dean or degree committee. Students who do not register for any fall or spring term, and for whom a leave of absence has not been approved by the appropriate associate dean, are considered to have withdrawn from the Graduate School.

A student who discontinues his or her program of study during the academic year without submitting an approved withdrawal form and the University identification card

will be liable for the tuition charge (or Continuous Registration Fee) for the term in which the withdrawal occurs. Tuition charges for students who withdraw in good standing will be adjusted as described in the Schedule of Academic Dates and Deadlines, pages 485–88. The Continuous Registration Fee for the term is not canceled if a student withdraws after the fourteenth day of the term. Health service policies related to withdrawal and readmission are described on page 474.

A student who has withdrawn from the Graduate School in good standing and who wishes to resume study at a later date must apply for readmission. Neither readmission nor financial aid is guaranteed to students who withdraw. The deadline for making application for readmission is January 2 of the year in which the student wishes to return to the Graduate School. The student's application will be considered by the department, which will make a recommendation for review by the appropriate associate dean. The student's remaining tuition obligation will be determined at the time of readmission. Ph.D. students who withdraw after completion of the full tuition requirement and who are subsequently readmitted will be charged the accumulated CRF up to a maximum of four terms.

Personal Conduct

Yale University is an academic community dedicated to the advancement of learning. Its members freely associate themselves with the University and in doing so affirm their commitment to a philosophy of tolerance and respect for all members of the community. They pledge to help sustain the intellectual integrity of the University and to uphold its standards of honesty, free expression, and inquiry. They are expected to abide by the regulations of the University. They are also expected to obey local, state, and federal laws, and violations of these may be cause for discipline by the Graduate School.

The Graduate School specifically prohibits the following forms of behavior by graduate students:

1. Cheating on examinations, problem sets, and any other form of test; also, falsification and/or fabrication of data.
2. Plagiarism, that is, the failure in a dissertation, essay, or other written exercise to acknowledge ideas, research, or language taken from others.
3. Misuse of the materials or facilities of the University Library.
4. Unauthorized use of University services, equipment, or facilities, such as telephones and photocopying equipment.
5. Violation of University rules for using information technology services and facilities, including computers, the University network, and electronic mail. (See *Policies for Use of Information Technology Services Facilities*.)
6. Assault on, or coercion, harassment, or intimidation of, any member of the University community, including harassment on the basis of race, religion, gender, ethnicity, or sexual orientation; sexual harassment; or the use of a teaching position to harass or intimidate another student.

7. Disruption of a legitimate function or activity of the University community, including disrupting classes and meetings, blocking entrances and exits to University buildings, unauthorized occupation of any space on the Yale campus, or preventing the free expression or dissemination of ideas. (See Report of the Committee on Freedom of Expression at Yale, pages 457–59.)
8. Refusal to comply with the direction of a University police officer or other University official, including a member of faculty, acting in the performance of her or his duties.
9. Misuse, alteration, or fabrication of University credentials or documents, such as an identification card or a transcript or grade list, including grade lists submitted by teaching fellows.
10. Misrepresentation or lying during a formal inquiry by University officials.
11. Misrepresentation in applying for admission or financial aid.
12. Theft, misuse of funds, or willful damage of University property.
13. Trespassing on University property to which access is prohibited.
14. The possession or use of explosives, incendiary devices, or weapons on or about the campus is absolutely prohibited.
15. Interference with the proper operation of safety or security devices, including fire alarms, electronic gates, and sprinkler systems.
16. Unlawful manufacture, possession, use, or distribution of illicit drugs or alcohol on University property or as part of any University activity.

Violations of any of the above regulations will be referred to the Graduate School Committee on Regulations and Discipline, composed of three graduate students, three faculty members, normally one from each division, and an associate dean. Students found guilty of such violations will be subject to one or more of the following penalties:

- Reprimand
- Probation
- Suspension
- Dismissal
- Fines
- Restriction

In addition to imposing these penalties for offenses subject to disciplinary action, the University may refer students for prosecution, and students found guilty of unlawful possession, use, or distribution of illicit drugs or alcohol on University property or as part of any University activity may be required to complete an appropriate rehabilitation program.

Copies of the procedures of the Committee on Regulations and Discipline are available at registration along with *Programs and Policies* and may also be obtained at other times from the office of each of the associate deans of the Graduate School or via the Graduate School Web site (www.yale.edu/graduateschool/academics/forms/grievanceProcedures.pdf). The deans may be consulted for further information and advice. A copy of the procedures is sent automatically to any student who is charged with a violation of the Graduate School's regulations.

Grievance Procedures

To address complaints and grievances of various kinds, the following procedures have been adopted.

Copies of the grievance procedures of the Graduate School are available at registration along with *Programs and Policies* and may also be obtained at other times from the office of each of the associate deans of the Graduate School, the Information Office, or via the Graduate School Web site (www.yale.edu/graduateschool/academics/forms/grievanceProcedures.pdf). The deans may be consulted for further information and advice.

COMPLAINTS OF SEXUAL HARASSMENT

A standing committee reviews complaints of sexual harassment brought by graduate students against administrators, faculty of the Graduate School of Arts and Sciences, other instructors of graduate students, postdoctoral appointees, or other graduate students.

THE GRADUATE SCHOOL PROCEDURE FOR STUDENT COMPLAINTS

This procedure governs any case in which a student has a complaint, including but not limited to a complaint of discrimination on the basis of race, sex, color, religion, national or ethnic origin, sexual preference, or handicap, against a member of the faculty or administration of the Graduate School. Complaints that involve a misapplication of Graduate School policy are also appropriate for consideration by the Dean's Advisory Committee on Student Grievances. Complaints that require an emendation of policy will be referred to the Graduate School Executive Committee.

PROVOST'S PROCEDURE

The Provost's Procedure governs cases in which a student has a complaint, including but not limited to a complaint of sexual harassment or of discrimination on the basis of race, sex, color, religion, national or ethnic origin, sexual preference, or handicap, against a faculty member who is not a member of the Faculty of Arts and Sciences; or against an employee who is not an administrator in the Graduate School or who is not subject to discipline by the student's dean.

Freedom of Expression

The Yale faculty has formally endorsed as an official policy of Yale University the following statement from the Report of the Committee on Freedom of Expression at Yale, published in January 1975.

The primary function of a university is to discover and disseminate knowledge by means of research and teaching. To fulfill this function a free interchange of ideas is necessary not only within its walls but with the world beyond as well. It follows that the university must do everything possible to ensure within it the fullest degree of intellectual freedom. The history of intellectual growth and discovery clearly demonstrates the need for unfettered freedom, the right to think the unthinkable, discuss the unmentionable, and challenge the unchallengeable. To curtail free expression strikes twice at intellectual freedom, for whoever deprives

another of the right to state unpopular views necessarily also deprives others of the right to listen to those views.

We take a chance, as the First Amendment takes a chance, when we commit ourselves to the idea that the results of free expression are to the general benefit in the long run, however unpleasant they may appear at the time. The validity of such a belief cannot be demonstrated conclusively. It is a belief of recent historical development, even within universities, one embodied in American constitutional doctrine but not widely shared outside the academic world, and denied in theory and in practice by much of the world most of the time.

Because few other institutions in our society have the same central function, few assign such high priority to freedom of expression. Few are expected to. Because no other kind of institution combines the discovery and dissemination of basic knowledge with teaching, none confronts quite the same problems as a university.

For if a university is a place for knowledge, it is also a special kind of small society. Yet it is not primarily a fellowship, a club, a circle of friends, a replica of the civil society outside it. Without sacrificing its central purpose, it cannot make its primary and dominant value the fostering of friendship, solidarity, harmony, civility, or mutual respect. To be sure, these are important values; other institutions may properly assign them the highest, and not merely a subordinate, priority; and a good university will seek and may in some significant measure attain these ends. But it will never let these values, important as they are, override its central purpose. We value freedom of expression precisely because it provides a forum for the new, the provocative, the disturbing, and the unorthodox. Free speech is a barrier to the tyranny of authoritarian or even majority opinion as to the rightness or wrongness of particular doctrines or thoughts.

If the priority assigned to free expression by the nature of a university is to be maintained in practice, clearly the responsibility for maintaining that priority rests with its members. By voluntarily taking up membership in a university and thereby asserting a claim to its rights and privileges, members also acknowledge the existence of certain obligations upon themselves and their fellows. Above all, every member of the university has an obligation to permit free expression in the university. No member has a right to prevent such expression. Every official of the university, moreover, has a special obligation to foster free expression and to ensure that it is not obstructed.

The strength of these obligations, and the willingness to respect and comply with them, probably depend less on the expectation of punishment for violation than they do on the presence of a widely shared belief in the primacy of free expression. Nonetheless, we believe that the positive obligation to protect and respect free expression shared by all members of the university should be enforced by appropriate formal sanctions, because obstruction of such expression threatens the central function of the university. We further believe that such sanctions should be made explicit, so that potential violators will be aware of the consequences of their intended acts.

In addition to the university's primary obligation to protect free expression there are also ethical responsibilities assumed by each member of the university community, along with the right to enjoy free expression. Though these are much more difficult to state clearly, they are of great importance. If freedom of expression is to serve its purpose and thus the purpose of the university, it should seek to enhance understanding. Shock, hurt, and anger are not consequences to be weighed lightly. No member of the community with a decent respect for others should use, or encourage others to use, slurs and epithets intended to discredit another's race, ethnic group, religion, or sex. It may sometimes be necessary in a university for civility and mutual respect to be superseded by the need to guarantee free expression. The values superseded are nevertheless important, and every member of the university community should consider them in exercising the fundamental right to free expression.

