

Graduate School of Arts and Sciences

Programs and Policies

2004–2005



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Series 100 Number 10 August 20, 2004

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Cover: Hall of Graduate Studies brick, honoring Wilbur Lucius Cross, dean of the Graduate
School from 1916 to 1930. Photo by Michael Marsland.

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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 (June 2005)*.

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*.

Holcombe Tucker Green, Jr., B.A., LL.B., *Atlanta, Georgia*.

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)*.

Linda Anne Mason, B.A., M.B.A., *Belmont, Massachusetts*.

The Rt. Rev. Victoria Matthews, B.A., M.DIV., TH.M., *Edmonton, Alberta, Canada*.

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

Susan Hockfield, B.A., PH.D.

Vice President and Secretary

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Vice President for Finance and Administration

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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*

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

Anita De Palma, B.S., *Assistant Director, Teaching Fellow Program*

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*

TBA, *Associate Director, Science Education, Graduate Teaching Center*

TBA, *Assistant Director of Admissions*

Calendar*

FALL 2004

August 23	Monday	New student orientation begins
August 25	Wednesday	SPEAK test for international students in Ph.D. programs
August 26	Thursday	Matriculation ceremony
August 27	Friday	Registration and orientation in departments for <i>all</i> new students begins
August 31	Tuesday	Registration and fall ID validation for returning students begins
		Orientation for all new teaching fellows
<i>September 1</i>	<i>Wednesday</i>	<i>Fall-term classes begin, 8.30 A.M.</i>
September 15	Wednesday	Registration ends, 4.30 P.M.
October 22	Friday	Midterm
November 19	Friday	Fall recess begins, 5.20 P.M.
November 29	Monday	Classes resume, 8.30 A.M.
<i>December 18</i>	<i>Saturday</i>	<i>Fall term ends</i>
		Winter recess begins

SPRING 2005

January 10	Monday	Spring-term registration begins
		<i>Spring-term classes begin, 8.30 A.M.</i>
March 4	Friday	Midterm
		Spring recess begins, 5.20 P.M.
March 21	Monday	Classes resume, 8.30 A.M.
<i>May 10</i>	<i>Tuesday</i>	<i>Spring term ends</i>
May 22	Sunday	Graduate School Convocation
May 23	Monday	University Commencement

*A more extensive Schedule of Academic Dates and Deadlines is presented on pages 458–61.

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. The divisions encompass seventy-four departments and programs, fifty-six of which offer courses of study leading to the Ph.D. degree. There are twenty-two 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 2,300 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 faculty 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 452 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 400–3.

Yale Center for the Study of Globalization

See the description on pages 403–4.

Office of International Students and Scholars (OISS)

See the description on page 451.

YALE WORLD FELLOWS PROGRAM

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. Web site: www.yale.edu/worldfellows/.

“YALE AND THE WORLD” ON THE WEB

“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: <http://world.yale.edu/>.

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

The associate dean for administration and student services oversees the offices of Admissions, Finance and Administration, Graduate Career Services, Student Life, and the Graduate Teaching Center. He serves as a liaison to the registrar and Office of Public Affairs, and assists in planning and program development.

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; and Spanish and Portuguese

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 within 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

TBA, 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 pages 430–31).

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 pages 430–31).

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 428–31).

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 410–20. 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 *2004 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

Paul Gilroy

Director of Graduate Studies

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

Professors

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

Associate Professors

Elizabeth Alexander, Kamari Clarke, Jonathan Holloway, 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, Seth Silberman, 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, 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 Late Twentieth Century (AFAM 505a/AMST 643a/SOCY 644a), which is a required course for all *first-year* graduate students in the combined program; (2) Readings in African American History to Emancipation (AFAM 758a/AMST 706a/HIST 708a) and/or Readings in Southern History since 1865 (AFAM 721b/AMST 735b/HIST 731b); (3) Intersecting Identities: Nation, Race, and Gender (AFAM 809a/PLSC 813a) and/or Modernity and Its Others: Self, Subject, and Cultural Differences (AFAM 712b/SOCY 650b); (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 416.

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 410–21.

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 Late Twentieth Century. Paul Gilroy.

T 9.30–11.20

A designated core course for students in the joint Ph.D. program; also open to students in American Studies and Sociology. The interdisciplinary seminar includes readings from the fields of anthropology, critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AMST 643a, SOCY 644a.*

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. Ezra Griffith.

W 2.30–4.20

A comparative analysis of several methodologies used by writers to recount the story of a black life. Systematic attention is given to the framework established by Erik Erikson and Daniel Levinson to study single life development. Then this framework is applied to the study of black autobiographies, biographies (e.g., Charles Hamilton's *Adam Clayton Powell, Jr.*), and other genres of storytelling as seen, for example, in Sarah Lawrence-Lightfoot's *I've Known Rivers*, James Comer's *Maggie's American Dream*, and James McBride's *The Color of Water*. The strengths and weaknesses of these different techniques of black single life study are considered.

[AFAM 557a^U, Introduction to Jazz Studies.]

[AFAM 562a^U, Miles Davis.]

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 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 AMST 921a, ENGL 921a.

AFAM 573a, Transnationalism, Modernity, and Diaspora. Kamari Clarke.

W 3.30–5.20

As anthropologists continue to grapple with changing notions of “the field” from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic context. Drawing on a range of ideas from world systems theories of globalization and notions of the invention of diasporas, to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes. These processes disrupt the once-homogenizing tendencies of ethnography and instead push us to examine different criteria for analyzing and constructing communities. Also AFST 695a, ANTH 595a.

AFAM 588a^U, Autobiography in America. Robert Stepto.

T 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 710a^U.

[AFAM 590b, Race, Gender, and the Culture Industry in Twentieth-Century America.]

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

T 1.30–3.20

This seminar examines both nineteenth- and twentieth-century African American literary texts, and while students gain a comprehensive understanding of the breadth of the field, we focus on several key issues or “problems” central to the study of African American literary history. We read variously from slave narratives, autobiographies, poetry, novels, nonfiction essays, and anthologies, joining close readings of literary texts with the interdisciplinary contexts of history, cultural criticism and theory, and other art forms. Also AMST 651b.

AFAM 596a^U, Twentieth-Century African American Poetry. Elizabeth Alexander.

T 3.30–5.20

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, Robert Hayden. Also AMST 653a^U.

[AFAM 657b, Globalization, Religious Nationalism, and Rethinking Human Rights.]

AFAM 687a, Race and Races in American Studies. Matthew Jacobson.

M 1.30–3.20

This reading-intensive seminar examines influential scholarship across the disciplines on “race” and racialized relations in American culture and society. Major topics include the cultural construction of race; race as both an instrument of oppression and an idiom of resistance in American politics; the centrality of race in literary, anthropological, and legal discourse; the racialization of U.S. foreign policy; “race mixing”; vicissitudes of “whiteness” in American political culture; and “race” in the realm of popular cultural representation. A lengthy review essay due at the end of the term gives students a chance to explore in depth the themes, periods, and methods which most interest them. Also AMST 701a, HIST 751a.

**AFAM 709a, Research in Twentieth-Century American Political and Social History.
Glenda Gilmore.**

W 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 709a, HIST 736a.*

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

**AFAM 712b, Modernity and Its Others: Self, Subject, and Cultural Differences.
Paul Gilroy.**

T 9.30–11.20

This social theory course explores aspects of the political, philosophical, and sociological debates that have emerged around the concept of modernity. It looks particularly at articulations of modernity and “race” following four interlinked lines of inquiry: how has the subject of modernity been imagined and articulated; what attributes and experiences have qualified that subject as properly human and rational; where has identity been recognized as coming from, culturally and materially; and where has cosmopolitan loyalty emerged as a demand to see and act beyond the boundaries of immediate particularity? *Also SOCY 650b.*

AFAM 721b, Readings in Southern History since 1865. Glenda Gilmore.

W 10.30–12.20

Readings in Southern History since 1865 revisits traditional themes in southern historiography, matching classics of southern U.S. history with recent work. The course expands the definition of “southerner”; challenges the narratives and periodization of Reconstruction, Jim Crow, and the Civil Rights Movement; and brings theories on the construction of gender and race into dialogue with southern history. The readings place the U.S. South in a global discourse of white supremacy, imperialism, Communism, Fascism, and Pan-Africanism. The course requires book reviews and an historiographical paper that reviews an issue in southern history and suggests opportunities for future research on the topic. *Also AMST 735b, HIST 731b.*

**AFAM 722b, Theorizing “Black” and “Asian” Intersectionalities in the United States.
Sanda Lwin, Diana Paulin.**

Th 3.30–5.20

This graduate seminar approaches racial formation and racial representation through the lens of Asian American and African American literary and cultural production. We read theoretical and primary texts from various fields, including performance studies, literary studies, psychoanalytic theory, cultural studies, gender studies, and postcolonial studies, in order to construct a critical apparatus for understanding race relationally rather than as strictly defined categories of identity that have, traditionally, been studied in segregated disciplines (such as black studies, whiteness studies, Asian and Asian American studies). We address the following topics: performance of identity, racial/sexual minorities and the politics of inclusion/exclusion, alliances across racial and national boundaries, diasporic identities, history and memory. We consider how a comparative approach might produce new methodologies for thinking about Asian American and African American representation comparatively. In doing so, we interrogate conventional black/white paradigms of race by looking at intersectionalities that unsettle binaries. Along these lines, we also account for the way in which race intersects with other categories of identity, such as sexuality, gender, nation, and class. We study works by authors/artists such as Judith Butler, David Eng, Claudia Tate, Vijah Prashad, Jose Muñoz, Franz Fanon, Homi Bhaba, Kobena Mercer, Mira Nair, and Anna Deveare Smith. *Also AMST 673b, ENGL 942b.*

[AFAM 726a, Black Travel and Transnationality.]

AFAM 728b^u, From West Africa to the Black Americas. Robert Thompson.

TTh 11.30–12.45

Art, music, and dance in the history of key classical civilizations south of the Sahara – Mali, Asante, Dahomey, Yoruba, Ejagham, Kongon – and their impact on the rise of New World art and music. *Also AFST 778b^u, HSAR 778b^u.*

AFAM 729a^u, New York Mambo: Microcosm of Black Creativity. Robert Thompson.

TTh 11.30–12.45

Rise, development, and philosophic achievement of the world of New York mambo and salsa. Emphasis on Palmieri, Cortijo, Roena, Harlow, and Colon. Examination of parallel traditions, e.g., New York Haitian art, Dominican merengue, reggae and rastas of Jamaican Brooklyn, and the New York school of Brazilian capoeira. *Also HSAR 779a^u.*

AFAM 739a,b, Problem and Theory in Afro-Atlantic Architecture.**Robert Thompson.**

Th 3.30–5.20

The seminar addresses a new frontier – rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture – Ituri Forest and Namibian spatial solutions, Berber casbah architecture and its interactions with the Jews on Djerba isle and in Morocco, the concept of the Muslim *assatayab* creolized into the Iberia *azotea* and the spread of this terrace-roof style throughout Latin America. Topics include the architecture of Djenne, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of African influence on the architecture of the Americas – the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Colombia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Colombia. The seminar ends with the shrine architecture of New World adherents of the classical religions of Dahomey. *Also AFST 781a,b, HSAR 781a,b.*

AFAM 753a, American Queer Studies: Theorizing Race, Gender, Sexuality.**Seth Silberman.**

M 1.30–3.20

Study of interdisciplinary methodologies shaping the field of lesbian/gay studies and its attendant queer theory. Focus on key works in the field's discourse and sociological studies. Authors include Boyarin, Butler, de Lauretis, Foucault, Harper, Martin, Mercer, Rubin, Sedgwick. *Also AMST 681a, WGSS 746a.*

AFAM 758a, Readings in African American History to Emancipation.**Jennifer Baszile.**

Th 1.30–3.20

This seminar surveys classic and recent scholarship on the African diaspora in North America. Topics include regional and temporal varieties of slavery and freedom, gender, religion, race, work, resistance, and emancipation. Attention is given to urban and rural communities. *Also AMST 706a, HIST 708a.*

AFAM 761b, Readings in Nineteenth-Century American History, 1820–1877.**David Blight.**

W 1.30–3.20

This course explores recent trends and historiography on several problems through the middle of the nineteenth century: sectionalism; expansion; slavery and the Old South; northern society and reform movements; Civil War causation; the meaning of the Confederacy; why the North won the Civil War; the political, constitutional, and social meanings of emancipation and Reconstruction; violence in Reconstruction society; the relationships between

social/cultural and military/political history; problems in historical memory; the tension between narrative and analytical history writing; and the ways in which race and gender have reshaped research and interpretive agendas. *Also AMST 715b, HIST 715b.*

AFAM 768a, 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 696a.*

AFAM 792a^U, The Jazz Avant-Garde, 1955–1980. John Szwed.

Th 1.30–3.20

The new forms of jazz that emerged shortly after the middle of the twentieth century (Ornette Coleman, Cecil Taylor, Sun Ra, et al.). Discussions include the economics and politics of the period, the achievements of the music, and the problems it raised for musical performance and criticism. *Also ANTH 630a^U.*

AFAM 807b, Interraciality and Hybridity. Naomi Pabst.

T 1.30–3.20

Examination of interracial and black subjectivity as represented within a variety of postemancipation literary and critical texts. Topics include interracial genealogies, the emerging rubric of “critical mixed race studies,” and theories of difference and hybridity. Identification and analysis of long-standing debates on race mixing in the realms of legal classification, census taking, grassroots movements, the discursive, the ideological, and the popular. *Also AMST 745b.*

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

Ange-Marie Hancock.

T 1.30–3.20

This seminar explores the value of approaching political identity from an intersectional perspective, primarily using the political philosophies of Hannah Arendt, W. E. B. Du Bois, and democratic theory. *Also PLSC 813a.*

[AFAM 814b, Race and Ethnicity.]

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.

[AFAM 841b, Black British Art and Theory.]

AFAM 843a, Theory and Practice of Ethnomusicology. Michael Veal.

T 1.30–3.20

A reading-based survey of the historical development of the field of ethnomusicology and the major issues with which it has been concerned. *Also MUSI 710a.*

AFAM 846a, Postcolonial Theory and Its Literature. Christopher L. Miller.

Th 10:30–12:20

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage*, *créolité*, “minor literature”), but also gives attention to the literary texts from which they are derived (francophone and Anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. Taught in English. *Also AFST 746a, CPLT 725a^{II}, FREN 946a^{II}.*

AFAM 848b, African American Studies Graduate Research Seminar in Diasporic Cultural Studies. Hazel Carby.

F 10:30–12:20

This seminar is intended for second-term second-year students in a Ph.D. program who wish to undertake a research project and write a research paper. Enrollment is limited to six to eight graduate students. In order to be considered for the seminar each student needs to submit a two-page description of the intended project by Wednesday, January 5, 2005. Please include names and e-mail addresses. I will notify students of their acceptance before the first class. Prospective students who wish to talk to me about the seminar should do so at the end of the 2004 fall term. Those admitted to the course prepare a packet of readings. These essays (maximum 100 pages) should act as an introduction to your field of research. During the first three or four weeks of the term, two members of the seminar make a one-hour presentation and lead a discussion of their selection of essays each week. This presentation schedule is organized during the first class. Those who cannot make the first organizational meeting cannot take the seminar. After these presentations are completed, the seminar does not meet for the six weeks while the research is undertaken but each student continues to meet with me individually. Toward the end of the semester we all read each of the research papers and schedule a series of morning and afternoon meetings for presentations and discussions of the final research project. *Also WGSS 848b.*

AFAM 854b, The French Atlantic Triangle: Literature and Culture of the Slave Trade. Christopher L. Miller.

Th 10:30–12:20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene, T. Mandeleau. Taught in English. *Also AFST 739b, CPLT 723b, FREN 939b.*

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

Robert Harms (*History*)

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

Associate Professors

Ann Biersteker (*Adjunct; Linguistics*), 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*)

Lector

Ore Yusuf (*African Languages*)

Lecturers

Kana Dower (*African Studies*), Anne-Marie Foltz (*Epidemiology & Public Health*), Peter Marris (*Sociology*), 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 764b), 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 764b, 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 a 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 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 598^U, Introduction to an African Language. Sandra Sanneh and staff.

5 HTBA

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. Individualized or small-group instruction. *Students may also study an African language through the noncredit Directed Independent Language Study program at the Center for Language Study.*

AFST 600^U, Elementary Kiswahili. Kiarie Wa’Njogu.

MTWThF 9.30–10.20

Beginning course with intensive training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken language and conversation. During the second term, students study texts that provide an introduction to basic structure of Kiswahili and the culture of the speakers of the language.

AFST 601^U, Intermediate Kiswahili. Kiarie Wa’Njogu.

MTWThF 11.30–12.20

Further development of the student’s speaking, listening, reading, and writing skills. Prepares the student 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 AFST 600.

AFST 603^U, Advanced Kiswahili. Kiarie Wa’Njogu.

TTh 2.30–3.45

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 AFST 601.

AFST 610^U, Elementary Yoruba. Ore Yusuf.

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 the unfamiliar consonantal sounds, nasal vowels, and tone, using isolated phrases, set conversational pieces, and simple dialogues. In the second term, more emphasis is placed on simple cultural texts and role playing.

AFST 611^U, Intermediate Yoruba. Ore Yusuf.

MTWThF 12.30–1.20

Refinement of the student’s speaking, listening, reading, and writing skills. More natural texts are provided to prepare the student for work in literary, language, and cultural studies as well as for a functional use of Yoruba. The student is 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 AFST 610.

AFST 612^U, Advanced Yoruba. Ore Yusuf.

3 HTBA

An advanced course intended to improve the student's 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 like film videos and recorded poems (*ewi*); and music. Extensive reading and writing skills are especially nurtured. After AFST 611.

AFST 614^U, Elementary Zulu. Sandra Sanneh.

MW 11.30–12.20, TTh 11.30–12.45

A beginner's course in conversational Zulu using Web-based materials filmed in South Africa. The fall term emphasizes the sounds of the language, including clicks and tonal variation, and the words and structures needed for initial social interaction. The spring term develops communication skills through dialogues and role-play, and reading skills with texts drawn from traditional and popular literature and songs.

AFST 615^U, Intermediate Zulu. Sandra Sanneh.

MTWTh 9.30–10.20, 1 HTBA

Development of basic fluency in speaking, listening, reading, and writing Zulu, using Web-based materials filmed in South Africa. Readings, viewings, and role-play situations are drawn from contemporary popular culture, folklore, and mass media. Grammar is reviewed as necessary. The course prepares students for initial research involving interaction with Zulu speakers in South Africa, and for the study of oral and literary genres. After AFST 614.

AFST 616^U, Advanced Zulu. Sandra Sanneh.

3 HTBA

Development of fluency in idiom, abstraction, and voicing preferences, and opinions in Zulu, using excerpts from oral genres, short stories, and dramas made for television. Introduction to the language map of southern Africa; study of changes in language use in South Africa since 1996; introduction to code-switching in the dialect of Zulu spoken in Soweto. Preparation for extended research in South Africa involving interviews with Zulu speakers. After AFST 615.

AFST 620, Second Year in an African Language.

By arrangement with faculty.

AFST 621, Third Year in an African Language.

By arrangement with faculty.

AFST 623, Fourth Year in an African Language.

By arrangement with faculty.

AFST 695a, Transnationalism, Modernity, and Diaspora. Kamari Clarke.

W 3.30–5.20

As anthropologists continue to grapple with changing notions of “the field” from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic contexts. Drawing on a range of ideas from world systems theories of globalization to notions of the invention of diasporas, to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes. These processes disrupt the once homogenizing tendencies of ethnography and instead push us to examine different criteria for analyzing and constructing communities. *Also AFAM 573a, ANTH 595a.*

AFST 739b, The French Atlantic Triangle: Literature and Culture of the Slave Trade.
Christopher L. Miller.

Th 10:30–12:20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene, T. Mandeleau. Taught in English. *Also AFAM 854b, CPLT 723b, FREN 939b.*

AFST 746a, Postcolonial Theory and Its Literature. **Christopher L. Miller.**

Th 10:30–12:20

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage*, *créolité*, “minor literature”), but also gives attention to the literary texts from which they are derived (francophone and Anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. Taught in English. *Also AFAM 846a, CPLT 725a^u, FREN 946a^u.*

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

M 1:30–3:20

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

AFST 764b^u, Africa and the Disciplines. **William Foltz.**

W 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 784b^u.*

AFST 778b^u, From West Africa to the Black Americas. **Robert Thompson.**

TTh 11:30–12:45

Art, music, and dance in the history of key classical civilizations south of the Sahara – Mali, Asante, Dahomey, Yoruba, Ejagham, Kongon – and their impact on the rise of New World art and music. *Also AFAM 728b^u, HSAR 778b^u.*

AFST 781a, Problem and Theory in Afro-Atlantic Architecture I: Africa.

Robert Thompson.

Th 3:30–5:20

The seminar addresses a new frontier – rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture – Ituri Forest and Namibian spatial solutions, Berber casbah architecture and its interactions with the Jews on Djerba isle and in Morocco, the concept of the Muslim *assatayab* creolized into the Iberia *azotea* and the spread of this terrace-roof style throughout Latin America. Topics include the architecture of Djenne, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of African influence on the architecture of the Americas – the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Colombia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Colombia. The seminar ends with the shrine architecture of New World adherents of the classical religions of Dahomey. *Also AFAM 739a, HSAR 781a.*

AFST 781b, Problem and Theory in Afro-Atlantic Architecture II: The Black Americas. Robert Thompson.

Th 3.30–5.20

A continuation of AFST 781a. *Also AFAM 739b, HSAR 781b.*

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 839b, Environmental History of Africa. Robert Harms.

Th 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.

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.

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)

Directors of Graduate Studies

Wai Chee Dimock [F] (230 HGS, 432.1186, wai.chee.dimock@yale.edu)

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

Professors

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

Associate Professors

Amy Hungerford, Thomas Otten, Stephen Pitti (*on leave* [Sp])

Assistant Professors

Jennifer Baszile, Elizabeth Dillon, Mary Lui, Sanda Lwin, Diana Paulin, Alicia Schmidt Camacho, Steven Stoll, Vron Ware, Kariann Yokota (*on leave*)

Lecturers

Wes Davis, Joseph Kip Kosek, David Musto, Priscilla Ybarra

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 either proficiency in one language tested in two successive stages, or proficiency in two languages each tested once. After completing both parts of the language requirement, a student should schedule the oral qualifying examinations in four fields, in the fifth term of study. Preparation, submission, and approval of the dissertation prospectus are normally completed by the end of the sixth

term with a final deadline at the end of the seventh term. 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 416.

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 first part 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 first stage 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 622a and 623b, Working Group on Globalization and Culture.

Michael Denning.

M 1.30–3.20

A continuing collective research project, a cultural studies “laboratory,” to be inaugurated in the fall of 2004, for which first- and second-year students receive course credit. Through regular meetings throughout the year, we develop a program of reading, collective and individual research, dialogues with invited speakers, and a Web journal where the work of the group is published. The general theme for the working group is culture and globalization, with three principal aspects: (a) 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;

(b) 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; (c) 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 643a, Theorizing the Racial Formation of the United States in the Late Twentieth Century. Paul Gilroy.

T 9.30–11.20

A designated core course for students in the joint Ph.D. program; also open to students in American Studies and Sociology. The interdisciplinary seminar includes readings from the fields of anthropology, critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AFAM 505a, SOCY 644a.*

AMST 649a, Readings in Latina/o History. Stephen Pitti.

W 1.30–3.20

A reading of historical works that focus on Latino communities in the United States. We focus particular attention on Mexican American, Puerto Rican, and Cuban American communities, and we look at topics such as racial identity, border conflict, 1960s activism, patterns of residency and migration, transnationality and citizenship, labor struggles and class formation, and gender and sexuality. Readings bring together scholarship from several disciplines and emphasize both the critical importance of this developing field and its contemporary challenges. *Also HIST 763a.*

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

T 1.30–3.20

This seminar examines both nineteenth- and twentieth-century African American literary texts, and while students gain a comprehensive understanding of the breadth of the field, we focus on several key issues or “problems” central to the study of African American literary history. We read variously from slave narratives, autobiographies, poetry, novels, nonfiction essays, and anthologies, joining close readings of literary texts with the interdisciplinary contexts of history, cultural criticism and theory, and other art forms. *Also AFAM 595b.*

AMST 653a^U, Twentieth-Century African American Poetry. Elizabeth Alexander.

T 3.30–5.20

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, Robert Hayden. *Also AFAM 596a^U.*

AMST 673b, Theorizing “Black” and “Asian” Intersectionalities in the United States. Sanda Lwin, Diana Paulin.

Th 3.30–5.20

This graduate seminar approaches racial formation/racial representation through the comparative lens of Asian American and African American literary and cultural production. We read theoretical and primary texts from various fields, including performance studies, literary studies, psychoanalytic theory, cultural studies, gender studies, legal studies, and postcolonial studies, in order to construct a critical apparatus for understanding race relationally rather than as strictly defined categories of identity that have, traditionally, been studied in segregated disciplines. We interrogate conventional black/white paradigms of race by looking at intersectionalities that unsettle binaries. Authors/artists include Homi Bhaba, Judith Butler, W.E.B. Du Bois, David Eng, Franz Fanon, Kobena Mercer, José Munoz, Vijah Prashad, Mira Nair, Anna Devere Smith, and Claudia Tate. *Also AFAM 722b, ENGL 942b.*

AMST 681a, American Queer Studies: Theorizing Race, Gender, Sexuality.**Seth Silberman.**

M 1.30–3.20

Study of interdisciplinary methodologies shaping the field of lesbian/gay studies and its attendant queer theory. Focus on key works in the field's discourse and sociological studies. Authors include Boyarin, Butler, de Lauretis, Foucault, Harper, Martin, Mercer, Rubin, Sedgwick. *Also AFAM 753a, WGSS 746a.*

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 701a, Race and Races in American Studies. Matthew Jacobson.

M 1.30–3.20

This reading-intensive seminar examines influential scholarship across the disciplines on "race" and racialized relations in American culture and society. Major topics include the cultural construction of race; race as both an instrument of oppression and an idiom of resistance in American politics; the centrality of race in literary, anthropological, and legal discourse; the racialization of U.S. foreign policy; "race mixing"; vicissitudes of "whiteness" in American political culture; and "race" in the realm of popular cultural representation. A lengthy review essay due at the end of the term gives students a chance to explore in depth the themes, periods, and methods that most interest them. *Also AFAM 687a, HIST 751a.*

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

Th 1.30–3.20

This seminar surveys classic and recent scholarship on the African diaspora in North America. Topics include regional and temporal varieties of slavery and freedom, gender, religion, race, work, resistance, and emancipation. Attention is given to urban and rural communities. *Also AFAM 758a, HIST 708a.*

AMST 709a, Research in Twentieth-Century American Political and Social History.**Glenda Gilmore.**

W 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 709a, HIST 736a.*

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

T 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 588a^U.*

AMST 715b, Readings in Nineteenth-Century American History, 1820–1877.**David Blight.**

W 1.30–3.20

This course explores recent trends and historiography on several problems through the middle of the nineteenth century: sectionalism; expansion; slavery and the Old South; northern society and reform movements; Civil War causation; the meaning of the Confederacy; why the North won the Civil War; the political, constitutional, and social meanings of emancipation and Reconstruction; violence in Reconstruction society; the relationships between

social/cultural and military/political history; problems in historical memory; the tension between narrative and analytical history writing; and the ways in which race and gender have reshaped research and interpretive agendas. *Also AFAM 761b, HIST 715b.*

AMST 717a, Readings in Twentieth-Century American Political and Social History.
Jennifer Klein.

T 1.30–3.20

Readings in American social and political history from the late nineteenth century to the present, with an emphasis on political economy. Major topics include the changing relationship between the state, economy, and community over time; the role of social movements of the left and right in political, social, and economic transformations; definitions and boundaries of citizenship; development of social policy, labor policy and politics, and the “New Deal Order”; American’s rural and urban economies in regional, national, and international context. *Also HIST 735a.*

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 HIST 780b.*

AMST 735b, Readings in Southern History since 1865. **Glenda Gilmore.**

W 10.30–12.20

The course revisits traditional themes in southern historiography, matching classics of southern U.S. history with recent work. The course expands the definition of “southerner”; challenges the narratives and periodization of Reconstruction, Jim Crow, and the Civil Rights Movement; and brings theories on the construction of gender and race into dialogue with southern history. The readings place the U.S. South in a global discourse of white supremacy, imperialism, Communism, Fascism, and Pan-Africanism. The course requires book reviews and an historiographical paper that reviews an issue in southern history and suggests opportunities for future research on the topic. *Also AFAM 721b, HIST 731b.*

AMST 745b, Interraciality and Hybridity. **Naomi Pabst.**

T 1.30–3.20

Examination of interracial and black subjectivity as represented within a variety of postmanicipation literary and critical texts. Topics include interracial genealogies, the emerging rubric of “critical mixed race studies,” and theories of difference and hybridity. Identification and analysis of long-standing debates on race mixing in the realms of legal classification, census taking, grassroots movements, the discursive, the ideological, and the popular. *Also AFAM 807b.*

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 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 768b, Asian American History and Historiography. Mary Lui.

M 1.30–3.20

This reading and discussion seminar examines new trends in Asian American history through a selection of recently published texts and other “classics” from the field. Major topics include the racial formation of Asian Americans in U.S. culture, politics, and law; U.S. imperialism; U.S. capitalist development and Asian labor migration; and transnational and local ethnic community formations. The class considers both the political and academic roots of the field and considers its evolving relationship to “mainstream” American history. *Also HIST 768b.*

AMST 777a, Research Seminar in U.S. International and Transnational Histories. Seth Fein.

M 11.30–1.20

Reading seminar that examines interdisciplinary approaches to the study of “culture” in relations between, within, and among the United States and other nations (mainly since 1900). Discussions and papers focus on comparing methodologies, using theory, doing research, writing history. Topics include globalization, Americanization, transnationalism, and hybridity; gender, national identity, international relations, and state formation; imperialism, post-colonialism, hegemony, and resistance; mass culture, political economy, foreign policy, and postmodernity. *Also HIST 758a.*

AMST 786a, American Women’s History. Joanne Meyerowitz.

Th 3.30–5.20

Selected topics in American/U.S. women’s and gender history. Themes include concepts of womanhood and manhood; gendered hierarchies of citizenship and labor; class, racial/ethnic, and regional differences; and women’s participation in religion, politics, social reform, and women’s rights movements. Readings, writing assignments, and classroom discussions emphasize recent historical literature, historiographic trends and debates, and theoretical and methodological approaches. *Also HIST 744a.*

AMST 798b, The Culture of the Gilded Age. Cynthia Russett.

Th 1.30–3.20

Although the politics of the Gilded Age may seem somewhat jejune (who today has lively memories of Chester A. Arthur or James Garfield?) its society and culture were undergoing dramatic and challenging developments. Industrialization and urbanization brought new immigrants to our shores; labor unions grew and flexed their muscle in a series of major strikes. In the world of thought the impact of Darwinism was still being absorbed, especially in the new academic disciplines of the social sciences: sociology, economics, and psychology. Some important names from the period: William James, Charlotte Perkins Gilman, Henry George, Andrew Carnegie, W.E.B. Dubois, Jane Addams, Edward Bellamy, Samuel Gompers (and, of course, many more). Research seminar. *Also HIST 726b.*

AMST 802b, Readings in Early National American History. Joanne Freeman.

T 1.30–3.20

This seminar is an introduction to the early national period and its scholarship, exploring major themes such as nationalism, national identity, the influence of the frontier, the structure of society, questions of race and gender, the creation of a national politics and a national culture, and the evolution of political cultures. *Also HIST 703b.*

AMST 812b^U, American Documentary Film and Photography. Charles Musser, Laura Wexler.

T 3.30–5.20, screenings M 7 P.M.

Examination of a series of historical moments in which documentary plays a significant cultural role. Topics include the relationship between photographic and cinematic practices and theories generated by makers and critics; filmic constructions of gender, race, class, and national identity in the twentieth century; and changing conceptions of photographic truth. *Also FILM 722b^U, WGSS 780b^U.*

AMST 813a^U, Contemporary Documentary Film and Video. Charles Musser.

M 7–10.30

Examination of documentary and related nonfiction forms in the last three decades. Issues include film truth, performance, ethics, race and gender, and the filmmaker as participant-observer. Filmmakers include Frederick Wiseman, William Greaves, Chris Choy, Errol Morris, Lourdes Portillo, Trin T. Minh-Ha, Sue Friedrich, and Marlon Riggs. *Also FILM 724a^U.*

AMST 814a, Historical Methods in Film Study. Charles Musser.

Th 1.30–3.20

Engages a range of historiographical issues in film studies, including the roles of technology, exhibition, and spectatorship as well as topics such as intermediality and intertextuality. A range of methodological approaches are considered. Particular attention is given to the interaction between scholars and archives. *Also FILM 603a.*

AMST 823a, Identities: Aspects of American and European Social and Cultural History. John Demos, Jay Winter.

W 1.30–3.20

This seminar addresses the historical literature surrounding problems of identities, defined in a host of ways — racial, gendered, ethnic, regional, national, psychological, and age-related. Both American and European scholarship is considered. *Also HIST 974a.*

AMST 825b, Readings on Early American History. John Demos.

T 1.30–3.20

Reading and discussion of the scholarly literature. *Also HIST 704b.*

AMST 839a, Readings in North American Environmental History. Steven Stoll.

W 10.30–12.20

Introduction to the essential scholarship of North American environmental history. The seminar assumes no previous course work, and students with a wide variety of backgrounds are welcome. We read books and articles with an eye to exploring the different themes, theories, and methods that have shaped environmental history. Our goal is to evaluate these works while trying to discover ways in which each approach might be helpful to our own work. At the same time, we use readings and discussions to think about the more general process of conceiving, conducting, and writing historical research. Subjects include colonialism, capitalism, American Indians, conservation, ecology, and environmentalism. *Also HIST 742a.*

AMST 880a, The Grounding of Modern Medicine. John Harley Warner.

M 1.30–3.20

An introductory exploration of the shaping of modern medical culture, focusing on the United States in the late nineteenth and early twentieth centuries. Readings engage recent historiography. Themes include struggles over the place and meanings of “science,” and the intersection of lay and professional understandings of the body; shifting conceptions of purity and danger in the social and physical environments, with attention to region, gender, class, ethnicity, race, and religion; orthodox and alternative professional identities and consumer expectations in the medical marketplace; the role of imperialist ventures and European

impulses in fashioning American biomedicine and public health; the medicalization of American society; antimodernist currents; and the ethical, epistemological, and aesthetic choices that were constitutive of medical modernity. A reading seminar that may be taken as a research seminar with permission of the instructor. *Also HIST 926a, HSHM 733a.*

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. Prerequisite for architecture graduate students: 912a, American Cultural Landscapes, or equivalent course work. 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, 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, ENGL 921a.*

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 927a, Literary Genres and World Cultures. Wai Chee Dimock.

T 10.30–12.20

This course uses the concept of “genre” as an entry point to the dynamic interactions between the local and the global, between the persistence of words and the transformative forces of migration, translation, and hybridization. The history of genres is, in this sense, a history of the diverse cultures of humankind. We read clusters of texts in this light: Homer’s *Odyssey* with Derek Walcott’s play of the same title, Walcott’s *Omeros*, and Wole Soyinka’s “The Eye of the Cyclops”; Daniel Defoe’s *Robinson Crusoe* with J. M. Coetzee’s *Foe*, Coetzee’s 2003 Nobel Lecture, Walcott’s “The Castaway,” “Crusoe’s Island,” “Crusoe’s Journal,” “The Figure of Crusoe,” as well as “The Adventures of Lo Bun Sun” in Maxine Hong Kingston’s *China Men*; Hawthorne’s *The Scarlet Letter* with Maryse Condé’s *I, Tituba, Black Witch of Salem*, Arthur Miller’s *The Crucible*, and Bharati Mukherjee’s *The Holder of the World*. Doing so, we explore the inflections wrought by local cultures on generic terms such as “drama,” “epic,” “novel,” and “lyric.” *Also CPLT 525a, ENGL 985a.*

AMST 928a, Fredric Jameson: The Poetics of Social Forms. Nigel Alderman.

W 10.30–12.20

This course examines the work of Fredric Jameson from his earliest forays into method to his revision of narrative theories to his mapping of periods and systems. By so doing, we cover virtually all the major theoretical and philosophical models of the postwar period as well as a range of cultural works including medieval romance, nineteenth-century novel, modernist poetry, postmodern architecture, film, and music. *Also CPLT 518a, ENGL 987a.*

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*)

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, Eric Sargis, Thomas Tartaron

Lecturers

Carol Carpenter (*Forestry & Environmental Studies*), Lisa Collins

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 416.

M.A. This degree is intended for students not continuing in the Ph.D. program. Requirement is satisfactory completion of at least one year in that program. Special attention is given to the quality of papers submitted in course work. Applications for a terminal master's degree are not accepted.

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 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 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 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 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 macro political 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 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 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 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 AMST 763b^U.*

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

W 1.30–3.20

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 594b, Theories of Value in Anthropology. David Graeber.

W 3.30–5.20

There is a broad feeling in anthropology that there is some level at which “values” in the sociological sense, “value” in the economic sense, and linguistic “value” in the Saussurean sense all come down to the same thing — and that a theory of value based on this insight holds out the promise of resolving many of the stickiest outstanding problems in social theory: most notably, the relation of individual desire and action with cultural meaning and social form. But it’s not at all clear whether such a theory actually exists. In this course, students examine some contenders and work on developing such a theory.

ANTH 595a, Transnationalism, Modernity, and Diaspora. Kamari Clarke.

W 3.30–5.20

As anthropologists continue to grapple with changing notions of “the field” from local to global, this course covers recent and emerging scholarship that explores theoretical problems of modernity, transnationalism, and diaspora in specific historical and ethnographic contexts. Drawing on a range of ideas from world systems theories of globalization to notions of the invention of diasporas, to postmodern ideas of social constructions, the emphasis is on the interrelations between local and global cultural processes. These processes disrupt the once

homogenizing tendencies of ethnography and instead push us to examine different criteria for analyzing and constructing communities. *Also AFAM 573a, AFST 695a.*

ANTH 598b, Sustainable Development and Conservation: Advanced Readings in Social Theory. Michael Dove, Carol Carpenter.

Th 2.30–5.20

An advanced seminar on the social science theory of sustainable development and conservation, intended for students interested in research design and policy planning in this field. It traces the conceptual history of the ideas of progress and development from the colonial period through the present and examines how these ideas are used by the parties who fund, design, and manage development projects, looking at both public expressions appearing in publications and underlying discourses. It also examines the response by local communities to development projects and compares development and conservation rationales with alternative local rationales. Finally, the linkage between the development project and the academy is examined. Students are expected to use the course to develop their own research and writing. Prerequisite: F&ES 747a or F&ES 757a. Enrollment limited to twelve. *Also F&ES 759b.*

ANTH 612b, Contemporary Social Theory. Kamari Clarke.

W 3.30–5.20

ANTH 613b, Theory and Method in the Study of Sex. Megan Sinnott.

Th 2–4

In this course sexuality is understood as a social, cultural, and historical phenomenon. An interdisciplinary approach to its study is used by exploring literature within the social sciences and humanities. Topics include the deconstruction of western cultural paradigms of sexuality, the relationship between researcher and research subjects, and sexual ethics in fieldwork. Each week focuses on a particular discipline or theoretical approach to the study of sexuality. *Also WGSS 613b.*

ANTH 630a^U, The Jazz Avant-Garde, 1955–1980. John Szwed.

Th 1.30–3.20

The new forms of jazz that emerged shortly after the middle of the twentieth century (Ornette Coleman, Cecil Taylor, Sun Ra, et al.). Discussions include the economics and politics of the period, the achievements of the music, and the problems it raised for musical performance and criticism. *Also AFAM 792a^U.*

ANTH 680b, Anthropological Perspectives on Health and Social Change.

Linda-Anne Rebhun.

W 1.30–3.20

Explores the impact on physical and mental health of social and economic change, industrialization, and introduction of international capital. We examine such topics as medicine and colonialism, changes in population structure, diseases of development, the politics of health care, the health impact of environmental change in cultural context, and maternal and child health.

ANTH 701a^U, Foundations of Modern Archaeology. Frank Hole.

TTh 9–10.15

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. Marcello Canuto.

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 732a^U and 733La^U, Archaeological Field Techniques and Archaeology Lab I. Marcello Canuto.

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 738b^U, Ethnoarchaeology. Frank Hole.

W 1.30–3.20

A survey and critical examination of the uses of ethnographic, experimental, and replication studies for the archaeological interpretation of material culture and patterns of behavior. *Also ARCG 738b^U.*

ANTH 740b^U, Maya Archaeology. Marcello Canuto.

T 1.30–3.20

Examination of current problems in Maya archaeology, epigraphy, iconography, and ethnohistory. Topics include the Preclassic, Classic, and Postclassic periods, the development and collapse of Classic Maya civilization, economic and political organization, warfare, and external relations. *Also ARCG 740b^U.*

ANTH 745a^U, Landscape Archaeology. Thomas Tartaron.

TR 2.30–3.45

Examination of landscape as a powerful concept in archaeology, and the basis of a thriving research agenda within the discipline. The course traces the intellectual development of landscape perspectives in archaeology, from a primary concern with adaptive and economic aspects of human environment interactions to more recent interest in cognitive and culturally constructed landscapes. Case studies reveal a multiplicity of archaeological approaches. Permission from instructor required for non-archaeology/anthropology undergraduates. *Also ARCG 745a^U.*

ANTH 749b, Archaeology of the African Diaspora. Lisa Collins.

TH 3.30–5.20

ANTH 751a, Topics and Issues in Archaeology. Frank Hole.

W 1.30–3.20

This course focuses on important new discoveries and theories concerning the early stages of ritual, religion, and the emergence of social complexity in the greater Near East. We consider evidence from Anatolia, the Levant, Mesopotamia, and Iran for the period commonly referred to as the Neolithic. *Also ARCG 751a^U.*

ANTH 771a, Archaeology of Complex Societies. Richard Burger.

T 10.30–12.20

A consideration of theories and methods developed by archaeologists to recognize and understand complex societies in prehistory. Topics include the nature of social differentiation and stratification as applied in archaeological interpretation; emergence of complex societies in human history; case studies of societies known ethnographically and archaeologically. *Also ARCG 771a^U.*

ANTH 777b^U, The Origins of Agriculture. Frank Hole.

TR 1–2.15

The concepts and processes of domestication are examined in the context of archaeological examples from several regions of the world. *Also ARCG 777b^U.*

ANTH 785a^U, Archaeological Ceramics I. Thomas Tartaron.

W 3.30–5.20

This seminar focuses on archaeological, ethnographic, and ethnoarchaeological approaches to the study of archaeological ceramics that permit archaeologists to mine assemblages for information on the people and societies that made and used them. First part of two-part sequence with Archaeological Ceramics II. Students are expected to attend both. *Also ARCG 785a^U.*

ANTH 786b^U, Archaeological Ceramics II. Thomas Tartaron.

M 2–5, Th 4.30–5.20

This laboratory course introduces students to archaeometric characterization techniques for the study of archaeological ceramics. Hands-on experience with thin-section petrography and other techniques, including electron probe microanalysis and scanning electron microscopy. Prerequisite: ANTH 785a^U/ARCG 785a^U (Archaeological Ceramics I). *Also ARCG 786b^U.*

ANTH 803b, Reproductive Ecology of Humans and Nonhuman Primates.

Richard Bribiescas.

T 1.30–3.20

Survey of the current understanding of the physiology of reproductive function within the control of evolutionary and life history theory. Emphasis on population variation in female and male reproductive endocrinology as well as the sources of that variation.

ANTH 811a, Behavioral Endocrinology. Richard Bribiescas.

T 1.30–3.20

This seminar examines the role of hormones in the evolution and expression of human and nonhuman primate behavior. Emphasis is placed on behaviors that are associated with aggression, stress, mating, and parenting. Advanced undergraduates are welcome with instructor's permission.

ANTH 822b, Topics and Issues in Human Evolution. Andrew Hill.

Th 1.30–3.20

Topics from the span of primate evolution are covered: the early primates, origin of modern type primates, anthropoid origins, monkey and hominoid evolution. Readings and discussions focus on issues of taxonomy—judging morphological similarities and differences among fossils. Specific attention paid to traits paleontologists use to assign fossils to species and functional/behavioral significance of those traits. Lectures and lab use of fossils provide background on fossil evidence.