We have considered the opposing argument that behavior which violates these social and ethical considerations should be made subject to formal sanctions, and the argument that such behavior entitles others to prevent speech they might regard as offensive. Our conviction that the central purpose of the university is to foster the free access of knowledge compels us to reject both of these arguments. They assert a right to prevent free expression. They rest upon the assumption that speech can be suppressed by anyone who deems it false or offensive. They deny what Justice Holmes termed "freedom for the thought that we hate." They make the majority, or any willful minority, the arbiters of truth for all. If expression may be prevented, censored or punished, because of its content or because of the motives attributed to those who promote it, then it is no longer free. It will be subordinated to other values that we believe to be of lower priority in a university.

The conclusions we draw, then, are these: even when some members of the university community fail to meet their social and ethical responsibilities, the paramount obligation of the university is to protect their right to free expression. This obligation can and should be enforced by appropriate formal sanctions. If the university's overriding commitment to free expression is to be sustained, secondary social and ethical responsibilities must be left to the informal processes of suasion, example, and argument.

Financing Graduate School

TUITION AND FEES, 2005 – 2006

*Tuition**

Full-time study, per term	\$14,000
Full-time study in IDE, per term	14,500
Half-time study, per term	7,000
Master's programs, less than half time per term	
One-quarter time study, per term	3,500
Division of Special Registration (DSR, nondegree study)	
Course work, per course, per term (including audited courses)	3,500
Visiting Affiliated Research Graduate Students, per term	14,000
Visiting Assistants in Research, per term	1,756
Visiting Assistants in Research appointed for half-term or the summer only	878

Fees†

Continuous Registration Fee (CRF), per term (see page 451)	\$280
Special in absentia registration, per term (see pages 450 – 51)	280
YHP Hospitalization/Specialty Coverage, twelve months‡	996
YHP Prescription Plus Coverage, twelve months	396

For fees relating to registration and course enrollment see pages 447 – 48.

Appointment to a University post does not exempt a student from registration and payment of other fees. Full-time (and certain part-time) Yale managerial and professional employees and their spouses, as well as the spouses of Yale faculty, are eligible for a tuition reduction in the DSR and master's programs. They should consult the Department of Human Resources for details. Full-time faculty members and their spouses, emeritus faculty and their spouses, and University employees may audit courses without charge.

Candidates for degrees in the Graduate School, nondegree students paying full tuition, and spouses of full-time candidates for degrees in the Graduate School may audit courses without charge.

STUDENT ACCOUNTS AND BILLS

Student accounts, billing, and related services are administered through the Office of Student Financial Services, which is located at 246 Church Street. The telephone number is 203.432.2700.

* It is anticipated that tuition will be increased in subsequent years.

† It is anticipated that the Continuous Registration Fee will be increased in subsequent years.

Other fees are subject to change without notice.

‡ Hospitalization fees are for single students. Rates are higher for students needing dependent coverage.

Yale Charge Account

Students who sign and return a Yale Charge Card Account Authorization form will be able to charge designated optional items and services to their student accounts. Students who want to charge toll calls made through the University's telephone system to their accounts must sign and return this Charge Card Account Authorization. The University may withdraw this privilege from students who do not pay their monthly bills on a timely basis. For more information, contact the Office of Student Financial Services at 246 Church Street, PO Box 208232, New Haven CT 06520-8232; telephone, 203.432.2700; fax, 203.432.7557; e-mail, sfs@yale.edu.

Yale Payment Plan

The Yale Payment Plan is a payment service that allows students and their families to pay tuition, room, and board in eleven or twelve equal monthly installments beginning in April or May preceding the academic year. It is administered for the University by Academic Management Services (AMS). To enroll by telephone, call 800.635.0120. The fee to cover administration of the plan is \$65. For additional information, please contact AMS at the number above or visit their Web site at www.tuitionpay.com/.

Bills

A student may not register for any term unless all bills due for that and for any prior term are paid in full.

Bills for tuition, room, and board are mailed to the student during July and August, due and payable by September 1 for the fall term, and during the first week of November, due and payable by December 1 for the spring term. The Office of Student Financial Services will impose a late charge if any part of the term bill, less Yale-administered loans and scholarships that have been applied for on a timely basis, is not paid when due.

Nonpayment of bills and failure to complete and submit financial aid application packages on a timely basis may result in the student's involuntary withdrawal from the University.

No degrees will be conferred and no transcripts will be furnished until all bills due the University are paid in full. In addition, transcripts will not be furnished to any student or former student who is in default on the payment of a student loan.

Charge for Returned Checks

A processing charge of \$20 will be assessed for checks returned for any reason by the bank on which they were drawn. In addition, the following penalties may apply if a check is returned:

1. If the check was in payment of a term bill, a \$110 late fee will be charged for the period the bill was unpaid.
2. If the check was in payment of a term bill to permit registration, the student's registration may be revoked.
3. If the check was given in payment of an unpaid balance in order to receive a diploma, the University may refer the account to an attorney for collection.

TRANSCRIPTS

Transcripts may be ordered in writing at the Office of the Registrar for the Faculty of Arts and Sciences (246 Church Street, third floor), or faxed, with a signature, to 203.432.2334. For each transcript order, the charge for the first transcript is \$7, with a charge of \$3 for each additional transcript. Normally a transcript order is processed within forty-eight hours after receipt. In some circumstances it may be possible to provide a transcript within twenty-four hours after receipt of the order; there is an additional charge of \$10 for such requests. For overnight delivery, additional mailing charges may be imposed. www.yale.edu/sfas

FINANCIAL AID

Financial assistance is provided in the form of Yale University Fellowships, tuition fellowships, teaching fellowships, traineeships, and research assistantships. The nature of the assistance varies among the divisions and departments. Yale University Fellowships are awarded at the time of admission. Doctoral students are normally provided a level of support comparable to the fellowship awarded at admission, from the first through the fourth year of study. Eligible students in the humanities and social sciences receive University Dissertation Fellowships in their fifth or sixth year of study. Beginning in 2005–2006, eligible students in the humanities and social sciences will also receive fellowships during their fifth and sixth years of study to cover the cost of the Continuous Registration Fee.

In addition to grants and fellowships for tuition and living costs, eligible Ph.D. students receive a Health Award, which covers the full cost of single-student Yale Health Plan Hospitalization/Specialty Coverage. For those eligible Ph.D. students who elect two-person or family coverage at the Yale Health Plan, the Graduate School covers half the cost of the coverage plan (which includes both Basic Coverage and Hospitalization/Specialty Coverage for the student and his or her dependents). Students for whom a Medical Leave of Absence or a Leave of Absence for Parental Responsibilities is approved (see pages 453–54) will continue to be eligible for the Health Award for the remainder of the term in which the leave was started, if they apply for Student Affiliate coverage through the Yale Health Plan within thirty days of the start of their leave. Information about Yale Health Plan Basic Coverage, provided at no cost to students enrolled at least half-time in M.A., M.S., or Ph.D. programs, may be found on page 472.

Students who do not participate in the Yale Health Plan Hospitalization/Specialty Coverage will not be provided with Health Awards. Yale Health Plan Prescription Plus Coverage is an option that eligible students may choose to purchase for themselves and their dependents. The Prescription Plus plan is not covered by the Health Award.

Application for University Fellowship Support

Applicants for admission to the DSR and to terminal M.A. departments and programs are required to complete the financial statement contained in the application brochure.

Applicants for admission to Ph.D. departments and programs will automatically be considered for all Yale fellowships, traineeships, research assistantships, and teaching fellowships for which they are eligible. These awards of financial aid are announced in letters of admission, which are usually mailed during the month of March. Tuition assistance is not available beyond the fourth year of study. Students are strongly encouraged to seek financial support from external sources (see page 468, External Fellowships and Combined Award Policy).

University Fellowships

The Graduate School awards University Fellowships in most departments. Fellowships are awarded at admission to entering students on the basis of recommendations made by individual departments to the appropriate associate dean. Fellowship awards are based on merit.

The Graduate School provides Ph.D. students with a level of support during the second, third, and fourth years of study comparable to that awarded at admission. In most departments the source of stipend support will change after the first or second year of study to a teaching fellowship or research assistantship. If during the teaching years a student's teaching fellowship is less than the standard departmental stipend, the Graduate School provides a supplemental fellowship to bring the annual stipend/fellowship to the level of the department's standard stipend. Students in the humanities and social sciences may defer a teaching year, and the supplemental fellowship, into the fifth year (see page 441).

To assist students in the completion of their studies, the Graduate School awards Summer Study Fellowships to eligible students at the time of admission. These fellowships may be used in any of the first five summers of study. University Dissertation Fellowships are awarded during the academic year to eligible students in years four, five, or six in the humanities and social sciences.

Students awarded a University Fellowship may not accept any other award without the permission of the appropriate associate dean. The Graduate School is the final authority on University Fellowships and any combination of University funding with other sources of financial aid. It is important to note that no University Fellowships, with the exception of the Summer Study Fellowships, are awarded during the summer.

In most departments in the humanities and social sciences, the fellowship stipends of students in the third and fourth years of study will be derived from teaching fellowships. When a student teaches in the third or fourth year, the teaching fellowship will comprise the student's fellowship stipend, according to the terms of the offer of admission. Students who teach in their first or second year when such teaching is not a departmental requirement will not receive more than the amount of the standard departmental stipend from the total combined support of a University Fellowship and a teaching fellowship. When students do teach before the departmental teaching years, they are advised to take a University Fellowship rather than a teaching fellowship in the later year.

In departments where there are insufficient opportunities for undergraduate teaching, doctoral students may continue to receive fellowship stipends in their third and

fourth years of study up to the level of the standard departmental stipend. Stipend support will normally be withheld if a student in the third or fourth years refuses a teaching position or elects not to teach. Exceptions to this policy require the permission of the appropriate associate dean and the director of the Teaching Fellow Program.