ANTH 849b, Primate Models for Human Evolution. David Watts.

T 9.30–11.20

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 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. Helena 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*), Richard Beals (*Mathematics*), 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

Elvir Causevic, John Emerson (*Statistics*), Ann Lee, Hannes Leeb (*Statistics*), Mauro Maggioni, Michael Mahoney, Per-Gunnar Martinsson, Boaz Nadler

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 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 third 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 416.

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 page 412).

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*), Pierre Hohenberg (*Adjunct*), Marshall Long, Tso-Ping Ma, Daniel Prober, Nicholas Read, Mark Reed, Subir Sachdev, Robert Schoelkopf, Ramamurty Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*), Jerry Woodall

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*), Frank Hole (*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*), Thomas Tartaron (*Anthropology*)

Lecturers

Lisa Collins (*Anthropology*), Karen Foster (*Near Eastern Languages & Civilizations*)

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; World Prehistory, Origins of Western Civilizations, or Introduction to 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 complete 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. Frank Hole.

TTH 9–10.15

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. Marcello Canuto.

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 732a^U and 733La^U, Archaeological Field Techniques and Archaeology Lab I. Marcello Canuto.

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 ANTH 732a^U and ANTH 733La^U.*

ARCG 738b^U, Ethnoarchaeology. Frank Hole.

W 1.30–3.20

A survey and critical examination of the uses of ethnographic, experimental, and replication studies for the archaeological interpretation of material culture and patterns of behavior. *Also ANTH 738b^U.*

ARCG 740b^U, Maya Archaeology. Marcello Canuto.

T 1.30–3.20

Examination of current problems in Maya archaeology, epigraphy, iconography, and ethnohistory. Topics include the Preclassic, Classic, and Postclassic periods, the development and collapse of Classic Maya civilization, economic and political organization, warfare, and external relations. *Also ANTH 740b^U.*

ARCG 745a^U, Landscape Archaeology. Thomas Tartaron.

TTH 2.30–3.45

Examination of landscape as a powerful concept in archaeology, and the basis of a thriving research agenda within the discipline. The course traces the intellectual development of landscape perspectives in archaeology, from a primary concern with adaptive and economic aspects of human environment interactions to more recent interest in cognitive and culturally constructed landscapes. Case studies reveal a multiplicity of archaeological approaches. Permission from instructor required for non-archaeology/anthropology undergraduates. *Also ANTH 745a^U.*

ARCG 751a^U, Topics and Issues in Archaeology. Frank Hole.

W 1.30–3.20

This course focuses on important new discoveries and theories concerning the early stages of ritual, religion, and the emergence of social complexity in the greater Near East. We consider evidence from Anatolia, the Levant, Mesopotamia, and Iran for the period commonly referred to as the Neolithic. *Also ANTH 751a.*

ARCG 771a^u, Archaeology of Complex Societies. Richard Burger.

T 10.30–12.20

A consideration of theories and methods developed by archaeologists to recognize and understand complex societies in prehistory. Topics include the nature of social differentiation and stratification as applied in archaeological interpretation; emergence of complex societies in human history; case studies of societies known ethnographically and archaeologically. *Also ANTH 771a.*

ARCG 777b^u, The Origins of Agriculture. Frank Hole.

TTh 1–2.15

The concepts and processes of domestication are examined in the context of archaeological examples from several regions of the world. *Also ANTH 777b^u.*

ARCG 785a^u, Archaeological Ceramics I. Thomas Tartaron.

W 3.30–5.20

This seminar focuses on archaeological, ethnographic, and ethnoarchaeological approaches to the study of archaeological ceramics that permit archaeologists to mine assemblages for information on the people and societies that made and used them. First part of two-part sequence with Archaeological Ceramics II. Students are expected to attend both. *Also ANTH 785a^u.*

ARCG 786b^u, Archaeological Ceramics II. Thomas Tartaron.

M 2–5, Th 4.30–5.20

This laboratory course introduces students to archaeometric characterization techniques for the study of archaeological ceramics. Hands-on experience with thin-section petrography and other techniques, including electron probe microanalysis and scanning electron microscopy. Prerequisite: ANTH 785a^u/ARCG 785a^u (Archaeological Ceramics I). *Also ANTH 786b^u.*

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 163b, From Pictograph to Pixel: Changing Ways of Human Communication. John Darnell, Michael Fischer, Beatrice Gruendler.

Also NELC 163b.

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

ARCG 172a, Great Hoaxes in Archaeology. Marcello Canuto.

Also ANTH 172a.

ARCG 212b, Art and Archaeology of Ancient China. Lillian Tseng.

Also HSAR 351b.

ARCG 232a, Ancient Civilizations of the Andes. Richard Burger.

ARCG 237a, Ancient Paintings and Mosaics. Karen Foster.

Also HSAR 237a, NELC 108a.

ARCG 239b, Art of the Ancient Near East and Aegean. Karen Foster.

Also NELC 104b, HUMS, HSAR 239b.

ARCG 250a, Roman Art: Empire, Identity, and Society. Diana Kleiner.

Also HSAR 250a, CLCV 170a.

ARCG 252b, Roman Architecture. Diana Kleiner.

Also HSAR 252b, CLCV 175b.

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

Also ANTH 281b, EVST 225b.

ARCG 349b, Archaeology of the African Diaspora. Lisa Collins.

Also ANTH 349b, AFAM 341b.

ARCG 360a, Parallel Worlds: Ancient Egypt and Mesopotamia. John Darnell,
Eckart Frahm.

Also NELC 120a.

ARCG 362a, Observing the Earth from Space. Ronald Smith.

Also G&G 362a.

ARCG 425a, The Art of Chu China. Lillian Tseng.

Also HSAR 480a.

ARCG 465a, Archaeometallurgy. Robert Gordon.

Also G&G 465a.

ARCG 467b, Geochemical Approaches to Archaeology. Karl Turekian.

Also G&G 467b.

HSAR 481b, Art and Architecture of the Forbidden City in China. Lillian Tseng.

**HSAR 580a, Everyday Romans in Extraordinary Times: The Art and Culture of the
Non-Elite in Ancient Rome.** Diana Kleiner.

ASTRONOMY

J.W. Gibbs Laboratories, 432.3000

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

Chair

Charles Bailyn

Director of Graduate Studies

Sabatino Sofia (256 JWG, 432.3011, sabatino.sofia@yale.edu)

Professors

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

Associate Professor

Sarbani Basu

Assistant Professors

Richard Easther (*Physics*), Priyamvada Natarajan, 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 412).

Master's Degrees

M.Phil. See Graduate School requirements, page 416.

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 510b^U, Stellar Populations. Robert Zinn.

The stellar populations of our galaxy and the galaxies of the local group. The properties of stars and star clusters, stellar evolution, and the structure and evolution of our galaxy.

[ASTR 518a, Stellar Dynamics.]

ASTR 520a, Computational Methods in Astrophysics and Geophysics.**Gordon Drukier, Jun Korenaga.**

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 538a.*

ASTR 530a^U, Galaxies. Jeffrey Kenney.

The structure, contents, dynamics, and evolution of galaxies. The properties and evolution of active galactic nuclei.

[ASTR 540, Radiative Processes in Astrophysics.]**ASTR 550b^U, Stellar Astrophysics. Sarbani Basu.**

MW 10.30 – 11.20, I HTBA

An introduction to the physics of stellar atmospheres and interiors. The basic equations of stellar structure, nuclear processes, stellar evolution, white dwarfs, and neutron stars.

ASTR 555a^U, 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 560, Interstellar Matter and Star Formation.]**[ASTR 565, The Early Universe.]****[ASTR 570^U, High Energy Astrophysics.]****[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.]****ASTR 666b, Statistical Thermodynamics for Astrophysics and Geophysics.****John Wettlaufer.**

TR 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. *Also G&G 666b.*

[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. Charles Bailyn.

Observations and models of accretion flows and their instabilities, particularly in the context of high energy sources such as x-ray binaries and quasars.

ATMOSPHERIC SCIENCE

Advisory Committee

Donald Aylor (*Forestry & Environmental Studies*)

Gary Haller (*Chemical Engineering; Chemistry*)

Xuhui Lee (*Forestry & Environmental Studies*)

Daniel Rosner (*Chemical Engineering; Mechanical Engineering*)

Steven Sherwood (*Geology & Geophysics*)

Ronald Smith (*Geology & Geophysics*)

Sabatino Sofia (*Astronomy*)

Jan Stolwijk (*Epidemiology & Public Health*)

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 250 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; the annual student-run Graduate Student Research Symposium; 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. Beginning in the fall of 2003, the tracks will be: (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 and applications 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; telefax 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

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, Mark Laubach, Erin Lavik, Xenios Papademetris

Fields of Study

Fields include the physics of image formation (MRI, ultrasound, nuclear medicine, and X-ray), NMR spectroscopy, 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

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

Chair

Ira Mellman

Director of Graduate Studies

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

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, Tom 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 trans-membrane signals, epithelial cell polarity and the extracellular matrix, protein folding, membrane function in the nervous system (synapse formation and function), neural networks, developmental genetics, cell biology of protozoan parasites and of pathogen/host interactions, cell biology of the immune response, mRNA and protein localization, RNA folding, the role of RNA-protein particles, cell biology of bone remodeling and of the cytoskeleton. Approaches to these topics include biochemistry, molecular biology, and macromolecular crystallography; yeast and *Drosophila* 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

Five courses are required: CBIO 602a, 727b, GENE 625a, MCDB 630b, in addition to one elective in one of the following areas: Genetics, Development, Neurobiology, Immunology, Microbiology, Pharmacology, Virology, or Molecular Genetics. Students plan their courses in consultation with the director of graduate studies to meet individual needs and interests. 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 better than passing record in the area of concentration, 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. See Graduate School requirements, pages 416–17; this degree is normally granted only to students who are withdrawing from the Ph.D. program.

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 502, The Cellular Basis of Human Biology. 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.

CBIO 503, Histology Laboratory. Thomas Lentz and staff.

A laboratory in microscopic anatomy to be taken in conjunction with CBIO 502.

CBIO 601, The Molecular and Cellular Basis of Human Disease. Pietro De Camilli, Fred Gorelick, and staff.

An exploration of primary literature and critical assessment of the data that form a basis for understanding human disease. A series of human genetic diseases, whose mechanisms have been identified as a result of sequencing of the human genome, are explored. Students are required to search out supportive data, discuss it with the session leader, and present it to the group. This course runs in parallel with CBIO 502.

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 727b, Advanced Seminar Course. Susan Ferro-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 3–6 sessions, starting with an introductory overview and followed by detailed analysis of key papers.

CBIO 900a and 901b, First-Year Introduction to Research. Carl Hashimoto, Ronald Breaker, Michael Stern.

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*), Gerhard Giebisch (*Emeritus*), Steven Hebert, Joseph Hoffman (*Emeritus*), Leonard Kaczmarek (*Pharmacology*), Mark Saltzman (*Biomedical Engineering*), Steven Segal, Gerald Shulman (*Internal Medicine/Endocrinology*), Fred Sigworth, Carolyn Slayman (*Genetics*), Clifford Slayman, John Stitt (*Epidemiology*), Fred Wright (*Internal Medicine/Nephrology*)

Associate Professors

Cecilia Canessa, Lloyd Cantley (*Internal Medicine/Nephrology*), Marie Egan (*Pediatrics*), Vincent Pieribone, George Richerson (*Neurology*)

Assistant Professors

Angelique Bordey (*Neurosurgery*), Reiko Maki Fitzsimonds, P. Darrell Neuffer, Michael Nitabach, 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 66–68).

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. 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.

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.

Honors Requirement

Students must meet the Graduate School's Honors requirement by the end of the fourth term of full-time study (see page 412).

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 410–21.

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.

TRH 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, 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. 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. 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 ENAS 570b^{II}, MCDB 560b^{II}.*

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

MW 9.30–10.45

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

John Walz

Professors

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

Associate Professors

Gaboury Benoit, Paul Van Tassel

Assistant Professor

William Mitch

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*)

Assistant Professors

Victor Batista, J. Patrick Loria, 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 [F], William Jorgensen [Sp].

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.]**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. Victor Batista.

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. Charles Schmuttenmaer.

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. Kurt Zilm.

TTh 10.30–11.45

A theoretical treatment of magnetic resonance spectroscopy. Development of the density Matrix formalism, including the basis for product operator rules. The use of average Hamiltonian and Floquet theory for describing coherent time-dependent interactions. Multi-dimensional NMT methods and data manipulation. Applications to a wide variety of problems ranging from solution NMR of proteins to a solid state NMR in materials science. Prerequisite: CHEM 440a/540a or permission of instructor.

[CHEM 547b, Electron Paramagnetic Resonance.]

[CHEM 548b, Nuclear Magnetic Resonance in Liquids.]

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 550b^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 551a, Physical Inorganic 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 553b, Main Group Chemistry.]**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 555a, Transition Metal Reaction Mechanisms.]**[CHEM 556a, Biochemical Rates and Mechanisms.]****CHEM 557a^U, Modern Coordination Chemistry. John Faller.**

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], R. James Cross, Jr. [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, electronics, 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 565a, Computational Chemistry.]

[CHEM 567a^u, Topics in Chemical Biology.]

[CHEM 568a, Applications of Molecular Orbital Theory.]

[CHEM 569a, Molecular Modeling.]

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 572a^u, Advanced Quantum Mechanics. John Tully.

TTh 9–10.15

Topics in quantum mechanics that are essential for understanding modern chemistry, physics, and biophysics. Topics include the interaction of radiation with matter, using quantized radiation fields, and may include time-dependent quantum theory, scattering, semiclassical methods, angular momentum, density matrices, and electronic structure methods. Prerequisite: CHEM 570 or the equivalent.

[CHEM 580b^u, Bio-Organic Chemistry.]

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

John Matthews

Director of Graduate Studies

Victor Bers (404 Phelps, 432.0980, victor.bers@yale.edu)

Professors

Egbert Bakker, Victor Bers, Donald Kagan, Diana Kleiner, Christina Kraus, John Matthews, William Metcalf (*Adjunct, Art Gallery*)

Associate Professor

Michael Anderson

Assistant Professors

Björn Ewald (*on leave*), Carlos Noreña, Corinne Pache, Celia Schultz (*on leave*)

Lecturers

Serena Connolly, Veronika Grimm

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 courses including: four courses in the history of Greek and Latin literature (or a reasonable 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.

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.

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.

CLASSICS AND PHILOSOPHY

Students who have had at least three years of college 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.

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.

Master's Degrees

M.Phil. See Graduate School requirements, page 416.

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 712b^U, Aristotle. John Hare.

TTH 2.30–3.45

A close reading of selected portions of Aristotle's *Nicomachean Ethics* in the Greek. Also *PHIL 601b^U*.

GREK 726b^U, Greek Religious Texts. Corinne Pache.

TTH 11.30–12.45

Close reading of selected Greek texts dealing with religious issues including the gods, heroes, death, burial, and oracles.

GREK 747b^U, The Language of Homer. Egbert Bakker.

MW 1–2.15

This course is a critical introduction to the language of the Greek epic tradition and its Indo-European heritage. We study Homeric Greek from three mutually connected viewpoints: (1) historical—dialects in their sequence, from contemporary Ionic back to Mycenaean (“Achaean”) Greek of the second millennium B.C.E.; the phonology, morphology, and syntax of Homeric Greek from a historical-comparative perspective; (2) formulaic/metrical—the notion of *Kunstsprache*, Parry's theory of oral-formulaic composition; (3) syntactic/cognitive—Homeric poetry as spoken language; Homeric deixis and vividness.

GREK 760a^U, Pindar and Bacchylides. Egbert Bakker.

TTH 11.30–12.45

This course offers readings in the poetry of Pindar and Bacchylides, whose work constitutes most of what we know of the choral poetry of Archaic and Classical Greece. In our reading of a representative sample of these poets' work, we address issues such as the subgenres of choral poetry, the occasions of their performance, the relation between composer/author and performer(s), and in particular the poetics and ideology of epinician (victory ode), the genre to which most of our poems belong.

GREK 790a^U, Syntax and Stylistics. Victor Bers.

TTH 9–10.15

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

GREK 798a^U/799b^U, Survey for the Major in Classics: History of Greek Literature.

Michael Anderson [F], Victor Bers [Sp].

MW 9–10.15

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 738b^U, 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 746a^u, Latin Panegyric. Carlos Noreña.

MW 1–2.15

A study of Latin prose panegyric. Close readings of selections from Cicero's *Pro Marcello* (proto-panegyric to Caesar) and the panegyrics of Pliny (to Trajan), Nazarius (Constantine), Mamertinus (Julian), and Ennodius (Theodoric), with attention to historical context, generic conventions, the rhetoric of praise, and changing conceptions of ideal rulership.

LATN 747b^u, 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 790b^u, Syntax and Stylistics. Ann Hanson.

TTh 9–10.15

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. Designed for students with some experience reading Latin literature who desire a better foundation in forms, syntax, idiom, and style.

LATN 798a^u/799b^u, Survey for the Major in Classics: History of Latin Literature.

Christina Kraus.

MW 9–10.15

A wide-ranging 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 605a^u, 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 645b^u, Numismatics. William Metcalf.

Th 2.30–4.20

An introduction to the history of ancient coinage and the modern methodology of numismatic study. Brief consideration of the Greek background followed by detailed treatment of the Roman Republic and Empire. Prerequisites: proficiency in Greek and Latin; reading knowledge of French, German, or Italian.

CLSS 820b, Sophocles. Corinne Pache.

W 2.30–4.20

Reading and discussion of Sophocles' extant tragedies. Topics for discussion include the Greek concept of the hero, ritual lament, the role of the chorus in Athenian drama, and the link between tragedy and ritual.

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

John Matthews.

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 854b, Roman Imperial Ideology: Text and Image. Carlos Noreña.

F 1.30–3.20

This seminar surveys the system of ideals, values, and beliefs that defined the figure of the Roman emperor (Augustus to Constantine). Following an introduction to modern theories of ideology and related terms (“propaganda,” “hegemony,” “consciousness,” etc.), the course is organized around a set of case studies of key texts (both literary and epigraphic) and visual representations of imperial ideals. Central topics include continuity and change in imperial ideology over time; official vs. unofficial conceptions of the “good” Roman emperor; coordinated programs of imperial publicity; the media of imperial communications; and Hellenistic/Republican antecedents of imperial ideals and values. The seminar concludes with an examination of the long-term impact of imperial ideology on the cultural integration of the Roman Empire. Prerequisites: proficiency in Greek, Latin, and either French or German.

CLSS 875a, Greek Epic, Elegy, and Epigram. Egbert Bakker.

Th 2.30–4.20

We first read the extant elegiac fragments of Archilochus, Tyrtaeus, Mimnermus, Solon, and Theognis, in search of a common “generic” feature. This involves theory on genre as well as the anthropology of “performance” and “song culture” in Archaic Greece. We then extend our readings to elegiac epigrams, many of which have been preserved as inscriptions to funerary and commemorative monuments. Finally we study the epigrammatic and elegiac passages in Homeric epic, assessing these “genre imports” and the relation between epic and elegy and between epic and epigram, particularly in their concern with *kleos*.

CLSS 878a, Everyday Romans in Extraordinary Times: The Art and Culture of the Non-Elite in Ancient Rome. Diana Kleiner.

T 1.30–3.20

Art and everyday Romans in Rome and Pompeii. A study of a half-century of scholarly discourse and its focus on non-elite Romans and their role as unique patrons and viewers. Case study analysis of the interaction between high and low art, the viability of the “trickle-down” phenomenon, and the distinction between the portrayal of non-elites in imperialistic state-sponsored monuments and their own privately commissioned portraits and narrative scenes. *Also HSAR 580a.*

CLSS 880a, Thucydides and the Peloponnesian War. Donald Kagan.

T 2.30–4.20

A study both of the great war between Athens and Sparta that transformed the world of the Greek city-states, and of the brilliant historian and political thinker who described it. *Also HIST 516a.*

CLSS 897a, Caesar’s Gallic War. Christina Kraus.

M 2.30–4.20

This seminar reads Books 1, 7, and 8 of Caesar’s *Bellum Gallicum* in Latin, and the rest in English; selections from the continuators and from the *Bellum Civile* may also be assigned (in Latin) during the course of the term. The approach is historiographical, covering such topics as narrative technique, prose style, the relationship of style to meaning, genre, space, and characterization.

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

Ann Gaylin, 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 history, culture, language, 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 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, Sanskrit, Provençal, or Biblical Hebrew). 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 in two parts, 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 first part consists of six topics that include texts from 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) and one question on theory or criticism. The second part consists of the student's presentation of a topic based on his or her original work.

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 in the course of 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 416. 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 515a, Problems in the Theory of Literature. Benjamin Harshav.

M 1.30–3.20

Introductory proseminar for all first-year graduate students in Comparative Literature. Critical readings of basic texts in modern literary theory on questions such as the discipline of comparative literature; theory, history, and criticism; interpretation and evaluation; theories of “the language of poetry,” narrative, and “fictional worlds”; literature and ideology; periods and genres; postmodernism and feminism.

CPLT 517b^U, Interpretation and Authority. Carol Jacobs.

T 1.30–3.20

The seminar explores the writings of four theorists of the twentieth century who meditate on the concepts of authority and interpretation. Our method entails close readings of these works in which much of what goes on is not only in the ostensible contents of the works, but also in the performance of the writing. One is confronted in each case with writers who question the relationship between text and simplistic notions of truth. The obvious problem we encounter, then, is how, in turn, to read texts which claim to unsettle that relationship. The issues raised are those among interpretation and authority, both textual and political. Works by Sigmund Freud, Roland Barthes, Paul de Man, and Walter Benjamin. *Also* *GMAN* 605b^U.

CPLT 518a, Fredric Jameson: The Poetics of Social Forms. Nigel Alderman.

W 10.30–12.20

This course examines the work of Fredric Jameson from his earliest forays into method to his revision of narrative theories to his mapping of periods and systems. By so doing, we cover virtually all the major theoretical and philosophical models of the postwar period as well as a range of cultural works including medieval romance, nineteenth-century novel, modernist poetry, postmodern architecture, film, and music. *Also* *AMST* 928a, *ENGL* 987a.

CPLT 525a, Literary Genres and World Cultures. Wai Chee Dimock.