Dissertation Fellowships

In addition to the substantial regular fellowships awarded to students, the Graduate School offers University Dissertation Fellowships to eligible advanced graduate students in the humanities and social sciences during their fourth, fifth, or sixth year of study. These awards are made when a student's adviser and director of graduate studies certify that the student will be engaged full-time in research and writing, is making satisfactory progress toward the degree, and has a reasonable schedule for the timely completion of the dissertation. The University Dissertation Fellowship is an academic-year fellowship and is offered exclusively during the fall and spring terms. It may never be held concurrently with a teaching fellowship of any kind. Students who accept a teaching position in the fall or spring of the year of final eligibility will forfeit that term's dissertation fellowship amount. A student may be awarded a dissertation fellowship for one year only. Students receiving external funding for dissertation research or writing may be eligible for a combined award and should consult the External Fellowships and Combined Award policy. Application materials and additional information can be obtained from the Graduate School Web site: www.yale.edu/graduateschool/financial/UDF_Form.pdf or from the appropriate associate dean.

Teaching Fellowships

TEACHING AND ADMISSION OFFERS

Letters of admission inform students of their programs' requirement for teaching. In many programs there are specific years when students teach. For example, most humanities and social science students will participate in teaching in their third and fourth years. In the natural sciences, the timing of teaching is earlier or is flexible across several years. When students are teaching as specified in their letters of admission, teaching assignments will not be adjusted in response to changes in course enrollments. Appointments for these students will change only if a course is cancelled or if the student, course instructor, and DGS all agree upon a reassignment.

Upon admission, many students receive financial aid packages that include teaching fellowships. The admission letter sets the minimum annual total stipend (including the teaching fellowship), which will be awarded even if appropriate teaching is not available or if the teaching fellowship is less than the standard departmental stipend. Such funding adjustments are made with the participation of a student's associate dean and DGS.

Teaching appointments outside those specified in the letter of admission are contingent on a graduate student's satisfactory academic progress and on sufficient course enrollment. Because the Graduate School considers teaching experience an integral part of graduate education, every effort will be made to assign students to another course at

an equivalent level if enrollments are lower than anticipated. Ph.D. students who teach in their first or second year, or when such teaching is not a departmental requirement, will receive the full teaching fellowship, plus a supplemental fellowship, bringing their combined stipend up to the level awarded in the admission letter. M.A. students will receive the full teaching fellowship; any other financial aid will be awarded according to the policies of their programs.

ACCESS TO TEACHING FELLOWSHIPS

When departments are considering applications for teaching fellowships, priority is given to qualified graduate students who are expected to teach as indicated in their letter of admission (usually in years three and four in the humanities and social sciences). Students in their fifth or sixth year of study will be permitted to teach as long as they have been admitted to candidacy and do not currently hold a dissertation fellowship. Students who are permitted to register beyond the sixth year of study may be appointed as TFs or PTAs, but only if there is no other qualified candidate available in the first six years of study in any department or program of the Graduate School. In cases where an appointing department must choose between two or more graduate students who are each well qualified to teach a particular course, the student or students who have not yet had a chance to teach or who have taught the least should be given preference.

LIMITS ON TEACHING

Except when specified in their letters of admission, first-year and second-year doctoral students may be appointed as teaching fellows only in exceptional cases, and only after prior approval by their DGS, the appropriate associate dean, and the director of the TFP. In any year of study, the maximum amount of teaching a student may do is four TF units or one PTAI per term. Students may not serve as faculty lecturers while registered in the Graduate School.

Students with outside fellowships are eligible to serve as TFs according to the policies of the Graduate School and the conditions of their outside awards.

APPOINTMENT LETTERS

The Graduate School expects that each term departments and programs will send letters of appointment to graduate students, signed by both the department and the TFP director, indicating the course in which a graduate student is expected to teach and the level of the assignment. An appointment is not official until the appointment letter has been prepared by the department or program, reviewed by the TFP, and sent to the student.

TEACHING FELLOW LEVELS

There are five levels of TFs at Yale. They are distinguished from one another by several considerations, including the kind or kinds of activity required, the approximate hours per week, and the number of students taught. For example, courses in which TFs are expected to provide frequent and intensive writing criticism, to grade problem sets or vocabulary tests frequently, or to prepare especially complicated visual or laboratory materials, may be accorded a higher-level teaching fellowship than courses that do

not carry such an expectation. A graduate student's teaching assignment is measured in terms of teaching fellow units (one unit for a term as TF 1, two units for a term as TF 2, and so on).

Teaching Fellow 1: The duties of a TF 1 are primarily (a) grading or (b) a modest combination of the following: attending class, reading, advising undergraduates, offering an occasional discussion section, helping to set up a lab, or assisting in the administrative details of a course. A TF 1 does not engage in regular classroom teaching. Approximate weekly effort, 5 hours. The 2005–2006 teaching fellowship is \$2,070 per term.

Teaching Fellow 2: A TF 2 typically leads and grades one discussion or laboratory section of up to 20 students in courses in the natural sciences and some social sciences or combines responsibilities (a) and (b) as described under TF 1. Approximate weekly effort, 10 hours. The 2005–2006 teaching fellowship is \$4,140 per term.

Teaching Fellow 3: Depending on department policy, the duties of a TF 3 may include leading and grading one or two lab or discussion sections, as in Chemistry. Alternatively, a TF 3 may be appropriate for a combination of duties that might include attending lectures, office hours and consultations, and grading, as in Psychology. Approximate weekly effort, 15 hours. The 2005–2006 teaching fellowship is \$6,210 per term.

Teaching Fellow 3.5: This appointment is appropriate for TFs who lead and grade one section in English, History of Art, the Literature major, in any literature course in the national language departments that may conform to the same mode of teaching, in courses double titled with these departments and programs, and in a few designated courses. Discussion section leaders are appointed for lecture courses with 30 or more students; a section size is expected not to exceed 18 students, with 20 the absolute maximum. This appointment is also used for Writing Intensive TFs. Approximate weekly effort, 17.5 hours. The 2005–2006 teaching fellowship is \$7,245 per term.

Teaching Fellow 4: This appointment is appropriate for TFs in humanities and social science departments where teaching fellows usually lead and grade two sections. Discussion section leaders are appointed for lecture courses with 30 or more students; a section size is expected not to exceed 18 students, with 20 the absolute maximum. Approximate weekly effort, 20 hours. The 2005–2006 teaching fellowship is \$8,280 per term.

PART-TIME ACTING INSTRUCTORS

Graduate students appointed as part-time acting instructors (PTAIs) conduct sections of introductory courses or advanced seminars, normally seminars in their special fields. Even in the case of seminars, PTAIs are supervised by faculty. In the case of multisection introductory courses, this may include the use of a common syllabus and examinations. PTAIs who teach advanced seminars must have satisfied all predissertation requirements (including the dissertation prospectus) and must be registered full time to be eligible for the appointment. Hours of effort for PTAIs will vary from one individual to another. The 2005–2006 teaching fellowship is \$8,380 per term.

Traineeships and Assistantships in Research

Traineeships (National Research Service Awards) from the National Institutes of Health are available in most of the biological sciences and in some other departments. These awards support full-time Ph.D. study by U.S. citizens, noncitizen nationals of the United States, and permanent residents. In combination with University and departmental supplements, they provide payment of tuition, a monthly stipend, and the hospitalization premium. Federal rules require that trainees pursue their research training on a full-time basis. In some instances, there is a federal payback provision, which is ordinarily satisfied by serving in health-related research or teaching at the conclusion of training. Information about this obligation and other matters relating to traineeships is available from the director of graduate studies or the principal investigator of the specific training grant in question.

Research Appointments

Graduate students in departments where the faculty receive research grants or contracts may be eligible for appointments as assistants in research (AR). In most of the science departments, advanced students are normally supported as ARs by individual faculty research grants. An assistantship in research provides a monthly salary at a rate agreed upon by the department and the Graduate School. It is understood that the work performed not only is part of the faculty principal investigator's research project but also is the student's dissertation research and therefore in satisfaction of a degree requirement. For a standard AR appointment, in addition to the salary, the grant pays half of the tuition or all of the CRF. When the appointee is eligible for a University Fellowship, the other half of tuition is covered by a fellowship.

An appointment as a project assistant (PA) is intended for a student who performs services for a research project that are not a part of the student's degree program. A project assistant may normally work no more than ten hours per week. The rate of compensation is based on the department-approved rate paid to assistants in research. With the permission of the director of graduate studies and the appropriate associate dean, a student may receive a combination of project assistant and assistant in research appointments.

Questions about AR or PA appointments should be directed to the director of graduate studies or the appropriate associate dean in the Graduate School.

SUPPLEMENTARY FELLOWSHIP AID

The Graduate School is currently able to offer a small amount of supplementary fellowship assistance to students who experience significant financial hardship at some point during their first four years of study. Students who wish to request supplemental fellowship awards should send to their associate dean a letter explaining the reasons for their request. Students requesting supplemental assistance may be asked to submit additional information about their financial status at any time thereafter until their request is considered. Requests for supplemental fellowship assistance are usually made during the spring term, and students are typically notified of decisions during the summer.

Students should note that the budget for supplementary aid is extremely modest and only requests from students in serious financial difficulty are likely to be met. Awards of supplementary aid are made for one year only.

EXTERNAL FELLOWSHIPS AND COMBINED AWARD POLICY

All current students and applicants for admission are strongly encouraged to compete for outside fellowships. These fellowships, sponsored by both public and private agencies, confer distinction on a student who wins an award in a national competition. They are often more generous than the fellowships the University is able to provide. Students must report to their associate dean any scholarship/fellowship received from an outside agency or organization.

Students are allowed to hold outside awards in conjunction with University stipends up to combined levels that are significantly higher than the normal stipend. During the nine-month academic year, the sum of the Graduate School's initial stipend award and all outside awards may total the standard department/program nine-month stipend plus \$4,000. If the sum of the Graduate School's initial stipend award and all outside awards exceeds this limit, the Graduate School stipend award will be reduced accordingly.

In humanities and social science departments, up to 3/12 of the external award may be reserved for the summer (when this is permitted by the awarding agency), prior to calculating the nine-month combined award. When outside awards include restricted funds (e.g., for tuition and/or research support), the restricted funds will not be used in calculating the combined stipend.

University Fellowship stipends awarded as a result of this formula are subject to all applicable policies, including replacement of stipends by teaching fellowships, and are awarded for the nine-month academic year. Administration of external awards is subject to rules and requirements specific to each external sponsor.

ELIGIBILITY FOR FELLOWSHIPS

Students who hold Yale-administered fellowships are required to be in residence and engaged in full-time study. Permission to hold a fellowship in absentia must be obtained from the appropriate associate dean. A student who leaves New Haven, except for short vacation periods, without having such permission may have the fellowship canceled. No fellowships will be paid for any period when a student is not registered.

Students are not eligible for stipend support from the Graduate School after six years of study, but they remain eligible for student loans as long as they are enrolled at least half-time.

A fellowship will be withdrawn and a stipend withheld if the recipient's activities become prejudicial to the purpose for which the fellowship was granted or if a student becomes ineligible to register for any reason.

OTHER MEANS OF FINANCING GRADUATE EDUCATION

Part-Time Employment

Study toward the Ph.D. degree is expected to be a full-time activity. Accordingly, part-time employment for compensation, at the University or elsewhere, should not conflict with the obligations of the Ph.D. program or interfere with academic progress.

Part-time employment beyond an average of ten hours per week requires permission of the director of graduate studies, who will inform the appropriate associate dean.

Students who hold student loans must report *all* part-time employment earnings to the Office of Financial Aid. Failure to do so may result in cancellation of the loan(s).

Loans and Work-Study

U.S. citizens may be eligible to borrow through federally subsidized loan programs. Eligibility is based on federal regulations and University policies. Information is available from the Financial Aid Office, 129 HGS.

Eligible students in the Graduate School may be able to borrow from the following federal student loan programs: Federal Stafford Loans and Federal Perkins Loans. The Graduate School also offers special “bridge loans” in the fall term to students whose financial aid is concentrated in the spring term. For full details, consult the director or associate director of finance.

The College Work-Study (CWS) program, which is federally funded, enables eligible graduate students to meet a portion of their academic year financial need through part-time employment.

All students applying for any of these federal programs must fill out a Free Application for Federal Student Aid (FAFSA). Information on loan and work-study programs is contained in *Financial Information for Entering Graduate Students* included with your letter of admission. These documents are available from the Office of Financial Aid. Information and FAFSA applications are also available at the Web site of the United States Department of Education (www.fafsa.ed.gov/).

International students are eligible to borrow from Graduate School loan funds, but normally only in the third and fourth years of study. These loans are limited in number, require a U.S. citizen as co-signer, and may not exceed \$5,000 per academic year. Because Graduate School loan funds are limited, this policy may change from year to year. Interest-bearing loans are available to international students from private lenders, but require a U.S. citizen as cosigner. International and U.S. students are eligible to borrow from the GATE Y-Loan, which does not require a co-signer. This program will allow students to borrow the full cost of their education less any other financial aid they receive. Features of the GATE Y-Loan include a low variable interest rate, no fees, a six-month grace period, a standard twenty-year level repayment stream, and no prepayment penalty. Information is available from the Financial Aid Office, 129 HGS.

TWO FEDERAL REGULATIONS GOVERNING TITLE IV FINANCIAL AID PROGRAMS

Satisfactory Academic Progress

Federal regulations require that students be making satisfactory academic progress each year in order to be eligible for Title IV funding (i.e., federal loans, Javits Fellowships, and College Work-Study). The standards by which satisfactory academic progress is measured are determined by the Graduate School and by individual departments. Verification of satisfactory progress is based on annual student evaluations from the directors of graduate studies and, for students in the dissertation stage, on a statement of progress from the student, the dissertation adviser, and the director of graduate studies.

Department of Education Refund Policy

Students receiving Title IV financial assistance who withdraw during a term and are entitled to a refund of any University charges will have their Title IV assistance adjusted according to a formula specified by the Department of Education. Please consult the Financial Aid Office in 129 HGS.

University Services and Facilities

LIVING ACCOMMODATIONS

Graduate Housing — On Campus

www.yale.edu/graduatehousing/

The Graduate Housing Department has dormitory and apartment units for a small number of graduate and professional students. Students who have accepted an offer of admission may obtain rates and access the online application at the Web site listed above. The online application is available starting April 1 of each year. As the supply of housing is limited and not guaranteed, early application is recommended. The assignment process generally starts in mid- to late April after current returning residents are offered renewals.

The Graduate Housing Department consists of two separate offices: the Graduate Dormitory Office and the Graduate Apartments Office, both located in Helen Hadley Hall, a graduate dormitory at 420 Temple Street. Office hours are from 9 A.M. to 4 P.M., Monday through Friday. For facility descriptions, floor plans, and rates, visit the Graduate Housing Web site. For further information on graduate dormitories, contact Beverly Whitney at 203.432.2167, fax 203.432.4578, or beverly.whitney@yale.edu. For graduate apartment information, contact Betsy Rosenthal at 203.432.8270, fax 203.432.0177, or betsy.rosenthal@yale.edu.

Off-Campus Listing Service

www.yale.edu/offcampuslisting

The University's Off-Campus Listing Service is an online database of rental apartments, houses, room shares, and sublets listed by private landlords and current students and staff. It is a service for current and incoming members of the Yale community that may be accessed from any computer at Yale through the Intranet or from anywhere in the world through the Internet at www.yale.edu/offcampuslisting. Use the user I.D. "housvis99" and the password "rix99" to access the site. No phone or e-mail assistance is available, as this is a self-service resource.

University Properties

www.yale.edu/universityproperties

University Properties owns and operates Yale University's nonacademic, off-campus properties in New Haven. The office is committed to enhancing the quality of life at Yale and in downtown New Haven through the development of unique retail and office environments and the revitalization of surrounding neighborhoods.

University Properties offers a variety of quality market-rate housing options to the Yale community and provides high-quality commercial space to businesses. Properties

are managed by contracted management companies chosen for their professionalism and ability to work effectively with the Yale community. Several apartment properties are leased exclusively to graduate students. Applications are accepted via the Web site listed above. As these properties are in high demand, early application is encouraged.

HEALTH SERVICES

www.yale.edu/uhs/

Yale University Health Services (YUHS) is located on campus at 17 Hillhouse Avenue. YUHS offers a wide variety of health care services for students and other members of the Yale community. Services include student medicine, obstetrics and gynecology, mental health, pediatrics, pharmacy, laboratory, radiology, a twenty-three-bed inpatient care facility (ICF), a twenty-four-hour urgent care clinic, and such specialty services as allergy, dermatology, orthopedics, and a travel clinic. Its Office of Student Health Education provides a variety of wellness programs, including de-stress days, smoking cessation, sexual health, cold and flu prevention, and family programs. YUHS also includes the Yale Health Plan (YHP), a health coverage option that coordinates and provides payment for the services outlined above, as well as for emergency treatment, off-site specialty services, inpatient hospital care, and other ancillary services, including Medex for students traveling away from campus. YUHS's services are detailed in the *YHP Student Handbook*, available through the YHP Member Services Department, 203.432.0246, or online at the Web site listed above.

Eligibility for Services

All full-time Yale degree-candidate students who are paying at least half tuition are enrolled automatically for YHP Basic Coverage. YHP Basic Coverage is offered at no charge and includes preventive health and medical services in the departments of Student Medicine, Internal Medicine, Obstetrics and Gynecology, Health Education, and Mental Hygiene. In addition, treatment for urgent medical problems can be obtained twenty-four hours a day through Urgent Care.

Students on leave of absence or on extended study and paying less than half tuition are not eligible for YHP Basic Coverage but may enroll in YHP Student Affiliate Coverage. Students enrolled in the Division of Special Registration as nondegree special students or visiting scholars are not eligible for YHP Basic Coverage but may enroll in the YHP Billed Associates Plan and pay a monthly premium. Associates must enroll for a minimum of one term within the first thirty days of affiliation with the University.

Students not eligible for YHP Basic Coverage may also use the services on a fee-for-service basis. Students who wish to be seen fee-for-service must enroll with the YHP Member Services Department. Enrollment applications for the YHP Student Affiliate Coverage, Billed Associates Plan, or Fee-for-Service Program are available from the YHP Member Services Department.

All students are welcome to use specialty and ancillary services at YUHS. Upon referral, YHP will cover the cost of these services if the student is a member of YHP Hospi-

talization/Specialty Care Coverage (see below). If the student has an alternate insurance plan, YHP will assist in submitting the claims for specialty and ancillary services to the other plan and will bill through the Office of Student Financial Services for noncovered charges and services.

Health Coverage Enrollment

The University also requires all students eligible for YHP Basic Coverage to have adequate hospital insurance coverage. Students may choose YHP Hospitalization/Specialty Coverage or elect to waive the plan if they have other hospitalization coverage, such as coverage through a spouse or parent. The waiver must be renewed annually, and it is the student's responsibility to confirm receipt of the waiver form by the University's deadlines noted below.