T 10.30–12.20

This course uses the concept of “genre” as an entry point to the dynamic interactions between the local and the global, between the persistence of words and the transformative forces of migration, translation, and hybridization. The history of genres is, in this sense, a history of the diverse cultures of humankind. We read clusters of texts in this light: Homer’s *Odyssey* with Derek Walcott’s play of the same title, Walcott’s *Omeros*, and Wole Soyinka’s “The Eye of the Cyclops”; Daniel Defoe’s *Robinson Crusoe* with J. M. Coetzee’s *Foe*, Coetzee’s 2003 Nobel Lecture, Walcott’s “The Castaway,” “Crusoe’s Island,” “Crusoe’s Journal,” “The Figure of

Crusoe," as well as "The Adventures of Lo Bun Sun" in Maxine Hong Kingston's *China Men*; Hawthorne's *The Scarlet Letter* with Maryse Condé's *I, Tituba, Black Witch of Salem*, Arthur Miller's *The Crucible*, and Bharati Mukherjee's *The Holder of the World*. Doing so, we explore the inflections wrought by local cultures on generic terms such as "drama," "epic," "novel," and "lyric." Also *AMST* 927a, *ENGL* 985a.

CPLT 527a, Art and Ideology. Katerina Clark.

W 1.30–3.20

Examination of texts identified as ideological art, focusing on the relationship between the conventions they use and the ideology they seek to advance. Theoretical readings include works by Benjamin, Jameson, Lukacs, Bakhtin, Marx, Althusser, and Judith Butler; literary works by Balzac, Brecht, Tretiakov, Ostrovsky, Orwell, Koestler, and others; films by Eisenstein, Leni Riefenstahl, and others. Also *FILM* 828a, *RUSS* 746a.

CPLT 541a^u, Complexity: Theory of Meaning and the Literary Text.

Benjamin Harshav.

W 1.30–3.20

The course presents a comprehensive and systematic theory of works of literature as the highest sign-complexes in human culture. Departing from the basic concepts of meaning and reference in linguistics and philosophy of language, a theory of semantic integration is developed. Departing from the basic assumptions of narratology and the philosophy of fictional worlds, a theory of works of literature as complex and open-ended constructs is offered. Also *PHIL* 704a.

CPLT 527b, Toward a Bioaesthetics: Burroughs, Warhol, Deleuze. David Joselit.

T 1.30–3.20

The vogue for organic forms and biological metaphors that has arisen from the recent discovery of the human genome is only the latest in a wave of "biologisms" in the twentieth century. Rather than tracing their history directly, this seminar approaches three major intellectual figures of the twentieth century, a writer (Burroughs), an artist (Warhol), and a philosopher (Deleuze), in order to lay down the tools for a twentieth-century bioaesthetics. In each of three units the texts (both visual and literary) associated with these figures are explored in depth. Also *HSAR* 695b.

CPLT 583a, Plato's Legacy. Carol Jacobs.

W 3.30–5.20

German thinkers such as Schleiermacher, Hegel, Heidegger, Nietzsche, Benjamin, and Arendt have pondered what it means to read Plato. As they do, a constellation of issues inevitably takes form. How are we to come to terms with the relationship between language and what we tend to call truth? How is language, in turn, fundamental to broader questions of epistemology, ethics, and the political? Our intensive readings in Plato's *Republic* are coupled with the sometimes unsettling readings of the German tradition. What considerably complicates this enterprise, in those who write about Plato no less than in Plato himself, is the uneasy disjunctions one often encounters between what is said and what is performed. Thus we want to analyze the way in which Socrates and his later readers formulate their arguments. In their own contributions to the seminar, students are encouraged to take this constellation of ideas into a variety of literatures or other relevant media. Also *GMAN* 635a.

CPLT 584b^u, Literary Criticism and Rhetoric from Plato to Vico. Olivia Holmes.

M 1.30–3.20

A survey of major works about literature and rhetoric, with special concentration on the classical and Italian traditions. Critics have tried to answer such basic questions as what literature is, what purposes it serves, and whether it is a good thing. We examine alternating attitudes toward figurative language, which has been seen over time as a dangerous seduction, a tool for teaching ethics, and a necessary first step in understanding reality. Authors include Plato, Aristotle, Horace, St. Augustine, Boccaccio, Sidney, and Vico. Also *ITAL* 505b.

CPLT 585b, Introduction to Middle High German Literature. William Whobrey.

TTH 11.30–12.45

A survey of the major works of German vernacular literature from 1150 to 1250, including selections from courtly love poetry, heroic epic, Arthurian romance, crusader songs, and religious narratives. Works are read in the original Middle High German, and aspects of reading and translation are closely linked to an examination of the development of the German language. Special attention is given to the development of vernacular literature, the broader context of Latin culture, and the problems of manuscript transmission. Works to be read in whole or part include: *Nibelungenlied*, *Parzival*, *Tristan*, *Minnesang*, *Gregorius*, and *Der arme Heinrich*. Also *GMAN 585b*.

CPLT 591a, Saussure dans son siècle. Haun Saussy.

W 10.30–12.20

Sometimes described as a watershed in the history of linguistics, Ferdinand de Saussure's *Cours de linguistique générale* is a patchwork of student notes transcribed and condensed into a continuous text. We read the 1916 *Cours* against a background of nineteenth-century linguistics, trace the history of twentieth-century "Saussurianism," and contrast the above with Saussure's manuscript *Ecrits de linguistique générale*, rediscovered in 1996.

CPLT 628b, Visuality and German Writing, 1750–1820. Brigitte Peucker.

T 3.30–5.20

Focusing on sight and the senses, this course explores vision and affect, problems of spectatorship, and the visual arts as they are articulated primarily, but not exclusively, in the German tradition. Texts are read against the backdrop of theories of visuality, both past and present, including essays on the picturesque, on landscape gardening, on physiognomy, and texts by Addison, Diderot, Walter Benjamin, E.H. Gombrich, Michael Fried, Jonathan Crary, Barbara Stafford. Authors include Winckelmann, Lessing, Lichtenberg, Goethe, Wackenroder/Tieck, Schlegel, Kleist, Hoffmann. Also *GMAN 628b*.

CPLT 630a^U, German Literature, Thought, and Culture in the Age of Goethe.

Cyrus Hamlin.

TTH 1–2.15

Interdisciplinary survey of German culture, literature, philosophy, music, and the arts during the Romantic era (1770–1830). Focus on concepts of the individual and self-consciousness, freedom and self-development, the rise of alienation, pessimism, and despair in the early nineteenth century. Among authors to be studied: Kant, Goethe (*Werther* and *Faust*), Mozart (*Magic Flute*), Schiller, and Hölderlin; music by Beethoven and Schubert; Romantic literary criticism and theory (the Schlegels, Novalis); stories by Kleist and Hoffmann; painting by C.D. Friedrich and architecture by C. F. Schinkel; philosophy of Hegel and Schopenhauer. No prerequisites. Readings and discussion in English. Also *GMAN 630a^U*.

CPLT 650a, Ideology, Religion, and Revolution in German Thought.

Henry Sussman.

TH 3.30–5.20

This is a course, pivoting on the close reading of its materials, whose challenge is to explore the cross-currents of conservatism and radicality in nineteenth- and early twentieth-century German thought. It begins with Nietzsche's critique of Christianity and religion in general, in the *Genealogy of Morals* and the *Anti-Christ* (selected passages). It proceeds to a section on Marx, one including the formative first volume of *Kapital* and Derrida's surprisingly heartfelt tribute, *Specters of Marx*. Through readings of *Moses and Monotheism* and some of the metapsychological essays, we trace both the radical and counterrevolutionary politics inherent to Freudian psychoanalysis. Among sources of illumination on this material, we consult Ernesto Laclau, Fredric Jameson, and David Harvey. Collateral literary readings, read in the context

of the aforementioned authors, include Zola (*Ladies' Paradise*), Brecht (*Saint Joan of the Stockyards*), and Döblin (*Berlin Alexanderplatz*). Students are welcome to do their reading and writing in German, French, and/or English. *Also GMAN 545a*.

CPLT 696b, Dutch Painting and the Realist Novel. Ruth Bernard Yeazell.

Th 1.30–3.20

Studies in visual and verbal realism, which take their cue from the nineteenth-century practice of comparing the novel to seventeenth-century Dutch and Flemish painting. Readings include selected art theory and criticism from Reynolds to the present, and novels by Balzac, George Eliot, and Thomas Hardy. *Also ENGL 819b, HSAR 600b*.

CPLT 723b, The French Atlantic Triangle: Literature and Culture of the Slave Trade.

Christopher L. Miller.

Th 10.30–12.20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene, T. Mandeleau. In English. *Also AFAM 854b, AFST 739b, FREN 939b*.

CPLT 725a^u, Postcolonial Theory and Its Literature. Christopher L. Miller.

Th 10.30–12.20

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage*, *créolité*, “minor literature”), but also gives attention to the literary texts from which they are derived (francophone and Anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. Taught in English. *Also AFAM 846a, AFST 746a, FREN 946a^u*.

CPLT 855b, Dickens and the Grotesque. Alexander Welsh.

W 1.30–3.20

A seminar on the nineteenth century's enthusiasm for the grotesque, as mediated by Shakespeare and other Renaissance texts. Theory of Hugo, Ruskin, Bakhtin; practice of Balzac, Hugo, Flaubert, and chiefly Dickens. *Also ENGL 806b*.

CPLT 900, Directed Reading. Faculty.

CPLT 901, Individual Research. Faculty.

CPLT 913a, Empire and Its Double. Sara Suleri Goodyear.

W 3.30–5.20

A course that concentrates on readings of Empire as a “secret sharer” of nineteenth- and twentieth-century British narrative. Rather than solely focusing on images of orientalism, we examine infiltrations of alterity that lie too close for comfort. While attempting to undo the idea of exoticism, we simultaneously address what E. M. Forster calls “aspects of the novel” in order to consider the question, What does the novel want? Texts include Edmund Burke's storytelling in Parliamentary debate, Dickens, Austen, Wilkie Collins, Kipling, Forster, Salman Rushdie, Bapsi Sidhwa, Agra Shahid Ali. Our examination of Conrad's trope of the secret sharer causes us to question the singularity of imperial stories and their slippage into theories of nation. *Also ENGL 913a*.

CPLT 916b^u, Russian Film. John MacKay.

Th 7–8.50 P.M., screenings M 9 P.M.

An historical overview of the development of Russian film with special attention to the classics of directors like Eisenstein and Vertov. Russian film examined in terms both of its contribution to film theory and practice and of the specific historical and cultural contexts of the major films. *Also E&RS 692b^u, FILM 773b^u, RUSS 744b^u*.

CPLT 927b^u, European Cinema in the Wake of Italian Neorealism.**Francesco Casetti.**

w 3.30–5.20

World War II saw modernism enter cinema via Italian neorealism, leading to New Waves in France, England, Germany, and Eastern Europe. Famous auteurs exploited both the “realism” and the “reflexivity” of the medium. This seminar examines strategies of narration through a cultural approach. *Also* *FILM* 731b^u, *ITAL* 597b^u.

CPLT 928b^u, Germany and Eastern Europe: Literature and Film. Katie Trumpener.

mw 2.30–3.45

Juxtaposing German with selected Polish, Czech, Hungarian, and Russian texts, this course explores the twentieth-century encounter between Central and Eastern Europe, and the ways German expansionism (from imperialism to Nazism) shaped cultural identity in both Europes. Particular focus on divergences in German and Eastern European cultural memory, on postwar German attempts at expiation and “decolonization” (particularly within the shared communist framework of the Warsaw Pact), and on how local cultural and political conditions shaped regional versions of modernism, magical realism, and feminist analysis. All texts available in English translations (although knowledge of relevant languages welcome). Texts by Musil, Roth, Hasek, Döblin, Jiri Weiss, Tadeusz Borowski, Christa Wolf, Miron Bialoszewski, Grass, Bobrowski, Herta Müller. Films by Pudovkin, Munk, Konrad Wolf, Szabo, Jonas Mekas, Egon Günther, Petra Tschörtner. *Also* *E&RS* 628b^u, *FILM* 769b^u, *GMAN* 928b.

CPLT 930b^u, Nazi Cinema. Brigitte Peucker.

th 1.30–3.20

An examination of German film during the Nazi period, including the propaganda film, the entertainment film, and the documentary. Special attention to the expression of ideology through cinema and to the development of a fascist aesthetic, its origins, and its aftermath. Films by Fritz Lang, Leni Riefenstahl, Detlef Sierck (Douglas Sirk), G.W. Pabst, Veidt Harlan, and others. In English; films with subtitles. *Also* *FILM* 763b^u, *GMAN* 795b^u.

CPLT 931a, French Film: History, Theory, Pedagogy. Thomas Kavanagh.

m 9.30–11.20

This seminar focuses on three related topics: the history of French cinema, how film theory conceptualizes and inflects that history, and the role of film studies in a French Studies curriculum. Neither strictly historical nor strictly theoretical, this course approaches the films we study through groupings of secondary texts (criticism, theory, literary works) that raise issues concerning the use of film in the broader study of French culture. We look at films by such directors as Lumière, Méliès, Vigo, Buñuel, Carné, Duvivier, Renoir, Resnais, Godard, Truffaut, Varda, Marker, Zonca, and Leconte as well as at critical and theoretical positions taken by Arnheim, Pudovkin, Eisenstein, Mitry, Bazin, Barthes, Metz, Baudry, and Deleuze. Conducted in French. *Also* *FILM* 621a, *FREN* 753a.

CPLT 932b, Cinema as Art, Institution, Discipline. Francesco Casetti.

m 3.30–5.20

Because cinema's status as an artform depends on the functions it serves in cultural contexts, it is also an institution with which spectators negotiate in a complex act of rhetorical communication. This seminar studies how cinema disciplined specific forms of viewing which shaped a gaze. This gaze adapted itself to cultural cues (the desire for a “total vision,” the presence of individual perspective, the desire for heightened perception, the requirement of an organized look, etc.). Texts and films from 1910s to the 1960s are examined. *Also* *FILM* 801b, *ITAL* 810b.

CLPT 941b, Fiestas cubanas. Roberto González Echevarría.

W 2.30–4.20

A study of the fiestas marking the Cuban calendar from the nineteenth century to the present, how they respond to cultural and political transformations, and how they are inscribed in literature, particularly the narrative. The feast as the representation of time and social and political change. The work of anthropologists and theorists of literature such as Claude Lévi-Strauss, Marcel Mauss, Arnold van Gennep, and Mikhail Bakhtin, along with that of Latin American and Cuban anthropologists and writers such as Fernando Ortiz, Lidia Cabrera, José Arrom, Manuel Moreno Fragonals, Miguel Barnet, and Octavio Paz. Fiction by Cirilo Villaverde, Alejo Carpentier, José Lezama Lima, Severo Sarduy, Reinaldo Arenas, Daína Chaviano, and others. In Spanish. *Also SPAN 942b.*

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*), Avi 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*), Heping Zhang (*Epidemiology & Public Health; Statistics*), Hongyu Zhao (*Epidemiology & Public Health; Genetics*)

Assistant Professors

Andrew Miranker (*Molecular Biophysics & Biochemistry*), Valerie Reinke (*Genetics*), David Tuck (*Pathology*), Kevin White (*Genetics*)

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, (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.

Courses

Students normally take at least three of the following four core courses.

MB&B 752b^U, Genomics and Bioinformatics.

MCDB 750a, Core Topics in Biomedical Informatics.

STAT 645b, Statistical Methods in Genetics and Bioinformatics.

CHEM 526a^U, Computational Chemistry and Biochemistry.

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

Paul Hudak

Director of Graduate Studies

Drew McDermott (508 AKW, 432.1283, drew.mcdermott@yale.edu)

Professors

Dana Angluin, Ronald Coifman (*Mathematics*), Julie Dorsey (*on leave* [Sp]), Stanley Eisenstat (*on leave* [Sp]), Joan Feigenbaum (*on leave*), Michael Fischer (*on leave* [F]), David Gelernter (*on leave* [Sp]), Paul Hudak, Ravindran Kannan, Drew McDermott, A. Stephen Morse (*Electrical Engineering*), Vladimir Rokhlin, Holly Rushmeier, Zhong Shao, Martin Schultz, Abraham Silberschatz, Steven Zucker

Associate Professor

James Aspnes

Assistant Professors

Mark Gerstein (*Molecular Biophysics & Biochemistry*), Arvind Krishnamurthy, Yorgis Makris (*Electrical Engineering*), Brian Scassellati (*on leave* [F]), Carsten Schürmann, Yang Richard Yang (*on leave* [F]), Edmund Yeh (*Electrical Engineering*)

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) successfully complete a research project in CPSC 690, 691, and submit a written report on it to the faculty; (3) pass written comprehensive examinations covering basic material in the major subareas of computer science; (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. At least six courses and two parts of the comprehensive examination must be completed by the end of the first year, and the remainder of the first four requirements must normally be completed by the end of the second year. 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 416.

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. Carsten Schürmann.

MWF 1.30–2.20

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. Abraham Silberschatz.

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. Arvind Krishnamurthy.

MWF 11.30–12.20

Software structures, architectures, and algorithms for parallel and distributed applications, focusing on coordination frameworks for asynchronous concurrency (on the code that creates and manages multiple processes and performs the interprocess communication necessary to create integrated ensembles). Coordination languages and program-development environments. The fast-changing WAN-software picture. Parallel and distributed programming exercises on LANs. (Taught in alternate years.)

[CPSC 525a^U, Theory of Distributed Systems.]

CPSC 528b^U, Language-Based Security. Zhong Shao.

MW 2.30–3.45

Survey of most promising LBS techniques and applications in building high-confidence embedded system software: proof-carrying code, certifying compilation and program transformation, typed intermediate and assembly languages, runtime checking and monitoring (software-based fault isolation, inclined reference monitors), high-confidence embedded operating systems and device drivers, and language support for verification of safety and liveness properties.

CPSC 529a^U, Functional Programming. Paul Hudak.

MWF 10.30–11.20

Methods for synthesizing functional programs from formal specifications and verifying correctness properties of programs. Topics include higher-order functions, pattern matching, abstract algebraic datatypes, polymorphic types, advanced typing issues such as type classes and higher-order modules, lazy/eager evaluation, equational reasoning, and realization of effects via continuations and monads. The functional languages Haskell and/or ML are used in the course. (Taught in alternate years.)

[CPSC 530a^U, Formal Semantics.]

CPSC 533b, Computer Networks. Yang Richard Yang.

MW 2.30–3.45

An introduction to computer networks with emphasis on the Internet. Topics include network and protocol architectures; communication and switching techniques; link layer and local area networks; performance analysis; network layer and routing; multimedia and integrated services; flow and congestion control; and network security. (Not taught every year.)

[CPSC 534b^u, Mobile Computing and Wireless Networking.]**CPSC 537a^u, Introduction to Databases. Abraham Silberschatz.**

TTh 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.

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 ENAS 907b^u.*

CPSC 540b^u, Numerical Computation I. Vladimir Rokhlin.

TTh 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 555b^u, Economics and Computation.]**[CPSC 557a^u, Sensitive Information in a Wired World.]****CPSC 560b^u, Theoretical Methods in Computer Science. Ravindran Kannan.**

TTh 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 564b^u, Quantum Computing.]**[CPSC 565a^u, Topics in Algorithms.]****CPSC 567a^u, Cryptography and Computer Security. Michael Fischer.**

MWF 10.30–11.20

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. Ravindran Kannan.

TTh 1–2.15

Beginning with an introduction to tools from probability theory including some inequalities like Chernoff bounds, the course covers randomized algorithms from several areas; graph algorithms, algorithms in algebra, approximate counting, probabilistically checkable proofs, and matrix algorithms. (Not taught every year.)

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 basic principles of building a purposeful autonomous robotic system, with an emphasis on human-machine interaction and cognitive modeling. (Not taught every year.)

[CPSC 574b, Autonomous Systems.]**CPSC 575b, Computational Vision and Biological Perception. Steven Zucker.**

MW 2.30–3.45

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 579a^u, Advanced Computer Graphics: Rendering Techniques. Julie Dorsey, Holly Rushmeier.

TTh 1–2.15

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 752b^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 MB&B 752b^{II}, MCDB 752b^{II}.*

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, Mimi Hall Yiengpruksawan (*History of Art*), Stanley Weinstein (*Emeritus; East Asian Languages & Literatures; Religious Studies*)

Associate Professor

Charles Laughlin

Assistant Professors

Aaron Gerow, Christopher Hill

Lecturer

Pauline Lin

Senior Lectors

Seungja Choi, Koichi Hiroe, Zhengguo Kang, Yoshiko Maruyama, John Montanaro, Ling Mu, Michiaki Murata, Masahiko Seto, Mari Stever, Wei Su, William Zhou

Lectors

Angela Lee-Smith, Rongzhen Li, Ninghui Liang, Hiroyo Nishimura, 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.

Program materials are available upon request to the Director of Graduate Studies, Department of East Asian Languages and Literatures, Yale University, PO Box 208236, New Haven CT 06520-8236, and 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 poetry 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 Poets of 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 cannon 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. 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, William Zhou.

MTWThF 9.30–10.20 *or*

MTWThF 10.30–11.20

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 8.30–9.20 *or*

MTWThF 9.30–10.20

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 545^U, Cantonese. Wei Su.

MWF 9.30–10.20

Introduction to the Cantonese language for learners of (Mandarin) Chinese. Expands students' knowledge of the Chinese language through study of one of its most influential regional variations. Focus on listening and speaking skills, from practical daily communication to the discussion of topics of general interest. Prerequisite: CHNS 530, CHNS 518, or equivalent.

CHNS 550^U, Advanced Modern Chinese. Li-li Teng.MTWThF 10.30–11.20 *or*

MTWThF 11.30–12.20

Third level of the standard foundational sequence of modern Chinese language study in the areas of speech, listening, reading, and writing. Use of audio-visual 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 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 557a^U, Readings in Modern Chinese Short Stories. Zhengguo Kang.

TTh 2.30–3.45

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. Hugh Stimson.

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 561^U, Literary Chinese through Modern Chinese. Pauline Lin.

TTH 11.30–12.45

Integration of the learning of literary Chinese (*wenyan*) with acquisition of modern language skills, with attention to basic problems of syntax and literary style. Conducted in Chinese. After CHNS 530 or equivalent.

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. Pre-requisite: CHNS 560 or equivalent.

CHNS 565b^U, Chinese Composition. Zhengguo Kang.