YHP HOSPITALIZATION/SPECIALTY COVERAGE

Students are automatically enrolled and charged a fee each term on their Student Financial Services bill for YHP Hospitalization/Specialty Coverage. Students with no break in coverage who are enrolled during both the fall and spring terms are billed each term and are covered from September 1 through August 31. For students entering Yale for the first time, readmitted students, and students returning from a leave of absence who have not been covered during their leave, YHP Hospitalization/Specialty Coverage begins on the day the dormitories officially open. A student who is enrolled for the fall term only is covered for services through January 31; a student enrolled for the spring term only is covered for services through August 31.

For a detailed explanation of this plan, see the *YHP Student Handbook*.

Waiving the YHP Hospitalization/Specialty Coverage: Students are permitted to waive YHP Hospitalization/Specialty Coverage by completing a waiver form that demonstrates proof of alternate coverage. Waiver forms are available from the YHP Member Services Department. It is the student's responsibility to report any changes in alternate insurance coverage to the YHP Member Services Department. Students are encouraged to review their present coverage and compare its benefits to those available under the YHP. The waiver form must be filed annually and must be received by September 15 for the full year or fall term or by January 31 for the spring term only.

Revoking the Waiver: Students who waive YHP Hospitalization/Specialty Coverage but later wish to be covered must complete and send a form voiding their waiver to the YHP Member Services Department by September 15 for the full year or fall term, or by January 31 for the spring term only. Students who wish to revoke their waiver during the term may do so, provided they show proof of loss of the alternate insurance plan and enroll within thirty days of the loss of this coverage. YHP premiums will not be prorated.

YHP STUDENT TWO-PERSON AND FAMILY PLANS

A student may enroll his or her lawfully married spouse or same-sex domestic partner and/or legally dependent child(ren) under the age of nineteen in one of two student

dependent plans: the Two-Person Plan or the Student Family Plan. These plans include coverage for YHP Basic Coverage and for coverage under YHP Hospitalization/Specialty Coverage. YHP Prescription Plus Coverage may be added at an additional cost. Coverage is not automatic and enrollment is by application. Applications are available from the YHP Member Services Department or can be downloaded from the YUHS Web site (www.yale.edu/uhs) and must be renewed annually. Applications must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

YHP STUDENT AFFILIATE COVERAGE

Students on leave of absence or extended study or students paying less than half tuition may enroll in YHP Student Affiliate Coverage, which includes coverage for YHP Basic and for the benefits offered under YHP Hospitalization/Specialty Coverage. Prescription Plus Coverage may also be added for an additional cost. Applications are available from the YHP Member Services Department or can be downloaded from the YUHS Web site (www.yale.edu/uhs) and must be received by September 15 for full-year or fall-term coverage, or by January 31 for spring-term coverage only.

YHP PRESCRIPTION PLUS COVERAGE

This plan has been designed for Yale students who purchase YHP Hospitalization/Specialty Coverage and student dependents who are enrolled in either the Two-Person Plan, the Student Family Plan, or Student Affiliate Coverage. YHP Prescription Plus Coverage provides protection for some types of medical expenses not covered under YHP Hospitalization/Specialty Coverage. Students are billed for this plan and may waive this coverage. The waiver form must be filed annually and must be received by September 15 for the full year or fall term or by January 31 for the spring term only. For a detailed explanation, please refer to the *YHP Student Handbook*.

Eligibility Changes

Withdrawal: A student who withdraws from the University during the first ten days of the term will be refunded the premium paid for YHP Hospitalization/Specialty Coverage and/or YHP Prescription Plus Coverage. The student will not be eligible for any YHP benefits, and the student's YHP membership will be terminated retroactive to the beginning of the term. The medical record will be reviewed, and any services rendered and/or claims paid will be billed to the student on a fee-for-service basis. At all other times, a student who withdraws from the University will be covered by YHP for thirty days following the date of withdrawal or to the last day of the term, whichever comes first. Premiums will not be prorated. Students who withdraw are not eligible to enroll in YHP Student Affiliate Coverage.

Leaves of Absence: Students who are granted leaves of absence are eligible to purchase YHP Student Affiliate Coverage during the term(s) of the leave. If the leave occurs during the term, YHP Hospitalization/Specialty Coverage will end on the date the leave is granted and students may enroll in YHP Student Affiliate Coverage. Students must

enroll in Affiliate Coverage prior to the beginning of the term during which the leave is taken or within thirty days of the start of the leave. Coverage is not automatic and enrollment forms are available at the YHP Member Services Department or can be downloaded from the YUHS Web site (www.yale.edu/uhs).

Extended Study or Reduced Tuition: Students who are granted extended study status or pay less than half tuition are not eligible for YHP Hospitalization/Specialty Coverage and YHP Prescription Plus Coverage. They may purchase YHP Student Affiliate Coverage during the term(s) of extended study. This plan includes coverage for YHP Basic and for the benefits offered under YHP Hospitalization/Specialty Coverage. Coverage is not automatic and enrollment forms are available at the YHP Member Services Department or can be downloaded from the YUHS Web site (www.yale.edu/uhs). Students must complete an enrollment application for the plan prior to the start of the term.

For a full description of the services and benefits provided by YHP, please refer to the *YHP Student Handbook*, available from the YHP Member Services Department, 203.432.0246, 17 Hillhouse Avenue, PO Box 208237, New Haven CT 06520-8237 or online at the Web site listed above.

Required Immunizations

Measles (Rubeola) and German Measles: All students who were born after December 31, 1956, are required to provide proof of immunization against measles (rubeola) and German measles (rubella). Connecticut state law requires two doses of measles vaccine. The first dose must have been given after January 1, 1969, *and* after the student's first birthday. The second dose must have been given after January 1, 1980. These doses must be at least 30 days apart. Connecticut state law requires proof of one dose of rubella vaccine administered after January 1, 1969, *and* after the student's first birthday. The law applies to all students unless they present (a) a certificate from a physician stating that such immunization is contraindicated, (b) a statement that such immunization would be contrary to the student's religious beliefs, or (c) documentation of a positive blood titer for measles and rubella.

Meningococcus (Meningitis): All students living in on-campus housing must be vaccinated against Meningococcal disease. The law went into effect in September 2002, meaning that all returning students who plan to live in University housing must be immunized or show proof of immunization within the last five years. Students who are not compliant with this law will not be permitted to register for classes or move into the dormitories for the fall term, 2004. Please note that the State of Connecticut does not require this vaccine for students who intend to reside off campus.

Students who have not met these requirements prior to arrival at Yale University must receive the immunizations from YHP at orientation and will be charged accordingly. Further information is available at the YUHS Office of Health Promotion and Education, 432-4054.

COMPUTING AND TELECOMMUNICATIONS

www.yale.edu/its/

Information Technology Services (ITS), located at 175 and 221 Whitney Avenue, is the University central computing and communications services organization, providing academic computing, data networking, telephone services, voice and video networking, computer sales, training, printing and copying services, and general user support (www.yale.edu/its/).

Student Computing of Academic Media & Technology (AMT), a unit of ITS, furnishes general purpose computing clusters at many locations on campus (www.yale.edu/cluster/), including the Graduate School's McDougal Center and the graduate student residences (Helen Hadley Hall and the Hall of Graduate Studies), where the computing facility is accessible to residents twenty-four hours a day (www.yale.edu/sc/). Windows and Apple computers and laser printers are available for open use by the Yale community at Connecticut Hall, Cross Campus Library, Dunham Laboratories, Kline Biology Tower, and the Social Sciences Statistical Laboratory.

The online purchasing site (www.yale.edu/eportal/) sells computers, networking cards, modems, and printers, as well as software and supplies. Apple, IBM, and Dell now support direct purchase of computers over the Internet, with systems properly configured for the Yale network. See the student computing site (www.yale.edu/sc/purchase) for more information and recommendations for purchasing computer supplies. Up-to-date information on pricing and on ordering can be found at the eportal Web site (www.yale.edu/eportal/). Information about computer hardware repairs can be obtained at the repair Web site (www.yale.edu/repair/) or by calling the ITS Help Desk at 203.432.9000.

Network Access to Yale Services and Beyond

www.yale.edu/networkservices/grad_prof.htm

ITS Network Services manages Yale's voice and data networks, including long distance, voice mail, operator services, cellular phones, video conference services, Internet and Internet 2 connectivity, and all the related cable and distribution facilities on Central Campus and in the Medical Center. The University provides a large, central system for e-mail, Web page hosting, and other services for the Graduate School, Yale College, and selected professional schools (www.yale.edu/computing).

Use of many of Yale's network resources requires a NetID and password. All new graduate students are automatically assigned a NetID, and all students in the Graduate School are provided with e-mail accounts.

Most rooms in on-campus residences, offices, and laboratories are equipped with Ethernet data outlets.

To enhance support for graduate student research activities, the University provides network roaming access for laptop computers. Laptop Ethernet ports and wireless Ethernet access sites are available in on-campus residences, in the McDougal Center

Common Room and 119 HGS, in the Sterling Memorial Library (SML) reading room and, for doctoral students, in the SML carrels. Wireless access points are available in many buildings on campus. Registered users can access network resources through wired or wireless connections (www.yale.edu/amt/doco/wireless/).

ITS Network Services provides on-campus telecommunications services, including local and long-distance phone service, voice mail, and operator services, as well as basic cable TV service in on-campus residences. Long-distance service for telephones on campus is available through the University's private network, YALENET. On-campus long-distance or toll calls require a toll authorization number (TAN), which can be arranged through the telecommunications office as well as through departmental offices. Phone cards and personal calling cards may also be used. YALENET calling cards are available to address off-campus needs.

OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS

www.oiss.yale.edu/

The Office of International Students and Scholars (OISS) coordinates services and support to Yale's international students, faculty, staff, and their dependents. OISS assists members of the Yale international community with all matters of special concern to them and serves as a source of referral to other university offices and departments. OISS staff provide assistance with employment, immigration, personal and cultural adjustment, and family and financial matters, as well as serve as a source of general information about living at Yale and in New Haven.

In addition, as Yale University's representative for immigration concerns, OISS provides information and assistance to students, staff, and faculty on how to obtain and maintain legal status in the United States. OISS issues the visa documents needed to request entry into the United States under Yale's immigration sponsorship and processes requests for extensions of authorized periods of stay in the United States, school transfers, and employment authorization. Beginning in fall of 2005, Yale University will pay the \$100 SEVIS Fee for all new degree-seeking students coming to the U.S. in F-1 or J-1 student status.

All international students and scholars must register with OISS as soon as they arrive at Yale, at which time OISS will provide information about orientation activities for newly arrived students, scholars, and family members. OISS programs, like the monthly international coffee hours, daily English conversation groups, and receptions for newly arrived graduate students, postdocs, and visiting scholars, provide an opportunity to meet members of Yale's international community and become acquainted with the many resources of Yale University and New Haven.

OISS maintains an extensive Web site (www.oiss.yale.edu) with useful information for students and scholars prior to and upon arrival in New Haven. As U.S. immigration regulations are complex and change rather frequently, we urge international students and scholars to visit the office and check the Web site for the most recent updates.

International students, scholars, and their families and partners can get connected with OISS and the international community at Yale by subscribing to the following e-mail lists: (1) OISS-L, the OISS electronic newsletter for Yale's international community; (2) Yale International E-Group, an interactive list through which over 2,000 international students and scholars connect to find roommates, rent apartments, sell cars and household goods, find companions, and keep each other informed about events in the area; (3) The ISPY E-Group, an interactive list of over 300 members to connect spouses, partners, and families at Yale. To subscribe to any of these lists, send a message to oiss@yale.edu.

The Office of International Students and Scholars, located at 246 Church Street, Suite 201, is open Monday through Friday from 8.30 A.M. to 5 P.M., except Tuesday, when the office is open from 10 A.M. to 5 P.M.

INTERNATIONAL STUDENT LIFE

In addition to the standard funding package for Ph.D. candidates, the Graduate School provides a number of resources specifically to international students. Among the most important of these is improved language training, both oral and written. The English Language Institute currently offers a six-week intensive summer language program in English as a Second Language (ESL). The School has also expanded the total number of ESL courses available throughout the academic year, including a conversation partners program and an advanced writing program, as well as the number of language fellowships available to graduate students interested in this program.

The McDougal Graduate Student Center (www.yale.edu/graduateschool/studentLife) provides services, programs, and facilities for all graduate students and facilitates student services that are particularly helpful for international students adjusting to life in New Haven. The center provides an extensive weeklong orientation program for all new students, including several events for new international students in cooperation with the Office of International Students and Scholars. Incoming international students also are offered an informal buddy system called the "international student mentor program" that pairs them with current students for friendship and informal advising prior to and upon arrival in New Haven. The center's staff and graduate fellows also provide special programs of interest to international students throughout the year, including foreign language films, social events, monthly international coffee hours, arts and music outings, workshops on cultural adjustment, safety, and health, and professional development seminars on careers, teaching, and writing. The McDougal Student Life Office co-sponsors and supports the activities of many graduate student nationality groups and intercultural performance groups.

RESOURCE OFFICE ON DISABILITIES

www.yale.edu/rod/

The Resource Office on Disabilities facilitates accommodations for undergraduate and graduate and professional school students with disabilities who register with and have appropriate documentation on file in the Resource Office. Early planning is critical. Documentation may be submitted to the Resource Office even though a specific accommodation request is not anticipated at the time of registration. It is recommended that matriculating students in need of disability-related accommodations at Yale University contact the Resource Office by June 1. Returning students must contact the Resource Office at the beginning of each term to arrange for course and exam accommodations.

The Resource Office also provides assistance to students with temporary disabilities. General informational inquiries are welcome from students and members of the Yale community and from the public. The mailing address is Resource Office on Disabilities, Yale University, PO Box 208305, New Haven CT 06520-8305. The Resource Office is located in William L. Harkness Hall (WLH), Rooms 102 and 103. Access to the Resource Office is through the College Street entrance to WLH. Office hours are Monday through Friday, 8.30 A.M. to 4.30 P.M. Voice callers may reach staff at 203.432.2324; TTY/TDD callers at 203.432.8250. The Resource Office may also be reached by e-mail (judith.york@yale.edu) or through its Web site (www.yale.edu/rod/).

Life at Yale

RELIGIOUS LIFE AT YALE

www.yale.edu/chaplain

The religious resources of Yale University serve all students, faculty, and staff. These resources are the University Chaplaincy (located on the lower level of Bingham Hall on Old Campus), which oversees University public worship weekly in Battell Chapel, and Yale Religious Ministry, the on-campus association of clergy and nonordained representatives of various religious faiths. The ministry includes the Chapel of St. Thomas More, the parish church for all Roman Catholic students at the University; the Joseph Slifka Center for Jewish Life at Yale, a religious and cultural center for students of the Jewish faith; several Protestant denominational ministries and nondenominational groups; and religious groups such as the Baha'i Association, the New Haven Zen Center, and the Muslim Student Association. Additional information is available at 203.432.1128 or by visiting the Web site listed above.

CULTURAL OPPORTUNITIES

A calendar listing the broad range of events at the University is issued weekly during the academic year in the *Yale Bulletin & Calendar*. The hours when special exhibitions and the University's permanent collections are open to the public are also recorded in this publication. Free copies of the *Yale Bulletin & Calendar* are available at many locations throughout the campus, and the paper is sent via U.S. Mail to subscribers; for more information, call 203.432.1316. The paper and Web calendar are also available online at www.yale.edu/opa/yb&c.

The Yale Peabody Museum of Natural History (www.yale.edu/peabody) contains collections in anthropology, mineralogy, oceanography, paleontology, and some aspects of geology.

The Yale University Art Gallery (www.yale.edu/artgallery) contains representative collections of ancient, medieval, and Renaissance art, Near and Far Eastern art, archaeological material from the University's excavations, Pre-Columbian and African art, works of European and American masters from virtually every period, and a rich collection of modern art. The landmark Louis I. Kahn building is closed for a two-year renovation. The hub of the museum's activities during this period will be the adjacent Swartwout building, housing Yale's world-renowned collections of American paintings, sculpture, and decorative arts, as well as a selection of masterworks from all other departments.

The Yale Center for British Art (www.yale.edu/ycba) houses an extraordinary collection of British paintings, sculpture, drawings, and books given to the University by the late Paul Mellon, Yale Class of 1929.

There are more than eighty endowed lecture series held at Yale each year on subjects ranging from anatomy to theology, and including virtually all disciplines.

More than four hundred musical events take place at the University during the academic year. These include concerts presented by students and faculty of the School of Music, the Department of Music, the Yale Concert and Jazz bands, the Yale Glee Club, the Yale Symphony Orchestra, and other undergraduate and graduate singing and instrumental groups. In addition to graduate recitals and ensemble performances, the School of Music features the Philharmonia Orchestra of Yale, the Chamber Music Society at Yale, the Duke Ellington Series, the Horowitz Piano Series, Great Organ Music at Yale, New Music New Haven, Yale Opera performances and public master classes, and the Faculty Artist Series. Among New Haven's numerous performing organizations are Orchestra New England, the New Haven Chorale, and the New Haven Symphony Orchestra.

For theatergoers, Yale and New Haven offer a wide range of dramatic productions at the University Theatre, Yale Repertory Theatre, Yale Cabaret, Long Wharf Theatre, Palace Theater, and Shubert Performing Arts Center.

ATHLETIC FACILITIES

<http://yalebulldogs.ocsn.com>

The Payne Whitney Gymnasium is one of the most elaborate and extensive indoor athletic facilities in the world. This complex includes the 3,100-seat John J. Lee Amphitheater, the site for many indoor varsity sports contests; the Robert J. H. Kipphut Exhibition Pool; the Brady Squash Center, a world-class facility with fifteen international-style courts; the Adrian C. Israel Fitness Center, a state-of-the-art exercise and weight-training complex; the Colonel William K. Lanman, Jr. Center, a 30,000-square-foot space for recreational/intramural play and varsity team practice; the Greenberg Brothers Track, an eighth-mile indoor jogging track; and other rooms devoted to fencing, gymnastics, rowing, wrestling, martial arts, general exercise, and dance. Numerous physical education classes in dance, martial arts, aerobic exercise, and sport skills are offered throughout the year. Graduate and professional school students may use the gym at no charge. Academic and summer memberships at reasonable fees are available for faculty, employees, postdoctoral and visiting fellows, student spouses, and unmarried domestic partners.

The David S. Ingalls Rink, the Sailing Center in Branford, the Outdoor Education Center (OEC), the tennis courts, and the golf course are open to faculty, students, and employees of the University at established fees. Ingalls Rink has public skating Monday through Thursday from 11.30 A.M. to 12.45 P.M. and on weekends as the training schedule permits. Up-to-date information on hours is available at 203.432.0875. Skate sharpening is available daily; however, skate rentals are not available.