TTH 2.30–3.45

Intended for advanced students with solid oral and reading proficiency but who want to improve their writing skills. The course offers a systematic writing program, from simple assignments like descriptions, narratives, and expositions to more sophisticated critical essays. Prerequisite: CHNS 553, 556, 557, or equivalent.

CHNS 572a^U, The Classic Chinese Novel. Charles Laughlin.

MW 1–2.15

Introduction to the full-length Chinese novel in the Ming and Qing dynasties (fourteenth to nineteenth century) in translation. Focus on works most influential in later times, including *Outlaws of the Marsh*, *Journey to the West*, *Dream of the Red Chamber (Story of the Stone)*, *Jin Ping Mei*, *The Scholars*, and others. Western scholarship on the Chinese novel also discussed. Previous course work on traditional Chinese literature preferred, but no knowledge of Chinese is required.

[CHNS 574a^U, The Revolutionary Tradition in Modern Chinese Literature.]**[CHNS 575, Wenxin Diaolong: Literary and Cultural Readings.]****[CHNS 578a, *Shishuo xinyu* and Six Dynasties Aesthetics.]****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 600, Seminar in Tang Literature.]**[CHNS 634, The Canon of Poetry (Shi Jing).]****[CHNS 635, The Tradition of the Song Lyric (Ci).]****[CHNS 639a, Canon and Gender in Ming-Qing Poetry and Drama.]****CHNS 641a, The Reception of Tang Poetry. Kang-i Sun Chang.**

T 2.30–4.20

The importance of Tang poetry's afterlife in late Imperial China is a perfect example of the ways in which the past in Chinese literature remained an active part of the future of literature. This course examines the major anthologies of Tang poetry produced during the fourteenth and seventeenth centuries and studies how the so-called Archaists debated the relationship between literary forms and individual creativity. Subjects and schools to be covered may

include the “cabinet” (*tai ge*) style of poetry; its relationship with the “eight-legged” (*bagu*) essay and the examination system; the revival of the *fu* genre; the Early Seven Masters, Later Seven Masters, and their impact on the cultural education.

CHNS 642b, Readings in the *Chuanqi* Fiction of the Ming. Kang-i Sun Chang.

T 2.30–4.20

This course focuses on the revival of the *chuanqi* fiction, a classical genre in Early and Middle Ming (ca. 1400 to 1550). Among the topics covered are manuscript and print culture, *chuanqi* tales as political allegory, cross-generic influences, the impact of the imperial policy on literature, and problems of censorship. The seminar is designed to introduce students to critical skills of literary interpretation through the examination of a variety of source materials.

[CHNS 660b^U, The Visual Imagination in Chinese Art.]

[CHNS 671b, Anti-Romanticism: The Tradition of Irony in Twentieth-Century Chinese Women’s Writing.]

[CHNS 672a, Modern and Contemporary Chinese Poetry.]

[CHNS 673b, The Chinese Body Politic.]

CHNS 689b, Middle Chinese Phonology. Hugh Stimson.

The sound system of seventh-century Chinese as presented in the *Guang Yun*, and its development into the sounds of modern Mandarin.

[CHNS 692a, Rereading the Six Dynasties Anthology, the *Wen Xuan*.]

[CHNS 695a, The Poetics of Place in Modern Chinese Literature.]

[CHNS 696a, Chinese Literary Criticism.]

[CHNS 704, Ming-Qing Literary Theory and Poetics.]

[CHNS 707a, Literature, Culture, and Myth in Ancient China: From *Chuci* to Han Poetry.]

[CHNS 840, Seminar in Qing Poetry.]

CHNS 851b, Modern Chinese Literary Journals. Charles Laughlin.

W 3–5

A survey of major Chinese literary journals in the Republican period (1911–1949), including *Xiaoshuo yuebao*, *Chuangzao yuekan*, *Xin yue*, *Yu si*, *Bei dou*, *Xiandai*, and others. Explores the implications for research methodology of using literary journals and newspaper literary supplements as primary research resources.

[JAPN 501b^U, *The Tale of Genji* and *The Pillow Book*.]

JAPN 515^U, Elementary Japanese. Michiaki Murata, Hiroyo Nishimura.

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, Mari Stever.

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 video tapes for listening comprehension and speaking practice, as well as multimedia materials. Prerequisite: JAPN 515 or equivalent.

JAPN 550^u, Advanced Japanese. Koichi Hiroe, Mari Stever.MWF 11.30–12.45 *or*

MTW 1–2.15

An advanced Japanese language course designed to develop further 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.]**[JAPN 553a^u, Modern Japanese Fiction and Its Margins.]****JAPN 557^u, Readings in Contemporary Media and Literature. Masahiko Seto.**

TTh 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 559a^u, Readings in Literature and the Humanities.]**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. Stanley Weinstein.

An introduction to the traditional Japanese method of reading literary Chinese texts. Selections from the dynastic histories and pre-Ch'in philosophers.

[JAPN 576b^u, Popular Culture from Late Edo to the Present.]**[JAPN 578a^u, Modern Japanese Fiction.]****JAPN 581b^u, Japanese Literature after 1970. John Whittier 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.]**JAPN 586a^u, Japanese Cinema before 1960. Aaron Gerow.**

Th 11.30–12.45, screenings w 7–9.30

An investigation of the history of Japanese cinema up until 1960, including the social, cultural, and industrial backgrounds to its development. Periods covered include the silent era, the coming of sound and the wartime period, Occupation-era film, the Golden Age of the 1950s, and the modernism of the late 1950s. No knowledge of Japanese required.

[JAPN 587b^u, Japanese Cinema after 1970.]

JAPN 700a, Readings in Premodern Japanese Literature. Edward Kamens.

F 9–11

Close reading of Japanese prose and/or poetry of various periods; research in traditional commentary and contemporary criticism.

JAPN 710b, The Textual and Visual Cultures of Heian Japan. Edward Kamens, Mimi Yiengpruksawan.

W 3.30–5.20

Topics in the study of the Heian period and the city-space/cultural center we call “Heian” explored through close examination of a variety of artifacts—works of art and architecture, historical and literary texts, both secular and religious. Primary documents in Japanese and Sino-Japanese (*kanbun*) are explored in depth; a reading knowledge of literary Japanese and of *kanbun* is required. *Also HSAR 802b.*

[JAPN 830b, Literature, Culture, and Thought in Modern Japan.]**[JAPN 835b, Modernity and Culture in Imperial Japan.]****JAPN 871b, Readings in Japanese Film Theory. Aaron Gerow.**

T 1.30–3.20, screenings W 7–9

Theorizations of film and culture in Japan from the 1910s to the present. Through readings in the works of a variety of authors, the course explores both the articulations of cinema in Japanese intellectual discourse and how this embodies the shifting position of film in Japanese popular cultural history.

JAPN 885, Modern Japanese Novel. John Whittier Treat.

W 2–4.30

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.

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 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 (*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*), 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 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 the Chinese or Japanese people, their culture, historical development, and contemporary problems. 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.

ECOLOGY AND EVOLUTIONARY BIOLOGY

Osborn Memorial Laboratories, Rm 101, 165 Prospect Street, 432.3837, www.eeb.yale.edu
M.S., Ph.D.

Chair

Stephen Stearns

Director of Graduate Studies

Günter Wagner [F], Richard Prum [Sp]

Professors

Leo Buss (*on leave* [Sp]), Michael Donoghue, Jacques Gauthier (*Geology & Geophysics*), Willard Hartman (*Emeritus*), Gene Likens (*Cary Arboretum*), Alvin Novick, Jeffrey Powell, Richard Prum, Charles Remington (*Emeritus*), Oswald Schmitz (*Forestry & Environmental Studies*), Stephen Stearns, J. Rimas Vaisnys (*Electrical Engineering*), Günter Wagner (*on leave* [Sp])

Associate Professors

Vivian Irish (*Molecular, Cellular & Developmental Biology*), Sean Rice, David Skelly (*Forestry & Environmental Studies*), Anne Yoder

Assistant Professors

Suzanne Alonzo, David Post, Melinda Smith, Paul Turner (*on leave*)

Lecturers

Adalgisa Caccone, 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. Each student is required to undertake laboratory research in the form of two research rotations in the first year. Students must also attend the advanced

research topics course E&EB 502 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 comprehensive examination in ecology and evolutionary biology. 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.

Courses

E&EB 502, Advanced Research Topics in Ecology and Evolutionary Biology.

Günter Wagner.

MWF 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 three weeks. At the end of each term the students are expected to write a paper on a topic of their choice.

E&EB 510a^U, Introduction to Statistics: Life Sciences. Jonathan Reuning-Scherer, 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. David Post, 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, Sean Rice.

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, David Post, 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. Alvin Novick.

MWF 10.30–11.20

The natural history, biology, and epidemiology of AIDS; social, ethical, public policy, and political aspects of AIDS and of the ways societies address a medical crisis.

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 555a^u, The Invertebrates. Adolf Seilacher, Derek Briggs, Leo Buss.

MW 11.30–12.45

The biology and paleobiology of invertebrates, including the diversity of body plans, comparative development, phylogeny, and functional morphology. *Also G&G 516a^u.*

E&EB 556La^u, Laboratory for the Invertebrates. Adolf Seilacher, Derek Briggs, Leo Buss.

Th 1.30

Comparative functional morphology of selected invertebrate phyla, with demonstrations of diversity within phyla. *Also G&G 517La^u.*

E&EB 558a^u, Seminar in Invertebrate Zoology. Marta Martinez Wells.

M 1.30–5.20

[E&EB 567a^u, Biology of Fishes.]**[E&EB 568La^u, Laboratory for Biology of Fishes.]****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.

MWF 9.30–10.20

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. Anne Yoder.

TTh 2.30–3.45

Review of the evolutionary history and defining characteristics of mammals. Topics include the fossil record, phylogenetic reconstruction, morphological transitions, and ecological and physiological specializations. Topics are viewed in a synthetic context that presents mammalian characteristics as solutions to a variety of evolutionary challenges.

E&EB 576Lb^u, Laboratory for Evolution of the Mammals. Anne Yoder.

W 1.30

Review of the morphological characteristics of living mammals. Examination of representative skeletons and skins for all major mammalian groups. A comparative study of morphological transitions and specializations within and among groups.

[E&EB 601a, Biocomplexity.]**[E&EB 610b^u, Evolutionary Genetics.]****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 620b^u, Seminar in Conservation Genetics. Gisella Caccone.

T 3.30–5.20

An introduction to conservation genetics. The importance of genetic diversity and the means of preserving it.

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 671La^u, Laboratory for Aquatic Ecology.]**[E&EB 675b^u, Molecular Approaches to Systematics, Conservation Genetics, and Behavioral Ecology.]****[E&EB 680a, Advanced Introduction to Evolutionary Theory.]****[E&EB 685b^u, Evolutionary Developmental Biology.]****[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. J. Rimas Vaisnys.**

TTh 11.30–12.45

An introduction to the ways in which the structure and behavior of evolving biological systems can be described, modeled, and analyzed. Examination of model systems as well as modeling of laboratory and field phenomena.

E&EB 845a, Advanced Evolutionary Theory. Sean Rice.

TTh 4–6

A lecture course covering the mathematical and conceptual basis of the major branches of evolutionary theory, including traditional and emerging areas. Emphasis on the biological insights that are gained from the theory. Open to undergraduates with permission of the instructor.

E&EB 900a–b, First-Year Introduction to Research and Rotations.**Günter Wagner [F], Richard Prum [Sp].****E&EB 930a, Seminar in Systematics. Jacques Gauthier.**^{3 HTBA}*Also G&G 703a.***E&EB 950a or b, Second-Year Research.**

By arrangement with faculty.

*Related University Course of Interest***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.

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. In recognition of the student's extra year of graduate study, the Graduate School charges five years of tuition but also considers the Economic History student eligible to apply for five years of financial aid. The Ph.D. degree is awarded by the department in which the student has been admitted for that degree.

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

David Pearce (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, Stephen Coate, 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, Stephen Morris, Giuseppe Moscarini, Barry Nalebuff, William Nordhaus, David Pearce, Peter Phillips, Benjamin Polak, Gustav Ranis, John Roemer, Herbert Scarf, T. Paul Schultz, Robert Shiller, Martin Shubik, T. N. Srinivasan, Christopher Udry

Associate Professors

George Hall, Carolyn Moehling

Assistant Professors

Patrick Bayer, Irene Brambilla, Björn Bruegemann, Hanming Fang, Donato Gerardi, Galina Hale, Justine Hastings, Fabian Lange, Taisuki Otsu, Rohini Pande, Anthony Smith, 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 418–19 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 245 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. Stephen Morris.

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, Benny Moldovanu.

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. Stephen Morris.

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, Giuseppe Moscarini.

Selected empirical topics.

ECON 527a, Behavioral and Institutional Economics. Robert Shiller.

Behavioral economics incorporates insights from other social sciences, such as psychology and sociology, into economic models, and attempts to explain anomalies that defy standard economic analysis. Institutional economics is the study of the evolution of economic organizations, laws, contracts, and customs as part of a historical and continuing process of economic development. Behavioral economics and institutional economics are naturally treated together, since so much of the logic and design of economic institutions has to do with complexities of human behavior.

ECON 530a, Mathematical Economics I. Truman Bewley.

The focus of the class is intertemporal problems in general equilibrium theory. One set of topics is the links between the theories of general equilibrium, overlapping generations models, and economic growth. Another topic is the link between the permanent income hypothesis and general equilibrium analysis. A third topic is the stability of equilibrium with and without the permanent income hypothesis.

ECON 531b, 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 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 546a, 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. 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. Staff.

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 555a, 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.

Peter Phillips.

This course is an introduction to nonstationary time series and econometric applications covering the following topics. Weak convergence and functional central limit theory with unit root model illustrations. An introduction to stochastic calculus, and weak convergence to stochastic integrals. Unit root tests and applications. Testing stationarity. Spurious regression. General regression asymptotics for integrated processes with Hilbert projection geometry. Co-integration, tests for co-integration and reduced rank regression. Regression estimation of co-integrated systems and VARs with some unit roots. Bayesian approaches to unit root and co-integration analysis. Nonlinear functions of integrated processes and econometric applications. Fractional processes and long memory. Theory and empirical applications are discussed. Computer exercises in Gauss. Credit is obtained from a take-home examination and an empirical computer application.

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 561b, Computational Method for Economic Dynamics. 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. Donald Andrews, Peter Phillips.

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. Donald Andrews, Peter Phillips.

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, Philip Haile, 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. Steven Berry, Philip Haile, Justine Hastings.

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. Joseph Altonji, Fabian Lange.

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. Patrick Bayer, 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. Patrick Bayer, Hanming Fang.

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 VERs 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. Galina Hale.

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. Rohini Pande, T. N. Srinivasan, Christopher Udry.

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. Rohini Pande, T. N. Srinivasan, 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. 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. Robert Evenson.

This is a comparative course emphasizing the extraordinary diversity in the technology utilized in different agricultural systems in different countries. This diversity ranges from the technology employed in U.S. agriculture where only one percent of the labor force is engaged in agricultural production, to the primitive technologies still being employed in parts of Sub-Saharan Africa where 70 percent of the labor force is engaged in agriculture. The course covers models of agricultural households, models of institutions and transaction costs in markets, models of mechanization, and models of demand.

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 737a^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/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. John Roemer.

W 10–12

Political competition in democracies is party competition. We develop, from the formal viewpoint, theories of party competition in democracies. The familiar “median voter theorem” of A. Downs is the simplest example of such a theory, but it is inadequate in several ways. We develop a theory in which parties (1) compete over several issues, not just one issue, as in Downs; (2) are uncertain about how citizens will respond to platforms; and (3) represent interest groups in the population. Applications, particularly to the theory of income distribution and taxation, are studied. *Also PLSC 575a.*

ECON 790b, Political Economy. Ebonya Washington.

Political economy is the study of public policy making from an economic perspective. This course provides an introduction to the field. The first part focuses on tools, providing an overview of theories of policy determination via the political process. Topics include voter behavior, electoral competition, legislative decision making, and interest group influence. The second part discusses applications, focusing on questions of interest to public economists. Topics include political failure, the implications of alternative electoral systems, campaign finance reform, citizen initiatives, and political transitions.

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, W.J. Cunningham (*Emeritus*), 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

Associate Professors

Jung Han, Lawrence Staib, Hemant Tagare

Assistant Professors

Hur Koser, Richard Lethin (*Adjunct*), Yiorgos Makris, Janet Pan, Andreas Savvides, Sekhar Tatikonda, Edmund Yeh

Fields of Study

Fields include control systems, neural networks, communications and signal processing, wireless networks, intelligent sensors, sensor networks, biomedical image processing, 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

Jerry M. Woodall

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*), Pierre Hohenberg (*Adjunct*), Marshall Long, Tso-Ping Ma, Daniel Prober, Nicholas Read, Mark Reed, Subir Sachdev, Robert Schoelkopf, Ramamurty Shankar, Mitchell Smooke, A. Douglas Stone, John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*), Jerry Woodall

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

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, Mark Laubach, Erin Lavik, Xenios Papademetris

FIELDS OF STUDY

Fields include the physics of image formation (MRI, ultrasound, nuclear medicine, and X-ray), NMR spectroscopy, 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*

John Walz

Professors

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

Associate Professors

Gaboury Benoit, Paul Van Tassel

Assistant Professor

William Mitch

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, W.J. Cunningham (*Emeritus*), 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

Associate Professors

Jung Han, Lawrence Staib, Hemant Tagare

Assistant Professors

Hur Koser, Richard Lethin (*Adjunct*), Yiorgos Makris, Janet Pan, Andreas Savvides, Sekhar Tatikonda, Edmund Yeh

FIELDS OF STUDY

Fields include control systems, neural networks, communications and signal processing, wireless networks, intelligent sensors, sensor networks, biomedical image processing, 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, Karl Turekian, John Walz

Associate Professor

James Saiers

Assistant Professors

Michelle Bell, Ruth Blake, William Mitch

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

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, Lisa Pfefferle, Daniel Rosner, Ronald Smith, Mitchell Smooke, Katepalli Sreenivasan (*Adjunct*), George Veronis, Peter Wegener (*Emeritus*), Forman Williams (*Adjunct*)

Associate Professors

Jacek Cholewicki, Udo Schwarz, Wei Tong, 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; experimental, theoretical, and computational studies of turbulence; chaos; fractals; aerodynamics; kinetic theory of gases and mixtures; electrospray theory and characterization; combustion and flames; computational methods for fluid dynamics and reacting flows; laser diagnostics of reacting and nonreacting flows; atmospheric turbulence, climate, theoretical and laboratory modeling of large-scale ocean circulation.

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; biomechanics of the heart; electromigration in metallic interconnects; transient nucleation in multicomponent systems; jamming in particulate systems such as glasses, colloids, and granular materials.

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, normally completed in the first two years. (Students registered in Applied Physics must take a minimum of twelve term courses.) Mastery of the mathematical topics, as covered, for example, in ENAS 500a, is expected and generally required (for exceptions, consult the individual department/program). 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 should be Special Investigations, and at least two should 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 416.

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/GIF/grad/courses.html for the most updated course listing.

ENAS 500a, Mathematical Methods I. Charles Ahn.

TRH 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 Bławdziewicz.

TRH 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. Sekhar Tatikonda.

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 505a, Advanced Engineering Mathematics. Paul Van Tassel.

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 9–10.15

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.][ENAS 509a^u, Electronic Materials: Fundamentals and Applications.]**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.]**ENAS 514b^u, Real Analysis. Serge Lang.**

TTH 1–2.15

The Lebesgue integral, Fourier series, applications to differential equations.

ENAS 521a, Classical and Statistical Thermodynamics. Abbas Firoozabadi.

TTH 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 525b, Optimization I.]

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. James Wilkins.

TTh 1–2.15

Biotechnology treated from the point of view of chemical engineering. Basics of microbiology, microbial genetics and control, and genetic engineering, followed by enzyme kinetics and biochemical reactors. Fermentation technologies: biochemical separation processes with emphasis on chromatography. Field trips to fermentation facilities.

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 2.30–3.45

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 602a, Chemical Reaction Engineering.]**ENAS 603a, Energy Mass and Momentum Processes. Michael Loewenberg.**

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. Paul Van Tassel.**

TTH 10.30–12

A graduate-level introduction is given to modern colloid science as practiced by engineers. Topics include self-assembly in solution and at surfaces, surface chemistry, the electric double layer, colloidal forces, and polymers. Applications to problems frequently encountered by chemical, biomedical, and environmental engineers are stressed throughout.

[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. Eric Altman.**

TTH 9–10.45

Fundamental and practical aspects of spectroscopy, diffraction, and microscopy related to the structural and chemical characterization of surfaces and thin films. Emphasis on identification of adsorbed species by vibrational spectroscopy, determination of the chemical state of the surface by photoelectron spectroscopy, quantitative methods in surface analysis, determination of surface structure by scanned probe microscopy techniques and diffraction methods, and recent advances in surface characterization.

ENAS 618a, Principles and Practice of Heterogeneous Catalysis. Gary Haller.

TTh 1–2.15

Emphasis on heterogeneous characterization by spectroscopic techniques. Following the introduction of principles, we review several large-scale industrial applications which include: catalytic reforming of naphtha (metal and bimetallic catalysts), catalytic cracking (zeolite catalysts), catalytic hydrotreating, automobile pollution catalysts, and chemical productions, e.g., ethylene oxide, methanol, etc.

[ENAS 619b, Advanced Transport: Topics in Multiphase Chemical Reaction Engineering.]**ENAS 622b, Topics in Multiphase Chemical Reaction Engineering. Daniel Rosner.**

TTh 10.30–11.45

A series of lectures dealing with fundamental aspects of the thermochemistry, phase/chemical equilibria, chemical kinetics, and transport phenomena underlying the use of homogeneous and/or heterogeneous chemical reactions (often combustion related) to economically synthesize materials at high production rates, including valuable vapors, particulate matter (ultrafine powders), dense and granular coatings, and monoliths. Included are scale-up, purity, safety, and environmental issues associated with the economics/choice of synthesis reactors, along with a summary of R&D trends and associated research needs.

ENAS 626a^U, Chemical Engineering Process Control. Eric Altman.

MW 1–2.15

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 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. Jason White.

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, Physical and Chemical Processes in Environmental Engineering. 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.**Joseph Pignatello.**

TTH 4–5.15

Fundamental chemical and physical processes controlling the distribution, transport, and transformation of anthropogenic organic chemicals in aqueous environments including soils, sediments, and groundwater. The course provides basic knowledge about the following: (1) the use of chemical and physical principles to quantify the thermodynamics and kinetics of individual processes, (2) the use of chemical structure to understand these processes at the molecular level, and (3) a framework for evaluating the relative importance of these processes so that the fate of a particular chemical in a particular environment may be predicted.

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, Marian Chertow.

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. James Saiers.

MW 11.30–12.50

An introduction to the essential elements of hydrogeologic processes. Course topics include groundwater flow, occurrence and movement of water in the vadose zone, streamflow generation, groundwater contamination, and transport of chemicals in groundwater. Computer software packages are used to reinforce concepts presented in class. A modest background in general physics and calculus is required. *Also F&ES 540a.*

ENAS 647b, Hydrological Modeling. James Saiers.

T 2.30–5.20

Application of computer models to solve problems related to water movement and chemical migration in subsurface environments. Unsaturated and saturated flow phenomena are considered, and the role of geochemical and microbiological processes in chemical fate and transport are examined. *Also F&ES 541b.*

[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. Corey O'Hern.

TTh 2.30–3.45

Review of equilibrium Molecular Dynamics and Monte Carlo simulation methods in various thermodynamic ensembles. Introduction to non-equilibrium molecular dynamics techniques especially to study shear flow and heat transport in liquids. The application of novel nonequilibrium Molecular Dynamics and Monte Carlo methods to the study of supercooled liquids and glasses and sheared granular materials and foams.

[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. David Bercovici.

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.]****ENAS 786b, Mechanical Behavior of Materials. David Wu.**

HTBA

A detailed treatment of the relationship between the microstructure of a material and its mechanical behavior. Topics include defects in crystals; strengthening mechanisms; crystal plasticity; work hardening; recovery, recrystallization, and grain growth. Emphasis on the relationship between material-based and continuum models.

[ENAS 789a, Turbulence and Related Problems.]**[ENAS 810b, Nonlinear Optics.]****[ENAS 815b, Detection of Radiation.]****ENAS 817a, Noise, Dissipation, and Amplification. Michel Devoret.**

TTH 9–10.30

Graduate-level equilibrium and non-equilibrium statistical physics applied to quantum electronics/optics phenomena. The aim is to explain the fundamental link between the random fluctuations of a physical system in equilibrium and the response of the same system to an external perturbation. Several key examples where noise appears as a resource rather than a limitation are treated: spin relaxation in nuclear magnetic resonance (motional narrowing), Johnson-Nyquist noise in solid state transport physics (noise thermometry), photon correlation measurements in quantum optics (Hanbury Brown-Twiss experiment), and so on. The course explores both passive and active systems. It discusses in particular the ultimate limits of amplifier sensitivity and speed in physics measurements. *Also PHYS 677a.*

[ENAS 818a, Mesoscopic Physics.]**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 850a^U and 851b^U, Solid State Physics I and II. Victor Henrich [F], Robert Schoelkopf [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, Many-Body Theory of Solids. A. Douglas Stone.

TTh 10.30–12

Solids as many-particle systems. Second quantization. Green's functions, quantum statistical mechanics, linear response theory. Hartree-Fock theory, perturbation theory, Feynman diagrams at finite temperature. Theory of the electron gas, electron-phonon coupling, BCS theory of superconductivity. *Also PHYS 610b.*

ENAS 856a, Theory of Solids I. Sohrab Ismail-Beigi.

WF 10.30–12

Theoretical techniques for the study of the structural and electronic properties of solids, with applications. Topics include band structure, phonons, defects, transport, magnetism, and superconductivity. *Also PHYS 650a.*

[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. Nicholas Read.

MW 10.30–12

Aspects of the quantum Hall effect, particularly the fractional effect, and conformal field theory, plus the connections between the two. Quantum Hall states, composite particles, quasiparticles, fractional charge, and statistics. Future applications to rotating trapped atoms. Conformal symmetry in two dimensions, applications to classical critical phenomena, 1+1 quantum field theory. Nonabelian quantum Hall states, and the relation with conformal field theory and Chern-Simons gauge theory. Background required: statistical mechanics, and either many-body theory or quantum field theory. *Also PHYS 667a.*

ENAS 863b, Introduction to Superconductivity. Daniel Prober.

MW 10.30–12

The fundamentals of superconductivity, including both theoretical understandings of basic mechanisms and description of major applications. Topics include historical overview, Ginzburg-Landau (mean field) theory, critical currents and fields of type II superconductors, BCS theory, Josephson junctions and microelectronic and quantum-bit devices, and high T_c oxide superconductors. *Also PHYS 633b.*

[ENAS 866a, MOS Device Physics and Technology.]**ENAS 875a^U, Introduction to VLSI System Design. Richard Lethin.**

Th 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 887a^U, Dynamic Programming 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.

MW 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. Richard Chang.

TTh 11.30–12.45

Comprehensive treatment of the optical and electronic properties of semiconductor alloys and quantum structures. Physical models of blackbody radiation, spontaneous emission, stimulated emission, absorption, and polarization. Quantitative analysis of the effects of temperature, pressure, stress fields, and electric and magnetic fields. *Also PHYS 676a.*

[ENAS 918b, Data/Telecommunication Technology.]

[ENAS 919b, Advanced Heterojunction Devices.]

ENAS 928b, Compound Semiconductor Materials Science, Processing, Devices, and Characterization. Jerry Woodall.

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.]**ENAS 944a^u, Digital Communications Systems. Sekhar Tatikonda.**

MW 10.30–11.45

An introduction to the rapidly expanding field of mobile and fixed, voice and data communications systems. A review of analog and digital signals and their time and frequency domain representations. Topics include modulation methods, including amplitude; frequency and time division multiplexing for continuous and discrete/digital signals; an overview of modern

voice and data communications networks; and an overview of information theory, including entropy, the quantification of information, data rates, coding, and compression. Examples and demonstrations are drawn from radio, telephone, television, computer, cellular, and satellite communications networks.

ENAS 954b^U, Information Theory. Edmund Yeh.

TRH 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.

[ENAS 964b^U, Communication Networks.]

[ENAS 974a, Math Tools/Biomed Signal Process.]

[ENAS 986b^U, Semiconductor Silicon Devices and Microelectronics.]

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. David Lavan.

MW 2.30–3.20

The SynThesis course is a product-based graduate course in product design and the management of innovation. Students work in entrepreneurial teams to research, develop, create, and market a viable, real-world product. The teams consist of exceptional Engineering students, drawn primarily from the Select Program, as well as School of Management students. The entrepreneurial teams work independently – with the guidance of industry mentors, faculty coaches, and a user community – to develop their prototypes, business plans, and final product. The teams are assessed by juries made up of industry representatives, venture capitalists, and product development experts.

[ENAS 996b, SynThesis: Product Design for Entrepreneurial Teams.]

ENGLISH LANGUAGE AND LITERATURE

Linsly-Chittenden Hall, 432.2233

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

Chair

Ruth Bernard Yeazell

Directors of Graduate Studies

Jill Campbell [F] (107A LC, 432.2226, jill.campbell@yale.edu)

Linda Peterson [Sp] (107A 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, Traugott Lawler, Lawrence Manley, Donald Margulies (*Adjunct*), J.D. McClatchy (*Adjunct*), Annabel Patterson, Lee Patterson, Linda Peterson, David Quint, Claude Rawson, Joseph Roach, John Rogers, Robert Stepto, Katie Trumpener, Alexander Welsh, Ruth Bernard Yeazell

Associate Professors

Murray Biggs (*Adjunct*), William Deresiewicz, Elizabeth Dillon, Laura Frost, Matthew Giancarlo, Blair Hoxby, Amy Hungerford, David Krasner, Pericles Lewis, Christopher R. Miller, Marc Robinson (*Adjunct*)

Assistant Professors

Tanya Agathocleous, Nigel Alderman, Ala Alryyes, Jennifer Baker, Shameem Black, Jessica Brantley, Wes Davis, El Mokhtar Ghambou, James Kearney, Sanda Lwin, Stefanie Markovits, Diana Paulin, Lloyd Pratt, Nicole Rice, 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 416. 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. Roberta Frank.

MW 9–10.20

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 9–10:20

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 505b^U, Readings in Old Norse Poetry and Prose: Chronicles of the Vikings. Roberta Frank.

MW 2.30–3.45

An introduction to the literature of earliest Norway and Iceland. Texts (read in the original) include runic inscriptions left behind by the Vikings, verse of their official skalds, the sometimes irreverent mythological poetry of the *Edda*, and the sagas telling of the Norse discovery of America. Prerequisite: LING 182/582 or permission of the instructor.

ENGL 534a^U, *Piers Plowman*. Traugott Lawler.

W 10.30–12.20

A reading of the whole poem in the B text, with some reference to the A and C texts; regular assignments also in the critical and scholarly literature.

ENGL 546b, Chaucer, *The Canterbury Tales*. Jessica Brantley.

T 10.30–12.20

A reading of *The Canterbury Tales* that places them in the contexts of both medieval culture and modern critical and editorial practices.

ENGL 550a, Sidney and Spenser. Annabel Patterson.

M 3.30–5.20

This course takes on two of our greatest unfinished literary works, Sir Philip Sidney's *Arcadia*, a pastoral romance in prose, and Edmund Spenser's *Faerie Queene*, a romantic epic in verse. Our task is to stretch our minds around these daunting structures; to understand the generic decisions and innovations they make; to theorize incompleteness and, in the case of the *Arcadia*, revision; and to develop our own take on "Elizabethanism" as a cultural phenomenon.

ENGL 577a, Renaissance Poetry. David Quint.

T 1.30–3.20

A survey of major sixteenth- and early seventeenth-century poets, with attention to the development of genres, explorations of subjectivity and love, classical and continental models. Authors include Skelton, Wyatt, Sidney, Shakespeare, Campion, Raleigh, Daniel, Marlowe, Donne, and Jonson.

ENGL 617b, Shakespeare and the Comedy of Evil. Lawrence Manley.

W 3.30–5.20

An examination of comic elements and implications in tragedies by Shakespeare and his major contemporaries. Special attention is given to the comedy of evil and its relationships to religious performance, villain tragedy, grand guignol, “horrid laughter,” and satire. Plays by Shakespeare, Marlowe, Webster, Jonson, Barnes, Middleton, and Rowley.

ENGL 672b, Milton. John Rogers.

F 1–3

This course studies Milton’s poetry and some of his controversial prose. We investigate the relation of the poetry to its historical contexts, focusing on the literary, religious, social, and political forces that shaped Milton’s verse. We are concerned, in addition, to survey and assess some of the dominant issues in contemporary Milton studies, examining the types of readings that psychoanalytic, feminist, Marxist, and historicist critics have produced.

ENGL 713a, Swift. Claude Rawson.

M 1.30–3.20

In *A Tale of a Tub* Swift parodied in advance a whole chain of Modernisms, from *Tristram Shandy* to Beckett, Joyce, the literature of “cruelty” and “black humor,” and some works by Nabokov, Burroughs, and Mailer. The course studies the *Tale*, the Irish writings, *Gulliver’s Travels*, *A Modest Proposal*, and the poems, in the context of a tradition that includes classical and Renaissance precursors, his own contemporaries (especially Alexander Pope), and his future legacy from Sterne to the present.

ENGL 720a, Studies in Eighteenth-Century Literature: Prose of the Age of Johnson. David Bromwich.

Th 9.30–11.20

A consideration of the major writings of Johnson, Gibbon, and Burke, with discussions centered on the emerging language of human nature. Additional reading may include some of Hume’s essays and Butler’s sermons as well as brief selections from Addison and Steele.

ENGL 725a, The Eighteenth-Century Novel. Jill Campbell.

Th 1.30–3.20

Study of works by Behn, Defoe, Richardson, Fielding, Sterne, Burney, Edgeworth, and Austen, and of current critical debate on “the rise of the novel” in eighteenth-century England and its shifting canon.

ENGL 769a, Wordsworth and Coleridge. Paul Fry.

W 1.30–3.20

Emphasis on Wordsworth’s poetry and prose, 1796–1815, read in opposition to selected poetry and prose of Coleridge, to which at least two weeks are devoted.

ENGL 770b^U, Romanticism and History. Leslie Brisman.

MW 11.30–12.45

Wordsworth and Blake and the history of the self as an alternative to preoccupation with political history. The Wordsworth reading includes *The Prelude* in its entirety, with special emphasis on the French Revolution books. The Blake selection includes *The French Revolution* and *Milton*. Some attention to the question of history in major poems and drama of Shelley and Byron. This is not a course in which students are asked to produce New Historical work, though we examine some New Historical approaches and their competitors.

ENGL 806b, Dickens and the Grotesque. Alexander Welsh.

W1.30–3.20

A seminar on the nineteenth century's enthusiasm for the grotesque, as mediated by Shakespeare and other Renaissance texts. Theory of Hugo, Ruskin, Bakhtin; practice of Balzac, Hugo, Flaubert, and chiefly Dickens. *Also CPLT 855b.*

ENGL 810a, Victorian Poetry in Its Contexts. Linda Peterson.

M 10.30–12.20

Readings in the poetry of five major Victorian writers: Tennyson, the Brownings, Arnold, and one of the Rossettis. We consider the poetry in various contemporary contexts: literary (including its relation to Romantic poetry and questions of genre, especially epic), social (engagement with contemporary social concerns, including education, religion, industrialization, and urbanization), and political and imperial concerns. Supplementary reading in current criticism and scholarship.

ENGL 819b, Dutch Painting and the Realist Novel. Ruth Bernard Yeazell.

Th 1.30–3.20

Studies in visual and verbal realism, which take their cue from the nineteenth-century practice of comparing the novel to seventeenth-century Dutch and Flemish painting. Readings include selected art theory and criticism from Reynolds to the present, and novels by Balzac, George Eliot, and Thomas Hardy. *Also CPLT 696b, HSAR 600b.*

ENGL 841b, Early American Literature and Transatlantic Print Culture.

Elizabeth Dillon.

Th 10.30–12.20

This course explores the literature of colonial America in relation to its transatlantic production and reception; we also read selected European texts that were widely circulated in the Atlantic world and that bear on questions of colonialism, specifically the advent of new economies and the new science, the encounter with new peoples, and the development of the literary public sphere. The course aims both to read central texts in the literature of the colonial world and to attend to the effects of colonialism itself on the thematics and forms of literature of the Atlantic public sphere in the seventeenth and eighteenth centuries. A variety of genres are considered, including personal narrative, poetry, the novel, and drama.

ENGL 913a, Empire and Its Double. Sara Suleri Goodyear.

W 3.30–5.20

A course that concentrates on readings of Empire as a “secret sharer” of nineteenth- and twentieth-century British narrative. Rather than solely focusing on images of orientalism, we examine infiltrations of alterity that lie too close for comfort. While attempting to undo the idea of exoticism, we simultaneously address what E. M. Forster calls “aspects of the novel” in order to consider the question, What does the novel want? Texts include Edmund Burke’s storytelling in Parliamentary debate, Dickens, Austen, Wilkie Collins, Kipling, Forster, Salman Rushdie, Bapsi Sidhwa, Agra Shahid Ali. Our examination of Conrad’s trope of the secret sharer causes us to question the singularity of imperial stories and their slippage into theories of nation. *Also CPLT 913a.*

ENGL 921a, 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^{II}, AMST 921a.*

ENGL 942b, Theorizing “Black” and “Asian” Intersectionalities in the United States.**Sanda Lwin, Diana Paulin.**

Th 3.30–5.20

This graduate seminar approaches racial formation/racial representation through the comparative lens of Asian American and African American literary and cultural production. We read theoretical and primary texts from various fields, including performance studies, literary studies, psychoanalytic theory, cultural studies, gender studies, legal studies, and postcolonial studies, in order to construct a critical apparatus for understanding race relationally rather than as strictly defined categories of identity that have, traditionally, been studied in segregated disciplines. We interrogate conventional black/white paradigms of race by looking at intersectionalities that unsettle binaries. Authors/artists include Homi Bhaba, Judith Butler, W.E.B. Du Bois, David Eng, Franz Fanon, Kobena Mercer, José Muñoz, Vijah Prashad, Mira Nair, Anna Devereaux Smith, and Claudia Tate. *Also AFAM 722b, AMST 673b.*

ENGL 985a, Literary Genres and World Cultures. Wai Chee Dimock.

T 10.30–12.20

This course uses the concept of “genre” as an entry point to the dynamic interactions between the local and the global, between the persistence of words and the transformative forces of migration, translation, and hybridization. The history of genres is, in this sense, a history of the diverse cultures of humankind. We read clusters of texts in this light: Homer’s *Odyssey* with Derek Walcott’s play of the same title, Walcott’s *Omeros*, and Wole Soyinka’s “The Eye of the Cyclops”; Daniel Defoe’s *Robinson Crusoe* with J. M. Coetzee’s *Foe*, Coetzee’s 2003 Nobel Lecture, Walcott’s “The Castaway,” “Crusoe’s Island,” “Crusoe’s Journal,” “The Figure of Crusoe,” as well as “The Adventures of Lo Bun Sun” in Maxine Hong Kingston’s *China Men*; Hawthorne’s *The Scarlet Letter* with Maryse Conde’s *I, Tituba, Black Witch of Salem*, Arthur Miller’s *The Crucible*, and Bharati Mukherjee’s *The Holder of the World*. Doing so, we explore the inflections wrought by local cultures on generic terms such as “drama,” “epic,” “novel,” and “lyric.” *Also AMST 927a, CPLT 525a.*

ENGL 986b, Lyric and Society after Auden. Langdon Hammer.

T 1.30–3.20

The relationship between lyric and society as a central issue in American and British poetry since the 1930s. Poems by W. H. Auden, Elizabeth Bishop, Adrienne Rich, James Merrill, Thom Gunn, John Ashbery, Thylas Moss, Michael Palmer, and Geoffrey Hill, as well as the “9/11” poems, read alongside essays in literary theory and criticism.

ENGL 987a, Fredric Jameson: The Poetics of Social Forms. Nigel Alderman.

W 10.30–12.20

This course examines the work of Fredric Jameson from his earliest forays into method to his revision of narrative theories to his mapping of periods and systems. By so doing we cover virtually all the major theoretical and philosophical models of the postwar period as well as a range of cultural works including medieval romance, nineteenth-century novel, modernist poetry, postmodern architecture, film, and music. *Also AMST 928a, CPLT 518a.*

ENGL 990a, The Teaching of English. John Rogers.

F 10–12

An introduction to the teaching of literature and composition. Weekly seminars address a series of practical problems connected with teaching: preparing syllabi 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 students’ papers. Continuing attention to important theoretical issues.

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, Karl Turekian, John Walz

Associate Professor

James Saiers

Assistant Professors

Michelle Bell, Ruth Blake, William Mitch

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.

Chair

Michael Merson

Director of Graduate Studies

Nancy Ruddle (785.6383)

Director of Medical Studies

David Katz

Professors

Serap Askoy, Michael Bracken, Kelly Brownell, Mark Cullen, Arthur DuBois, Erol Fikrig, Durland Fish, Theodore Holford, Keith Joiner, Edward Kaplan, Stanislav Kasl, Ilona Kickbusch, Harlan Krumholz, Brian Leaderer, Robert Makuch, Lawrence Marks, Diane McMahon-Pratt, Michael Merson, I. George Miller, Curtis Patton, Harvey Risch, Nancy Ruddle, Peter Salovey, Eugene Shapiro, John Stitt, Mary Tinetti, Derek Yach, Daniel Zelterman, Heping Zhang

Associate Professors

Elizabeth Bradley, Michael Cappello, Elizabeth Claus, Loretta DiPietro, Nora Groce, Robert Heimer, Jeannette Ickovics, Gary Mack, Susan Mayne, Mary Olson, A. David Paltiel, Holly Prigerson, Mark Schlesinger, Kathleen Sikkema, Jody Sindelar, William White, Herbert Yu, Hongyu Zhao, Liangbiao Zheng, Tongzhang Zheng

Assistant Professors

Louis Alexander, Colleen Barry, Susan Busch, Joel Dubin, Andrew Epstein, Alison Galvani, Ralitza Gueorguieva, Josephine Hoh, Karen Hudmon, Melinda Irwin, Beth Jones, Trace Kershaw, Kaveh Khoshnood, Douglas Leslie, Becca Levy, Judith Lichtman, Haiqun Lin, Xiaomei Ma, Linda Niccolai, Melinda Pettigrew, Jennifer Ruger, Nina Stachenfeld, Christian Tschudi, Hong Wang, 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 and, in the case of biostatistics, mathematics. The GRE General Test is required.

Special Requirements for the Ph.D. Degree

To be admitted to candidacy, a student 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 usually is taken at 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. The dissertation prospectus must be approved within a year of passing the comprehensive examination.

All doctoral students are required to successfully complete a minimum of ten graduate-level courses.

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 developed with a faculty committee;

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 a Teaching Fellow (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 pages 411–12. If a student has been awarded one year of advanced standing, he/she will be allowed to teach both fall and spring terms of their 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 their 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. degree. Students are not admitted to this degree; however, 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 at least one year of the doctoral program.

Terminal M.S. in EPH. The department also 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 416–17. 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 take the TOEFL 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, and 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 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 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. Prerequisite: algebra.

BIS 505b, Introduction to Statistical Thinking II. Faculty.

This continuation of BIS 505a covers multiple regression, analysis of variance, nonparametric tests, survival analysis, and an introduction to logistic regression. The course concludes with a review of variable classification and choice of statistical analysis. 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. Faculty.

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. Prerequisite: basic computer skills. No prior GIS experience necessary.

BIS 525a and b, Seminar in Biostatistics. Hongyu Zhao, Ralitza 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.

Prakash Nadkarni.

This course covers the theory and practice of database management as applied to clinical trials, observational studies, and other prospective research projects. Emphasis is placed on the use of user-friendly database management packages that require little programming. Difficult problems in database management are described, although students are not expected to build applications of such complexity. Recent advances in the field of data management are studied. Prerequisite: working knowledge of Macintosh or Microsoft Windows.

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, testing hypotheses in multivariate regression, regression diagnostics, analysis of variance, and adjusting for covariates. Emphasis is on the application of methods. 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 of a variety of data sets. Prerequisite: BIS 505b.

BIS 628b, Longitudinal Data Analysis. Joel Dubin.

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. Hongyu Zhao.