Approximately thirty-five club sports and outdoor activities come under the jurisdiction of the Office of Outdoor Education and Club Sports. Many of the activities, both

purely recreational and instructional, are open to graduate and professional school students. Students, faculty, staff, and alumni, as well as groups, may use the Outdoor Education Center (OEC). The center consists of two thousand acres in East Lyme, Connecticut, and includes cabins, campsites, pavilion, dining hall, swimming, boating, canoeing, and picnic groves beside a mile-long lake. Hiking trails surround a wildlife marsh. The OEC season extends from the third weekend in June through Labor Day and September weekends. For more information, telephone 203.432.2492 or visit the Web page at <http://yalebulldogs.ocsn.com/> (click on Sports Rec, then on Outdoor Education).

Throughout the year, Yale University graduate and professional school students have the opportunity to participate in numerous intramural sports activities. The McDougal Sports Program coordinates and promotes the intramural programs for students in the Graduate School. These seasonal, team-oriented activities include volleyball, soccer, and softball in the fall; basketball and volleyball in the winter; softball, soccer, and volleyball in the spring; and softball in the summer. With few exceptions, all academic-year graduate-professional student sports activities are scheduled on weekends, and most sports activities are open to competitive, recreational, and coeducational teams. More information is available from the Intramurals Office in Payne Whitney Gymnasium, 203.432.2487, or online at <http://yalebulldogs.ocsn.com/>.

The Work of Yale University

The work of Yale University is carried on in the following schools:

Yale College: Courses in humanities, social sciences, natural sciences, mathematical and computer sciences, and engineering. Bachelor of Arts (B.A.), Bachelor of Science (B.S.).

For additional information, please write to the Office of Undergraduate Admissions, Yale University, PO Box 208234, New Haven CT 06520-8234; telephone, 203.432.9300; e-mail, undergraduate.admissions@yale.edu; Web site, www.yale.edu/admit/

Graduate School of Arts and Sciences: Courses for college graduates. Master of Arts (M.A.), Master of Engineering (M.Eng.), Master of Science (M.S.), Master of Philosophy (M.Phil.), Doctor of Philosophy (Ph.D.).

For additional information, please write to the Office of Graduate Admissions, Yale Graduate School of Arts and Sciences, PO Box 208323, New Haven CT 06520-8323; telephone, 203.432.2771; e-mail, graduate.admissions@yale.edu; Web site, www.yale.edu/graduateschool/

School of Medicine: Courses for college graduates and students who have completed requisite training in approved institutions. Doctor of Medicine (M.D.). Postgraduate study in the basic sciences and clinical subjects. Combined program with the Graduate School of Arts and Sciences leading to Doctor of Medicine and Doctor of Philosophy (M.D./Ph.D.). Courses in public health for qualified students. Master of Public Health (M.P.H.), Master of Medical Science (M.M.Sc.) from the Physician Associate Program.

For additional information, please write to the Director of Admissions, Office of Admissions, Yale University School of Medicine, 367 Cedar Street, New Haven CT 06510; telephone, 203.785.2643; fax, 203.785.3234; e-mail, medical.admissions@yale.edu; Web site, <http://info.med.yale.edu/education/admissions/>

For additional information about the Department of Epidemiology and Public Health, an accredited School of Public Health, please write to the Director of Admissions, Yale School of Public Health, PO Box 208034, New Haven CT 06520-8034; e-mail, eph.admissions@yale.edu; Web site, <http://publichealth.yale.edu/>

Divinity School: Courses for college graduates. Master of Divinity (M.Div.), Master of Arts in Religion (M.A.R.). Individuals with an M.Div. degree may apply for the program leading to the degree of Master of Sacred Theology (S.T.M.).

For additional information, please write to the Admissions Office, Yale Divinity School, 409 Prospect Street, New Haven CT 06511; telephone, 203.432.5360; fax, 203.432.7475; e-mail, divinityadmissions@yale.edu; Web site, www.yale.edu/divinity/. Online application, <http://apply.embark.com/grad/yale/divinity/>

Law School: Courses for college graduates. Juris Doctor (J.D.). For additional information, please write to the Admissions Office, Yale Law School, PO Box 208329, New Haven CT 06520-8329; telephone, 203.432.4995; e-mail, admissions.law@yale.edu; Web site, www.law.yale.edu/

Graduate Programs: Master of Laws (LL.M.), Doctor of the Science of Law (J.S.D.), Master of Studies in Law (M.S.L.). For additional information, please write to Graduate Programs, Yale Law School, PO Box 208215, New Haven CT 06520-8215; telephone, 203.432.1696; e-mail, gradpro.law@yale.edu; Web site, www.law.yale.edu/

School of Art: Professional courses for college and art school graduates. Master of Fine Arts (M.F.A.).

For additional information, please write to the Office of Academic Affairs, Yale University School of Art, PO Box 208339, New Haven CT 06520-8339; telephone, 203.432.2600; e-mail, artschool.info@yale.edu; Web site, www.yale.edu/art/

School of Music: Graduate professional studies in performance, composition, and conducting. Certificate in Performance, Master of Music (M.M.), Master of Musical Arts (M.M.A.), Artist Diploma, Doctor of Musical Arts (D.M.A.).

For additional information, please write to the Yale School of Music, PO Box 208246, New Haven CT 06520-8246; telephone, 203.432.4155; fax, 203.432.7448; e-mail, gradmusic.admissions@yale.edu; Web site, www.yale.edu/music/

School of Forestry & Environmental Studies: Courses for college graduates. Master of Forestry (M.F.), Master of Forest Science (M.F.S.), Master of Environmental Science (M.E.Sc.), Master of Environmental Management (M.E.M.), Doctor of Philosophy (Ph.D.).

For additional information, please write to the Office of Academic Services, Yale School of Forestry & Environmental Studies, 205 Prospect Street, New Haven CT 06511; telephone, 800.825.0330 or 203.432.5100; e-mail, fesinfo@yale.edu; Web site, www.yale.edu/environment/

School of Architecture: Courses for college graduates. Professional degree: Master of Architecture (M.Arch.); nonprofessional degree: Master of Environmental Design (M.E.D.).

For additional information, please write to the Yale School of Architecture, PO Box 208242, New Haven CT 06520-8242; telephone, 203.432.2296; e-mail, gradarch.admissions@yale.edu; Web site, www.architecture.yale.edu/

School of Nursing: Courses for college graduates. Master of Science in Nursing (M.S.N.), Post Master's Certificate, Doctor of Nursing Science (D.N.Sc.).

For additional information, please write to the Yale School of Nursing, PO Box 9740, New Haven CT 06536-0740; telephone, 203.785.2389; Web site, <http://nursing.yale.edu/>

School of Drama: Courses for college graduates and certificate students. Master of Fine Arts (M.F.A.), Certificate in Drama, One-year Technical Internship (Certificate), Doctor of Fine Arts (D.F.A.).

For additional information, please write to the Registrar's Office, Yale School of Drama, PO Box 208325, New Haven CT 06520-8325; telephone, 203.432.1507; Web site, www.yale.edu/drama/

School of Management: Courses for college graduates. Professional degree: Master of Business Administration (M.B.A.).

For additional information, please write to the Admissions Office, Yale School of Management, PO Box 208200, 135 Prospect Street, New Haven CT 06520-8200; telephone, 203.432.5932; fax, 203.432.7004; e-mail, mba.admissions@yale.edu; Web site, www.mba.yale.edu/

Schedule of Academic Dates and Deadlines

FALL TERM 2005

Monday, August 22	New student orientation week begins.
Wednesday, August 24	SPEAK test for new international students in Ph.D. programs.
Thursday, August 25	Matriculation ceremony.
Friday, August 26	Fall-term Online Course Selection (OCS) begins. Orientation in departments for all new students begins.
Monday, August 29	Orientation for all new teaching fellows.
Tuesday, August 30	Registration for returning students begins.
Wednesday, August 31	Fall-term classes begin, 8:30 A.M.
Friday, September 2	Final day to pick up registration materials from academic departments.
Monday, September 5	Labor Day; classes meet. Administrative offices closed.
Friday, September 9	Final day to apply for a fall-term <i>personal leave of absence</i> . The entire fall-term tuition charge or Continuous Registration Fee (CRF) will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>leave of absence</i> effective on or before this date.
Wednesday, September 14	Fall-term online course selection (OCS) ends. Final day for registration. <i>A fee of \$25 is assessed for course schedules submitted after this date.</i>
Friday, September 23	One-half of the fall-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>medical leave of absence</i> effective on or before this date <i>The CRF is not prorated.</i>
Monday, October 3	Final date for the faculty to submit grades to replace Temporary Incompletes (TIs) awarded during the 2004–2005 academic year.

	Due date for dissertations to be considered by the degree committees for award of the Ph.D. in December.
	Final day to file petitions for degrees to be awarded in December.
Friday, October 21	Midterm. Final day to add a fall-term course. One-quarter of the fall-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>medical leave of absence</i> effective on or before this date. <i>The CRF is not prorated.</i> Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date.
Friday, November 4	Readers' reports are due for dissertations to be considered by the Degree Committees for award of the Ph.D. in December. Final day to change enrollment in a fall-term course from Credit to Audit or from Audit to Credit.
Friday, November 11	Departmental recommendations are due for candidates for December degrees. Final day to withdraw a degree petition for degrees to be awarded in December. Final day to withdraw from a fall-term course.
Thursday, November 17	SPEAK test for international students in Ph.D. programs.
Friday, November 18	Fall recess begins, 5.20 P.M.
Monday, November 28	Classes resume, 8.30 A.M.
Friday, December 9	Classes end, 5.20 P.M. Final grades for fall-term courses are due for candidates for terminal M.A. and M.S. degrees to be awarded in December.
Saturday, December 17	Fall term ends; winter recess begins.