This course discusses the role of human genetics in epidemiology and public health, focusing on the epidemiology of mendelian disorders and the genetic and environmental contributions to common, complex familial traits. Topics of discussion include study designs for assessing the importance of genetic factors (family, twin, and adoption studies), methods for determining mode of inheritance (segregation analysis), and identification and mapping of major genes through linkage analysis and disease-marker associations. Applications to coronary heart disease, psychiatry, neurology, and cancer are given. Prerequisites: BIS 505a and BIS 505b; basic genetics.

BIS 635b, Topics in Statistical Epidemiology. Heping Zhang.

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 643a, 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 645b, Statistical Methods in Human Genetics.]

BIS 646a, Nonparametric Statistical Methods and Their Applications. Joel Dubin, Heping Zhang.

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. Haiqun Lin, Hongyu Zhao.

This course considers a class of statistical models which generalize the linear model through the link functions of response mean. Major varieties of GLMs including models for Gaussian, Gamma, binomial, un/ordered polynomial and Poisson responses are discussed. Goodness of fit of the models and overdispersion is considered. Extensions to correlated responses are examined through the approaches of quasi-likelihood and generalized estimating equation. The course covers both theoretical and applied aspects of data analytic issues arising from practice. Prerequisites: STAT 542b, BIS 623a, and some knowledge of matrix calculation.

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 511a, Health Psychology: Clinical and Social Foundations.]**CDE 516b, Principles of Epidemiology II. Xiaomei Ma, Amy Darefsky.**

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. Michael Bracken.

The course provides a basic orientation to the study of safety, efficacy, and utilization of ethical pharmaceuticals. The application of epidemiologic methods to the field is emphasized. Among the subjects considered are the usefulness of databases from HMOs, governmental, international, and other sources; current pharmacoepidemiology research within Yale School of Medicine; the role of the Food and Drug Administration; the assessment of drug safety; and assessment of quality of life and the role of pharmacoepidemiology in a managed care environment. Prerequisites: CDE/EMD 508a, BIS 505a, and BIS 505b.

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 stress, 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.]

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.

Josephine Ho, 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 508a, 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. Susan Mayne.

This course provides students with a scientific basis for understanding the role of nutrition and specific nutrients in the etiology, prevention, and management of chronic diseases. Nutrition and cancer are particularly emphasized. Other topics addressed include cardiovascular diseases, osteoporosis, obesity, diabetes mellitus, and aging. Policy implications are discussed. Prerequisites: biology, biochemistry, and physiology helpful. Preference is given to CDE majors.

[CDE 570a, Epidemiology of Psychiatric Disorders.]

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 573a, Measurement Issues in Psychosocial and Behavioral Epidemiology.]**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, evaluated, 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. Peter Van Ness.

The course examines the impact of various dimensions of religiousness on mortality and health status, giving special attention to the relation between religion and other social factors such as age, gender, race, and class. Discussion focuses on the public health implications of the epidemiological findings including the nature and significance of faith-based programs serving health needs. Special attention is given to studies drawn from religiously diverse populations.

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. Gary Mack.**

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.

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. Elan Gandsman, Tom Ouimet, Robert Klein.

Human activities affect natural phenomena, and the resulting changes affect humans. Environmental monitoring refers to repeated observations for the study of these relations. The objective of environmental monitoring is to guide the formulation and aid the implementation of environmental management policies designed to protect human health and well-being, which includes ecological well-being. This course investigates the basic scientific principles and technologies of environmental measurements and monitoring, including boundaries on the collection, interpretation, and use of environmental data.

EHS 532b, Indoor Climate. Faculty.

The impact of environmental factors in the indoor environment on human health and well-being is examined. Emphasis is placed on assessing the nature of and exposures to indoor air contaminants and different thermal micro-environments and their influence on health and comfort.

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 551a 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 553a, Epidemiological Methods in Injury Control. Faculty.

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. Mark Cullen.

This course considers the range of historic and modern epidemiologic approaches to the investigation of human health effects from workplace chemical, physical, biologic, and psychosocial hazards. Critical review of the literature and original study design are stressed. The course is designed as an intermediate methods course, but some knowledge of both major hazards and common health outcomes is assumed. Prerequisites: BIS 505a and CDE/EMD 508a. Completion of BIS 505b and EHS 575a is desirable.

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. Jonathan Borak.

Case studies on various topics and problems in the area of risk assessment in relation to environmental health are presented. Topics include modeling, victim compensation, perception, cost-benefit, ethics, comparable risk, validity, data and assumptions, historical aspects, animal versus human data, and federal risk assessment procedures. Prerequisites: BIS 505a; doctoral status.

EHS 655, Readings in Environmental Health. Faculty.

By arrangement with instructor, students study environmental topics through the current literature, often to develop a research or thesis protocol. Prerequisite: EHS major.

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 512b, 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 534a, Medical Bacteriology. Ravi Durvasula.

This course is designed to introduce students to the fundamentals of the molecular epidemiology of bacterial pathogens. The scientific basis for molecular epidemiological tools and their application toward addressing contemporary problems in public health are evaluated through a combination of lectures and case studies. Topics include the emergence of new bacterial pathogens, antibiotic resistance, vaccine design, and bioterrorism. Prerequisite: permission of the instructor.

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 543a, Biology of Prokaryotic Pathogens. Melinda Pettigrew.

The goal of this course is for students to develop the tools needed for critical analysis in the field of pathogenic bacteriology, with emphasis placed on problems related to epidemiology. This course is focused on basic principles of bacterial pathogenesis using model microbial systems that illustrate the epidemiology of these organisms and mechanisms of virulence. Topics include antibiotic resistance, emerging infections, and how advances in molecular biology lead to new methods for detection, diagnosis, treatment, and/or prevention of bacterial diseases. Prerequisites: EMD/CDE 508a and two terms of college biology or permission of instructor.

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. Diane McMahon-Pratt, L. Nicholas Ornston.

TTh 11.30–12.45

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.

MW 11–12

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 two or 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. Requirements: written analyses in the form of research article/paper.

EMD 675a and b, Advanced Topics in Infectious Disease Epidemiology. Durland Fish.

A required course for EMD first- and second-year doctoral students; not for credit. 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.

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 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.

Diane McMahon-Pratt, Curtis Patton, Christian Tschudi.

F 12–2

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. Karl Kronebusch.

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. Karl Kronebusch.

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. Mary Olson.

This course provides students with an understanding of the role of government regulation in public health and health-related markets. Students learn to analyze how economic and political forces can influence both the development and the implementation of public health regulations. The course utilizes theories and empirical evidence from economics, political science, law, and public health to help students answer five questions relating to government intervention in health-related markets: Why regulate? How are regulatory rules made? How are regulations enforced? How do we determine whether regulations are successful? What alternatives exist to regulation? Students also apply insights and concepts from the course to explain policy making in public health bureaucracies. Prerequisite: microeconomics or permission of the instructor.

HPA 542a, Health of Women and Children. Mary Alice Lee.

The health of women and children in the United States is the focus of this course. The epidemiology of selected health conditions is presented. The utilization and financing of women and children's health care services are discussed. Existing targeted governmental and private programs are identified and assessed. Major sources of data on the health of women and children are identified and compared. Health care access issues are discussed. Students report on a women's or infant's health care condition and develop a fact sheet with recommendations for addressing the problem. Topics include prenatal care, low birth weight, infant mortality, contraceptive use, abortion, maternal mortality (with an international perspective) and health care coverage for pregnant women and children. Discussion of the public health implications of these health conditions and the health care of women and children provides a basis for policy analysis in later study.

[HPA 544a, Public Law and Public Health: The Law, the Individual, and the State.]**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. Bruce Jennings.

Public health policy is always the product of controversy. Scientific considerations blend with political and ethical conflicts in public health; questions of autonomy, coercion, justice, and the common good are central. This seminar discusses these issues of ethics and political theory in reference to selected public health issues such as preventive medicine and behavior modification, smoking, control of infectious disease, and contraception and teen pregnancy.

HPA 547b, Law and the Management of Health Care Organizations.

William J. Thomas.

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. Donna Diers, Stephen Allegretto.

No matter what the regulatory or payment environment is, management of health care delivery systems depends upon data. In this course, theory of information management and applications are provided, using real data. The course uses a powerful local resource, the work of the Resource Information Management System (RIMS) at Yale–New Haven Hospital, as the basis for learning about the clinical, financial, operational, and technical input to a manage-

ment information system. The uses and applications of information in planning, developing, operating, negotiating, and evaluating health care service are stressed. HPA 560b, or equivalent, and accounting are desirable but not required.

HPA 570a, 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. Rani Desai.

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. William White.

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. Donald Green.

This seminar is an advanced course in quantitative methodology. It begins with linear regression and works its way to simultaneous equations with unobserved variables. The aim of the course is to provide students with the statistical background necessary to read and conduct quantitative research. There is special effort to integrate applications into presentations of statistical theory. A weekly computer lab is part of the course. Prerequisite: PLSC 500 or equivalent.

HPA 590b, Economics of Drugs and Crime. Jody Sindelar.

The primary topic is illicit drugs and their use. The course covers the prevention, treatment, and consequences of the use of illicit drugs, and public policies to mitigate the adverse consequences. Crime is discussed as it relates to illicit drugs. The intellectual basis and many of the readings come from the economics field. Some economic concepts are taught in class. The class starts with introductory material on drugs, crime, and the association between drugs and crime. Readings and lectures provide the background information, facts, and in some cases the history of topics. Public policy solutions to help to mitigate the adverse consequences of drugs and crime are discussed. No prerequisites, but a familiarization with microeconomics is preferred.

HPA 592a, Concepts and Principles of Aging. Courtney Lyder.

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.**Michael Merson.**

This seminar is intended for students with an understanding of the epidemiology of HIV/AIDS (either through work experience or course work). Students in public health, medicine, nursing, law, management, and international studies will appreciate this in-depth interdisciplinary examination of key policy challenges that this global pandemic presents, as well as the sharpened skills in policy analysis that such examination necessarily fosters. Enrollment limited to twenty students. Prerequisite: first-term core.

HPA 597b, Integrative Policy Analysis Seminar. Mary Olson.

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. Susan Katz.

This seminar exposes students to both practical and theoretical issues in research ethics. The focus is on real-world situations in public health research with the aim of equipping students to function as responsible researchers. Representative areas to be addressed include, among others, informed consent; research with vulnerable populations; privacy and confidentiality; the collection, retention, and reporting of data; federal regulations and institutional policies governing research; research in developing countries; authorship and publication; scientific misconduct; and conflict of interest. Prerequisite: Ph.D. student status or permission of the instructor.

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

Laura Engelstein

Director of Graduate Studies

Paul Bushkovitch (245 Luce Hall, 432.3423)

Professors

Vladimir Alexandrov (*Slavic Languages & Literatures; on leave*), Ivo Banac (*History; on leave*), Dirk Bergemann (*Economics*), Paul Bushkovitch (*History*), David Cameron (*Political Science*), Katerina Clark (*Slavic Languages & Literatures*), Mirjan Damaška (*Law*), Edwin Duval (*French*), Laura Engelstein (*History*), Robert Evenson (*Economics*), Paul Freedman (*History*), Ute Frevert (*History*), John Gaddis (*History*), Harvey Goldblatt (*Slavic Languages & Literatures*), Philip Gorski (*Sociology*), Cyrus Hamlin (*Germanic Languages & Literatures*), Benjamin Harshav (*Comparative Literature; on leave*), Michael Holquist (*Comparative Literature; on leave*), Stathis Kalyvas (*Political Science*), Paul Kennedy (*History*), John Merriman (*History*), Susan Rose-Ackerman (*Law*), Frank Snowden (*History*), Ivan Szelenyi (*Sociology*), Katie Trumpener (*Comparative Literature*), Tomas Venclova (*Slavic Languages & Literatures*), Miroslav Volf (*Divinity*), Jay Winter (*History*)

Associate Professors

Hilary Fink (*Slavic Languages & Literatures; on leave*), Robert Greenberg (*Slavic Languages & Literatures*), Anna Grzymala-Busse (*Political Science*), Lawrence King (*Sociology*), Nicholas Sambanis (*Political Science*), Timothy Snyder (*History; on leave*)

Assistant Professors

Keith Darden (*Political Science*), 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 Lorkovi (*Library*)

In 1999, the former Council on West European Studies merged with the Council on Russian and East European Studies to create a new interdisciplinary body. The integrated 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 undergraduate major and a restructured 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 benefits provided to the Yale community by the European Studies Council include not only its status as a 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, through a grant to the European Union Studies Program. The EU Fellow during the 2002–2003 academic year was Thierry Vissol, who was Head of Unit in the EU Directorate General for Health and Consumer Policy and who taught a graduate course on the euro and an undergraduate course on the EU's economic and structural policies. In 2003–2004 the EU Fellow was Denis Chaibi, a specialist in international law and EU foreign policy, its trade policy in particular, who came to New Haven from Nicosia, Cyprus, where he was First Secretary and Deputy Head of the European Commission Delegation. Also in 2003–2004, 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 com-

petence 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:
 - a. a core course on Europe as a whole;

- b. of the remaining five non-core courses, three must offer transnational approaches to Europe-related issues or concern countries other than the student's primary focus. For students focusing on Russia and Eastern Europe, at least one course must concern 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 five non-core courses, or
 - b. as independent work under faculty supervision, counting for one course credit — in other words, taking the place of 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 628b^U, Germany and Eastern Europe: Literature and Film. Katie Trumpener.

MW 2.30–3.45

Juxtaposing German with selected Polish, Czech, Hungarian, and Russian texts, this course explores the twentieth-century encounter between Central and Eastern Europe, and the ways German expansionism (from imperialism to Nazism) shaped cultural identity in both Europes. Particular focus on divergences in German and Eastern European cultural memory, on postwar German attempts at expiation and “decolonization” (particularly within the shared communist framework of the Warsaw Pact), and on how local cultural and political conditions shaped regional versions of modernism, magical realism, and feminist analysis. All texts available in English translations (although knowledge of relevant languages welcome). Texts by Musil, Roth, Hasek, Döblin, Jiri Weiss, Tadeusz Borowski, Christa Wolf, Miron Bialoslewski, Grass, Bobrowski, Herta Müller. Films by Pudovkin, Munk, Konrad Wolf, Szabo, Jonas Mekas, Egon Günther, Petra Tschörtner. *Also CPLT 928b^U, FILM 769b^U, GMAN 928b.*

E&RS 646b, Conflicts in International Relations. Vitaly Kozyrev.

MW 1.30–3.20

Introduction to theoretical and practical approaches to conflicts and their resolutions. The course consists of two sections, focused on: (1) the phenomenon of conflict in international relations in the late twentieth century and its theoretical interpretations (political, economic, ideological, religious, ethnic, national, territorial), and (2) the problem of conflict resolution through the peacemaking process. Special attention is paid to international humanitarian law and the concept of “military crime.” *Also INRL 546b.*

E&RS 692b^U, Russian Film. John MacKay.

Th 7–8.50 P.M., screenings M 9 P.M.

A historical overview of the development of Russian film with special attention to the classics of directors like Eisenstein and Vertov. Russian film examined in terms both of its contribution to film theory and practice and of the specific historical and cultural contexts of the major films. *Also CPLT 916b^U, FILM 773b^U, RUSS 744b^U.*

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 66–68).

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 416. 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

Charles Musser [F] (Rm 217, 53 Wall, charles.musser@yale.edu)

Dudley Andrew [Sp] (Rm 219, 53 Wall, dudley.andrew@yale.edu)

Graduate Committee

Dudley Andrew, Katerina Clark, Aaron Gerow, John MacKay, Thomas Kavanagh, Charles Musser, Brigitte Peucker, Noa Steimatsky, Katie Trumpener

Professors

Ora Avni, David Bromwich, Hazel Carby, Michael Denning, John Mack Faragher, Benjamin Harshav, David Joselit, Christopher L. Miller, Joseph Roach, Michael Roemer, John Szwed, Laura Wexler

Assistant Professors

Seth Fein, Terri Francis, Kristin Phillips-Court

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.

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 416.

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 603a, Historical Methods in Film Study. Charles Musser.

Th 1.30–3.20

Engages a range of historiographical issues in film studies, including the roles of technology, exhibition, and spectatorship as well as topics such as intermediality and intertextuality. A range of methodological approaches are considered. Particular attention is given to the interaction between scholars and archives. *Also AMST 814a.*

FILM 621a, French Film: History, Theory, Pedagogy. Thomas Kavanagh.

M 9.30–11.20

This seminar focuses on three related topics: the history of French cinema, how film theory conceptualizes and inflects that history, and the role of film studies in a French Studies curriculum. Neither strictly historical nor strictly theoretical, this course approaches the films we study through groupings of secondary texts (criticism, theory, literary works) that raise issues concerning the use of film in the broader study of French culture. We look at films by such directors as Lumière, Méliès, Vigo, Buñuel, Carné, Duvivier, Renoir, Resnais, Godard, Truffaut, Varda, Marker, Zonca, and Leconte as well as at critical and theoretical positions taken by Arnheim, Pudovkin, Eisenstein, Mitry, Bazin, Barthes, Metz, Baudry, and Deleuze. The course is conducted in French. *Also CPLT 931a, FREN 753a.*

FILM 722b^U, American Documentary Film and Photography. Charles Musser, Laura Wexler.

T 3.30–5.20, screenings M 7 P.M.

Examination of a series of historical moments in which documentary plays a significant cultural role. Topics include the relationship between photographic and cinematic practices and theories generated by makers and critics; filmic constructions of gender, race, class, and national identity in the twentieth century; and changing conceptions of photographic truth. *Also AMST 812b^U, WGSS 780b^U.*

FILM 724a^U, Contemporary Documentary Film and Video. Charles Musser.

M 7–10.30

Examination of documentary and related nonfiction forms in the last three decades. Issues include film truth, performance, ethics, race and gender, and the filmmaker as participant-observer. Filmmakers include Frederick Wiseman, William Greaves, Chris Choy, Errol Morris, Lourdes Portillo, Trin T. Minh-Ha, Sue Friedrich, and Marlon Riggs. *Also AMST 813a^U.*

FILM 731b^U, European Cinema in the Wake of Italian Neorealism.

Francesco Casetti.

W 3.30–5.20

World War II saw modernism enter cinema via Italian neorealism, leading to New Waves in France, England, Germany, and Eastern Europe. Famous auteurs exploited both the “realism” and the “reflexivity” of the medium. This seminar examines strategies of narration through a cultural approach. *Also CPLT 927b^U, ITAL 597b^U.*

FILM 763b^U, Nazi Cinema. Brigitte Peucker.

Th 1.30–3.20

An examination of German film during the Nazi period, including the propaganda film, the entertainment film, and the documentary. Special attention to the expression of ideology through cinema and to the development of a fascist aesthetic, its origins, and its aftermath. Films by Fritz Lang, Leni Riefenstahl, Detlef Sierck (Douglas Sirk), G.W. Pabst, Veidt Harlan, and others. In English; films with subtitles. *Also CPLT 930b^U, GMAN 795b^U.*

FILM 769b^U, Germany and Eastern Europe: Literature and Film. Katie Trumpener.

MW 2.30–3.45

Juxtaposing German with selected Polish, Czech, Hungarian, and Russian texts, this course explores the twentieth-century encounter between Central and Eastern Europe, and the ways German expansionism (from imperialism to Nazism) shaped cultural identity in both Europes. Particular focus on divergences in German and Eastern European cultural memory, on postwar German attempts at expiation and “decolonization” (particularly within the shared communist framework of the Warsaw Pact), and on how local cultural and political conditions shaped regional versions of modernism, magical realism, and feminist analysis. All texts available in English translations (although knowledge of relevant languages welcome). Texts by Musil, Roth, Hasek, Döblin, Jiri Weiss, Tadeusz Borowski, Christa Wolf, Miron Bialoszewski, Grass, Bobrowski, Herta Müller. Films by Pudovkin, Munk, Konrad Wolf, Szabo, Jonas Mekas, Egon Günther, Petra Tschörtner. *Also CPLT 928b^U, E&RS 628b^U, GMAN 928b.*

FILM 773b^U, Russian Film. John MacKay.

Th 7–8.50 P.M., screenings M 9 P.M.

An historical overview of the development of Russian film with special attention to the classics of directors like Eisenstein and Vertov. Russian film examined in terms both of its contribution to film theory and practice and of the specific historical and cultural contexts of the major films. *Also CPLT 916b^U, RUSS 744b^U, E&RS 692b^U.*

FILM 801b, Cinema as Art, Institution, Discipline. Francesco Casetti.

M 3.30–5.20

Because cinema’s status as an artform depends on the functions it serves in cultural contexts, it is also an institution with which spectators negotiate in a complex act of rhetorical communication. This seminar studies how cinema disciplined specific forms of viewing which shaped a gaze. This gaze adapted itself to cultural cues (the desire for a “total vision,” the presence of individual perspective, the desire for heightened perception, the requirement of an organized look, etc.). Texts and films from the 1910s to the 1960s are examined. *Also CPLT 932b, ITAL 810b.*

FILM 828a, Art and Ideology. Katerina Clark.

W 1.30–3.20

Examination of texts identified as ideological art, focusing on the relationship between the conventions they use and the ideology they seek to advance. Theoretical readings include works by Benjamin, Jameson, Lukacs, Bakhtin, Marx, Althusser, and Judith Butler; literary works by Balzac, Brecht, Tretiakov, Ostrovsky, Orwell, Koestler, and others; films by Eisenstein, Leni Riefenstahl, and others. *Also CPLT 527a, RUSS 746a.*

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, Gerry Brewer, William Burch, Michael Dove, Daniel Esty, Thomas Graedel, Timothy Gregoire, Stephen Kellert, Xuhui Lee, Robert Mendelsohn, Chadwick Oliver, Oswald Schmitz, David Skelly, John Wargo

Associate Professors

Lisa Curran, James Saiers, Benjamin Cashore

Assistant Professors

Michele Bell, Marian Chertow, Erin Mansur, Sheila Olmstead, Peter Raymond

Non-Ladder Faculty

Shimon Anisfeld, Richard Burroughs, Ann Camp, Carol Carpenter, Timothy Clark, Michael Conroy, Gordon Geballe, Bradford Gentry, Arnulf Gruebler, Florencia Montagnini, Thomas Siccama, Fred Strebeigh, Dana Tomlin

Joint Appointments

James Axley, 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

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.