SPRING TERM 2006

Monday, January 9	Registration and spring ID validation begin. Spring-term classes begin, 8.30 A.M.
Wednesday, January 11	Final grades for fall-term courses due.
Friday, January 13	Friday classes do not meet. Monday classes meet instead.
Monday, January 16	Martin Luther King, Jr. Day. Administrative offices closed. Classes do not meet.
Friday, January 20	Registration and spring ID validation end. Spring-term online course selection (OCS) ends. Final day for registration. <i>A fee of \$25 is assessed for forms submitted after this date.</i> Final day to apply for a spring-term <i>personal leave of absence</i> . The entire spring-term tuition charge or CRF will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>leave of absence</i> effective on or before this date.
Friday, February 3	One-half of the spring-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>medical leave of absence</i> effective on or before this date. <i>The CRF is not prorated.</i>
Friday, March 3	Midterm. Spring recess begins, 5.20 P.M. Final day to add a spring-term course. One-quarter of the spring-term full-tuition charge will be canceled for students who withdraw from the Graduate School on or before this date or who are granted a <i>medical leave of absence</i> effective on or before this date. <i>The CRF is not prorated.</i> Teaching appointments will not appear on the transcripts of students who withdraw from the assignment on or before this date.

Wednesday, March 15	Due date for dissertations to be considered by the Degree Committees for award of the Ph.D. in May. Final day to file petitions for degrees to be awarded in May.
Monday, March 20	Classes resume, 8.30 A.M.
Monday, March 27	Final day to change enrollment in a spring-term course from Credit to Audit <i>or</i> from Audit to Credit. Final day to withdraw from a spring-term course.
Friday, April 14	Good Friday; classes meet.
Monday, April 17	Readers' reports are due for dissertations to be considered by the degree committees for award of the Ph.D. in May.
Thursday, April 20	SPEAK test for international students in Ph.D. programs.
Monday, April 24	Monday classes do not meet. Friday classes meet instead.
Wednesday, April 26	Departmental recommendations are due for candidates for May degrees.
Friday, April 28	Final day to withdraw a degree petition for degrees to be awarded in May.
Monday, May 1	Classes end, 5.20 P.M. Final day to submit Dissertation Progress Reports and Petitions for Extended Registration.
Tuesday, May 9	Spring term ends.
Friday, May 12	Final grades for spring-term courses are due for candidates for M.A. and M.S. degrees to be awarded at Commencement.
Sunday, May 21	Graduate School Convocation.
Monday, May 22	University Commencement.
Monday, May 29	Final grades for spring-term courses and full-year courses are due.

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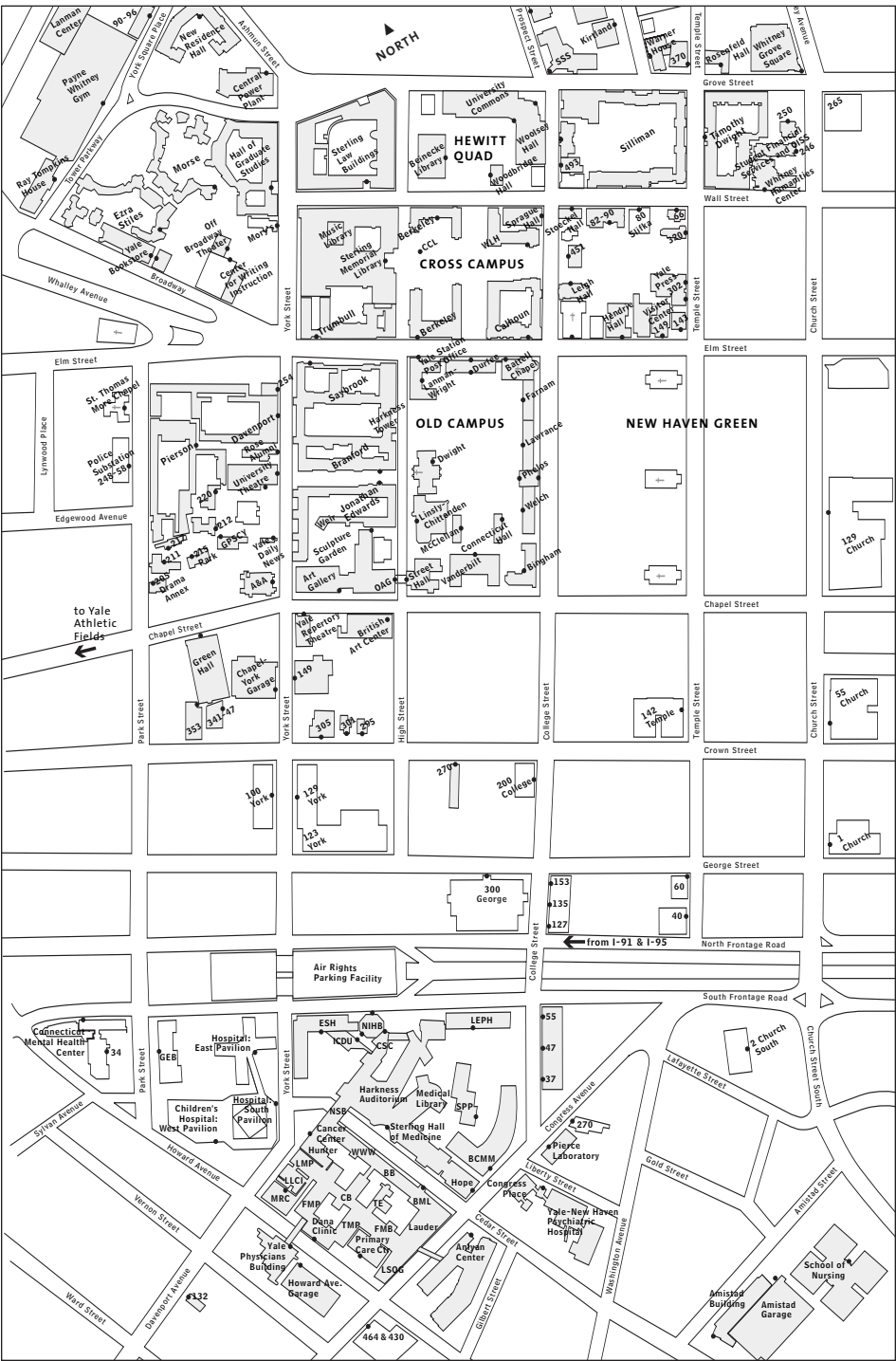
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YALE UNIVERSITY CAMPUS SOUTH & YALE MEDICAL CENTER



The University is committed to basing judgments concerning the admission, education, and employment of individuals upon their qualifications and abilities and affirmatively seeks to attract to its faculty, staff, and student body qualified persons of diverse backgrounds. In accordance with this policy and as delineated by federal and Connecticut law, Yale does not discriminate in admissions, educational programs, or employment against any individual on account of that individual's sex, race, color, religion, age, disability, status as a special disabled veteran, veteran of the Vietnam era, or other covered veteran, or national or ethnic origin; nor does Yale discriminate on the basis of sexual orientation.

University policy is committed to affirmative action under law in employment of women, minority group members, individuals with disabilities, special disabled veterans, veterans of the Vietnam era, and other covered veterans.

Inquiries concerning these policies may be referred to Valerie O. Hayes, Director of the Office for Equal Opportunity Programs, 104 William L. Harkness Hall, 203.432.0849.

In accordance with both federal and state law, the University maintains information concerning current security policies and procedures and prepares an annual crime report concerning crimes committed within the geographical limits of the University. Upon request to the Office of the Secretary of the University, PO Box 208230, New Haven CT 06520-8230, 203.432.2310, the University will provide such information to any applicant for admission.

In accordance with federal law, the University prepares an annual report on participation rates, financial support, and other information regarding men's and women's intercollegiate athletic programs. Upon request to the Director of Athletics, PO Box 208216, New Haven CT 06520-8216, 203.432.1414, the University will provide its annual report to any student or prospective student.

Offices Serving Graduate Students

POLICE EMERGENCY: Dial III from any University telephone

HEALTH EMERGENCY: 432.0123

GRADUATE HOUSING OFFICE: 432.2167

420 Temple Street (Information about all housing for graduate students)

GRADUATE-PROFESSIONAL STUDENT CENTER: 432.2638

204 York Street (GYPSY bar; social activities)

GRADUATE-PROFESSIONAL STUDENT SENATE: 432.2632

204 York Street (Forum for discussion and representation of graduate and professional student concerns.)

GRADUATE STUDENT ASSEMBLY: 432.8893; www.yale.edu/assembly

GRADUATE STUDENT DOSSIER SERVICE: 432.8850

320 York Street (Maintains dossier files.)

OFFICE OF INTERNATIONAL STUDENTS AND SCHOLARS: 432.2305

246 Church Street (Assists all international students and scholars with immigration matters.)

OFFICE OF STUDENT FINANCIAL SERVICES: 432.2700

246 Church Street (Processes bills for tuition and other fees, disburses loans administered by the Graduate School.)

PAYROLL DEPARTMENT: 432.5408

155 Whitney Avenue (Disburses fellowship, traineeship, and assistantship stipends.)

STUDENT EMPLOYMENT OFFICE: 432.0167

246 Church Street (Assists students in obtaining part-time employment both inside and outside the University.)

STUDENT LOAN OFFICE: 432.2727

246 Church Street (Processes federal loans authorized by the Graduate School Financial Aid Office. Handles questions about repayment of student loans.)

UNIVERSITY HEALTH SERVICE: 432.0246 [urgent visit: 432.0123]

17 Hillhouse Avenue (Concerned with all health problems of member students and dependents. 24-hour coverage for emergency problems is available throughout the calendar year.)

UNIVERSITY POLICE: 432.4400

Phelps Gateway, Old Campus (Any student arrested by the New Haven Police Department for other than minor traffic violation should immediately contact the Chief of the University Police Dept. at 432.4407.)

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