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, 3rd floor, 432.4900

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

Chair

Edwin Duval

Director of Graduate Studies

Thomas Kavanagh (82–90 Wall Street, Rm 316, 432.4902, thomas.kavanagh@yale.edu)

Professors

Ora Avni, Howard Bloch, Edwin Duval, Thomas Kavanagh, Christopher L. Miller

Associate Professor

Catherine Labio

Assistant Professors

Mark Burde, Farid Laroussi, 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 will have to 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 normally takes place during the fifth term or, in some special cases, no later than the end of 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 416. 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. Mark Burde.

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 713b, Mythology and Renewal in French Theater. Donia Mounsef.

W 5.30–7.20

This course looks at modern stage adaptations of classical theatrical myths as a form of renewal, denial, or distortion of a tradition and examines the structural, thematic, and ideological specificity of the adapted text (including parody and pastiche). Readings from Anouilh, Molière, Racine, Césaire, Cixous, Cocteau, Sartre, and Ionesco; theoretical readings from Ricoeur, Domenach, Barthes, Genette, and Lassalle.

FREN 753a, French Film: History, Theory, Pedagogy. Thomas Kavanagh.

M 9.30–11.20

This seminar focuses on three related topics: the history of French cinema, how film theory conceptualizes and inflects that history, and the role of film studies in a French Studies curriculum. Neither strictly historical nor strictly theoretical, this course approaches the films we study through groupings of secondary texts (criticism, theory, literary works) that raise issues concerning the use of film in the broader study of French culture. We look at films by such directors as Lumière, Méliès, Vigo, Buñuel, Carné, Duvivier, Renoir, Resnais, Godard, Truffaut, Varda, Marker, Zonca, and Leconte as well as at critical and theoretical positions taken by Arnheim, Pudovkin, Eisenstein, Mitry, Bazin, Barthes, Metz, Baudry, and Deleuze. *Also CPLT 931a, FILM 621a.*

FREN 824a, 1532 et ses suites. Edwin Duval.

W 10.30–12.20

First works and their sequels, by three major authors of the early French Renaissance, all written at a crucial turning point in French literary and intellectual history: Marot's *Adolescence Clémentine* (the first printed, composed *recueil* of poetry in France) and the *Suite de l'Adolescence*; Rabelais's *Pantagruel* (the first of his serio-comic mock epics) and its "prequel" *Gargantua*; Marguerite de Navarre's *Le Miroir de l'âme pécheresse* (a mystico-allegorical first-person narrative) and her earliest evangelical farces. In all of these watershed works, medieval literary traditions are stretched to the breaking point to serve new Renaissance ideologies.

FREN 858a, Sex and Gender in Seventeenth-Century Theater. Julia Prest.

T 1.30–3.20

Seventeenth-century French theater, for all its association with rules and *bienséance*, is a remarkably rich site of gender ambiguity and sexual confusion. Benserade's Ovidian comedy, *Iphis et Iante* (1634), for example, includes a sexually ambiguous relationship between the two eponymous heroines which is all the more intriguing for having been written at a time when modern perceptions of sexual difference were yet to be established and when the notion of female homosexuality was undeveloped. Ovid's Iphis and Iante are of an age when their sexuality (and, by extension, their biological sex) is not yet fully determined, allowing for an uncertain reading of their physical interaction. Benserade, on the other hand, chooses to depict mature adults who marry, and to describe the consummation of their marriage in highly sexual and graphic terms. We shall examine this and other examples from theater texts as well as questions of theater production, notably the effect of male-to-female cross-casting.

FREN 876b, Libertins et philosophes. Thomas Kavanagh.

M 10.30–12.20

This seminar focuses on two major currents within eighteenth-century French literature and culture: *libertinage* and *philosophie*. Our concern is with examining how the intersection of these different options — one focusing on the body, the other on the mind; one frivolous, the other serious — represent distinct yet complementary attempts to recast the premises of the cultural and social order. Works by Crébillon, Boyer d'Argens, Foucheret, Jourdan, Rousseau, Diderot, La Morlière, Palissot, La Mettrie, Laclos, Beaumarchais, and Sade as well as paintings by Boucher, Fragonard, and David.

FREN 939b, The French Atlantic Triangle: Literature and Culture of the Slave Trade. Christopher L. Miller.

Th 10.30–12.20

An analysis of the Atlantic world that was created by the slave trade, in its French version, as seen through history, philosophy, and literature from the eighteenth through the twentieth century. Readings from Voltaire, the journal of a slave-trading sailor, Rousseau, Madame de Duras, Baron Roger, Mérimée, Sue, Césaire, Sembene, T. Mandeleau. In English. Also *AFAM 854b*, *AFST 739b*, *CPLT 723b*.

FREN 940a, Introduction to Modern Poetry. Jean-Jacques Poucel.

M 3–4.50

A practical workshop in close reading, this course offers a broad introduction to the poetic movements of the twentieth century. Emphasis on developing strategies for dealing with the shifting conditions of poetics in verse and prose. Critical works by Gleize, Jakobson, Kristeva, Riffaterre. Poets may include G. Apollinaire, T. Tzara, L. Aragon, P. Reverdy, P. Eluard, F. Ponge, R. Char, A. Césaire, R. Queneau, E. Jabès, M. Deguy, M. Leiris, E. Glissant, J. Roubaud, A.-M. Albiach, and Anne Portugal.

FREN 941b, Formes narratives du dix-neuvième siècle. Ora Avni.

Th 1.30–3.20

An examination of (mostly) nineteenth-century French short story and novel. Focus on narrative techniques. Authors may include Gautier, Balzac, Mérimée, Maupassant, Flaubert, Barbey d'Aurevilly, Hugo, Dumas, Nerval, Constant, Daudet.

FREN 946a^U, Postcolonial Theory and Its Literature. Christopher L. Miller.

Th 10.30–12.20

A survey of theories relevant to colonial and postcolonial literature and culture. The course focuses on theoretical models (Orientalism, hybridity, *métissage*, *créolité*, “minor literature”), but also gives attention to the literary texts from which they are derived (francophone and Anglophone). Readings from Said, Bhabha, Spivak, Mbembe, Amselle, Glissant, Deleuze, Guattari. Taught in English. Also *AFAM 846a*, *AFST 746a*, *CPLT 725a^U*.

FREN 965b, Literature in Migration. Farid Laroussi.

T 1.30–3.20

A seminar in cultural studies, the course provides a venue to explore literature (novels, autobiographies) by French writers of Maghreban stock. We focus on key themes such as identity and identification, writing the self in the face of universalism, or the subversion of the oriental topos. Discussions also tackle cultural issues, which seem to loom large in contemporary France (*intégration*, citizenship, religion, multiculturalism, and so forth). Readings include Begag, Belghoul, Charef, Kettane, Smail, and Durmelat, Forsdick, Hargreaves, Laroussi. Some material is borrowed from the French media.

GENETICS

I-313 Sterling Hall of Medicine, 785.5846

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

Chair

Richard Lifton, M.D., Ph.D.

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, Kay Tanaka (*Emeritus*), Peter Tattersall (*Laboratory Medicine*), Sherman Weissman

Associate Professors

Allen Bale, Susan Baserga (*Molecular Biophysics & Biochemistry*), Stefan Somlo (*Internal Medicine; Nephrology*), Michael Stern, Hong Sun, Joann Sweasy (*Therapeutic Radiology*), Tian Xu, Hui Zhang, Hongyu Zhao (*Epidemiology & Public Health; Biostatistics*)

Assistant Professors

Valerie Reinke, Matthew State (*Child Study Center*), Kevin White

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 66–68).

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. 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 page 412).

Master's Degrees

M.Phil. See Graduate School requirements, page 416.

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. Students are not admitted for this degree.

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 520b, Scientific Integrity in Biomedical Research.]

GENE 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 IBIO 603.*

GENE 625a, Basic Concepts of Genetic Analysis. Tian Xu, Michael Koelle, Richard Lifton, 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.

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. Daniel DiMaio.

TTh 1.30–2.45

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions. *Also MBIO 734a.*

GENE 743b, Advanced Eukaryotic Molecular Biology. Anthony Koleske,
Mark Hochstrasser, Patrick Sung.

TRH 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^U.*

GENE 749a, Medical Impact of Basic Science. Joan Steitz, Enrique De La Cruz,
Mark Hochstrasser, Andrew Miranker, Patrick Sung.

TRH 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^U/601b^U or permission of the instructor. *Also MB&B 749a^U.*

GENE 777b, Mechanisms of Development. Lynn Cooley, Xing-Wang Deng,
Scott Holley, Valerie Reinke, Frank Slack, Michael Stern.

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 presentations and 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. Frank Slack.

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 920a and b, Reading Course for Qualifying Examination. Michael Stern and staff.

Reading period for second-year Genetics students for qualifying examination.

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

Assistant Professors

Ruth Blake, David Evans, Alexey Federov, Jun Korenaga, Mark Pagani, Peter Reiners, Steven Sherwood

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 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 student'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 416.

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 502b^U, Introduction to Geochemistry. Peter Reiners, Mark Pagani.

MWF 9.30–10.20

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.

Catherine Skinner.

TTh 11.20–12.45

Study of the interrelations between earth materials and processes, and personal and public health. The transposition of the chemical elements essential for life from the environment.

[G&G 505a^U, Geochemistry of Planetary Evolution.]

G&G 506b^U, Chemical Cycles, Pollution, and the Global Environment.

Robert Berner.

TTh 11.30–12.45

Application of basic chemical, biological, and geological principles to the study of the cycling of major elements of the atmosphere, rainwater, lakes, rivers, and the ocean and how humans have disrupted this cycling.

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 measured sections.

[G&G 512b^U, Structural Geology and Tectonics.]

[G&G 515a^U, Paleobotany.]

G&G 516a^U, The Invertebrates. Adolf Seilacher, Derek Briggs, Leo Buss.

MW 11.30–12.45

The biology and paleobiology of invertebrates, including the diversity of body plans, comparative development, phylogeny, and functional morphology. *Also E&EB 555a^U.*

G&G 517La^U, Laboratory for the Invertebrates. Adolf Seilacher, Derek Briggs, Leo Buss.

Th 1.30

Comparative functional morphology of selected invertebrate phyla, with demonstrations of diversity within phyla. *Also E&EB 556La^U.*

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.]

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.]

G&G 525a, Introduction to Continuum Mechanics. David Bercovici.

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. Jun Korenaga.

MWF 10.30–11.20

An introduction to the structure and dynamics of the earth and other planets in the context of cosmic evolution. Review of basic physical principles and their applications to geophysics and planetary physics. Star formation and nucleosynthesis; planetary accretion and the birth of the

solar system; heat flow, plate tectonics, and mantle dynamics; seismology and geodesy; core dynamics, geomagnetism, and planetary magnetism.

[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. David Evans.

MWF 10.30–11.20

Introduction to the theory and application of paleomagnetic methods, which provide quantitative information on magnetic remanence preserved in rocks and artifacts. Ferromagnetic mineralogy, domain states, modes of acquisition, and strategies of laboratory measurement and data analysis; continental reconstructions, orogenic deformation, mineral deposits and crystal fluid flow, and stratigraphy.

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.]

G&G 538a, Computational Methods in Astrophysics and Geophysics. Jun Korenaga, Gordon Drukier.

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 520a.*

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. Jeffrey Park.

TTh 9–10.15

The solution of the elastodynamic wave equation in layered media, seismic source representation, and wave propagation in 2-D and 3-D structures. Elastic Green's functions and the reciprocity theorem, refraction and reflection of plane and spherical waves, generalized wave theory, the excitation of surface waves, free oscillations of the earth, and the effects of anisotropy. Knowledge of vector calculus, linear algebra, partial differential equations, and some complex analysis recommended.

[G&G 559b, Data Analysis in the Earth Sciences.]

[G&G 560a^U, Theory of Viscous Flow.]

G&G 562a^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 F&ES 506a.*

G&G 565a^U, Archaeometallurgy. Robert Gordon.

TTH 10.30–11.20, 1 HTBA

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.

G&G 567b^U, Geochemical Approaches to Archaeology. Karl Turekian.

TTH 9–10.15

The use of geochemical techniques to address archaeological problems including radioactive dating, source identification, and production of artifacts, all in the context of environmental constraints in human development.

[G&G 601b, Topics in Earth Science.]

[G&G 611a, Advanced Stratigraphy.]

[G&G 615a, Advanced Petrology.]

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. David Evans.

MWF 9.30–10.20

An introduction to the large-scale elements of Earth's crust and mantle, and quantitative methods of measuring their relative motions within a spherical geometry. Investigation of geological and geophysical processes associated with oceans and continents in motion.

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.]****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. *Also ASTR 666b.*

[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

*Also E&EB 930a.***[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.**

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.

F 3.30–5.20

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 767a, 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. David Evans, Adolf Seilacher.

HTBA

Critical evaluation of data and hypotheses bearing on the origin and evolution of Precambrian life on earth.

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 (302 WLH, 432.0789, brigitte.peucker@yale.edu)

Professors

Cyrus Hamlin, Carol Jacobs, Brigitte Peucker, Henry Sussman (*Visiting* [F])

Assistant Professors

Kirk Wetters, Kirk Williams

Lecturer

William Whobrey

Affiliated Faculty

Seyla Benhabib (*Political Science; Philosophy*), James Kreines (*Philosophy*), Christine Mehring (*History of Art*), Leon Plantinga (*Music*), Kevin Repp (*History*), 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; literary sociology; 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 two other foreign languages, one at the end of the second term, the other by the fifth term of study. Recommended are Latin and French, although other relevant languages may be substituted for these. The faculty in German consider teaching to be essential to the professional preparation of graduate students. Students in German teach in their third and fourth years, at least. Students are normally expected to teach undergraduate language courses under supervision beginning in the third year of study. 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 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 November or early December of the seventh term. Students are admitted to candidacy for the Ph.D. upon completion of all predissertation 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 416. 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 either Latin or 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 page 417.

Program materials are available upon request to the Director of Graduate Studies, Department of Germanic Languages and Literatures, Yale University, PO Box 208210, New Haven CT 06520-8210; e-mail, german@yale.edu.

Courses

GMAN 545a, Ideology, Religion, and Revolution in German Thought.

Henry Sussman.

Th 3.30–5.20

This is a course, pivoting on the close reading of its materials, whose challenge is to explore the cross-currents of conservatism and radicality in nineteenth- and early twentieth-century German thought. It begins with Nietzsche's critique of Christianity and religion in general, in the *Genealogy of Morals* and the *Anti-Christ* (selected passages). It proceeds to a section on Marx, one including the formative first volume of *Kapital* and Derrida's surprisingly heartfelt tribute, *Specters of Marx*. Through readings of *Moses and Monotheism* and some of the metapsychological essays, we trace both the radical and counterrevolutionary politics inherent to Freudian psychoanalysis. Among sources of illumination on this material, we consult Ernesto Laclau, Fredric Jameson, and David Harvey. Collateral literary readings, read in the context of the aforementioned authors, include Zola (*Ladies' Paradise*), Brecht (*Saint Joan of the Stockyards*), and Döblin (*Berlin Alexanderplatz*). Students are welcome to do their reading and writing in German, French, and/or English. Also CPLT 650a.

GMAN 585b, Introduction to Middle High German Literature. William Whobrey.

TTh 11.30–12.45

A survey of the major works of German vernacular literature from 1150 to 1250, including selections from courtly love poetry, heroic epic, Arthurian romance, crusader songs, and religious narratives. Works are read in the original Middle High German, and aspects of reading and translation are closely linked to an examination of the development of the German language. Special attention is given to the development of vernacular literature, the broader context of Latin culture, and the problems of manuscript transmission. Works to be read in whole or part include: *Nibelungenlied*, *Parzival*, *Tristan*, *Minnesang*, *Gregorius*, and *Der arme Heinrich*. Also CPLT 585b.

GMAN 605b^u, Interpretation and Authority. Carol Jacobs.

T 1.30–3.20

The seminar explores the writings of four theorists of the twentieth century who meditate on the concepts of authority and interpretation. Our method entails close readings of these works in which much of what goes on is not only in the ostensible contents of the works, but also in the performance of the writing. One is confronted in each case with writers who question the relationship between text and simplistic notions of truth. The obvious problem we encounter, then, is how, in turn, to read texts which claim to unsettle that relationship. The issues raised are those among interpretation and authority, both textual and political. Works by Sigmund Freud, Roland Barthes, Paul de Man, and Walter Benjamin. Also CPLT 517b^u.

GMAN 628b, Visuality and German Writing, 1750–1820. Brigitte Peucker.

T 3.30–5.20

Focusing on sight and the senses, this course explores vision and affect, problems of spectatorship, and the visual arts as they are articulated primarily, but not exclusively, in the German tradition. Texts are read against the backdrop of theories of visuality, both past and present, including essays on the picturesque, on landscape gardening, on physiognomy, and texts by Addison, Diderot, Walter Benjamin, E. H. Gombrich, Michael Fried, Jonathan Crary, Barbara Stafford. Authors include Winckelmann, Lessing, Lichtenberg, Goethe, Wackenroder/Tieck, Schlegel, Kleist, Hoffmann. Also CPLT 628b.

GMAN 630a^U, German Literature, Thought, and Culture in the Age of Goethe.**Cyrus Hamlin.**

TTH 1–2.15

Interdisciplinary survey of German culture, literature, philosophy, music, and the arts during the Romantic era (1770–1830). Focus on concepts of the individual and self-consciousness, freedom and self-development, the rise of alienation, pessimism, and despair in the early nineteenth century. Among authors to be studied: Kant, Goethe (*Werther* and *Faust*), Mozart (*Magic Flute*), Schiller, and Hölderlin; music by Beethoven and Schubert; Romantic literary criticism and theory (the Schlegels, Novalis); stories by Kleist and Hoffmann; painting by C. D. Friedrich and architecture by C. F. Schinkel; philosophy of Hegel and Schopenhauer. No prerequisites. Readings and discussion in English. *Also CPLT 630a^U.*

GMAN 635a, Plato's Legacy. Carol Jacobs.

W 3.30–5.20

German thinkers such as Schleiermacher, Hegel, Heidegger, Nietzsche, Benjamin, and Arendt have pondered what it means to read Plato. As they do, a constellation of issues inevitably takes form. How are we to come to terms with the relationship between language and what we tend to call truth? How is language, in turn, fundamental to broader questions of epistemology, ethics, and the political? Our intensive readings in Plato's *Republic* are coupled with the sometimes unsettling readings of the German tradition. What considerably complicates this enterprise, in those who write about Plato no less than in Plato himself, is the uneasy disjunctions one often encounters between what is said and what is performed. Thus we want to analyze the way in which Socrates and his later readers formulate their arguments. In their own contributions to the seminar, students are encouraged to take this constellation of ideas into a variety of literatures or other relevant media. *Also CPLT 583a.*

GMAN 795b^U, Nazi Cinema. Brigitte Peucker.

TH 1.30–3.20

An examination of German film during the Nazi period, including the propaganda film, the entertainment film, and the documentary. Special attention to the expression of ideology through cinema and to the development of a fascist aesthetics, its origins and its aftermath. Films by Fritz Lang, Leni Riefenstahl, Detlef Sierck (Douglas Sirk), G. W. Pabst, Veit Harlan, and others. In English; films with subtitles. *Also CPLT 930b^U, FILM 763b^U.*

GMAN 900a,b, Directed Reading.

By arrangement with the faculty.

GMAN 928b, Germany and Eastern Europe: Literature and Film. Katie Trumpener.

MW 2.30–3.45

Juxtaposing German with selected Polish, Czech, Hungarian, and Russian texts, this course explores the twentieth-century encounter between Central and Eastern Europe, and the ways German expansionism (from imperialism to Nazism) shaped cultural identity in both Europes. Particular focus on divergences in German and Eastern European cultural memory, on postwar German attempts at expiation and “decolonization” (particularly within the shared communist framework of the Warsaw Pact), and on how local cultural and political conditions shaped regional versions of modernism, magical realism, and feminist analysis. All texts available in English translations (although knowledge of relevant languages welcome). Texts by Musil, Roth, Hasek, Döblin, Jiri Weiss, Tadeusz Borowski, Christa Wolf, Miron Bialoszewski, Grass, Bobrowski, Herta Müller. Films by Pudovkin, Munk, Konrad Wolf, Szabo, Jonas Mekas, Egon Günther, Petra Tschörtner. *Also CPLT 928b^U, E&RS 628b^U, FILM 769b^U.*

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, Beatrice Bartlett, 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, Paul Kennedy, Daniel Kevles, Benedict Kiernan, Bentley Layton (*Religious Studies*), Ivan Marcus, John Matthews (*Classics*), John Merri- man, Joanne Meyerowitz, Cynthia Russett, Lamin Sanneh (*Divinity School*), 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

Mary Habeck, Susan Lederer (*History of Medicine & Science*), Stephen Pitti, Kevin Repp, Timothy Snyder, Steven Stoll

Assistant Professors

Michael Auslin, Jennifer Baszile, Brian Cowan, Seth Fein, Beverly Gage, Andrew Gregory (*Classics*), Lillian Guerra, Jennifer Klein, Mary Lui, Michael Mahoney, Carolyn Moehling, Ole Molvig, Nicole Neatby (*Visiting*), Carlos Noreña (*Classics*), Mridu Rai, Ronald Rittgers (*Divinity School*), Naomi Rogers (*History of Medicine & Science*), Youval Rotman, Celia Schultz (*Classics*), Francesca Trevellato, 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.

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 516a, Thucydides and the Peloponnesian War. Donald Kagan.

T 2.30–4.20

A study both of the great war between Athens and Sparta that transformed the world of the Greek city-states and of the brilliant historian and political thinker who described it. *Also CLSS 880a.*

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 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 CLSS 850b.*

HIST 527a, The Worlds of Bede and Paul the Deacon. Walter Goffart.

T 1.30–3.20

The English Ecclesiastical History of Bede (ca. 733) and the *History of the Lombards* by Paul the Deacon (ca. 795) are major monuments of historical writing, as well as principal sources for the earliest centuries of the Middle Ages. A close reading of the histories of Bede and Paul, along with attention to their historical contexts, provides a springboard to consideration of England, Italy, and the wider world they lived in. A reading and discussion course. The sources are assigned in translation, but use of readings in Latin and modern foreign languages in written work and class reports is strongly recommended for those qualified.

HIST 531b, Seminar: The Making of Monasticism. Bentley Layton.

T 2.30–4.20

The history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity, with special attention to the eastern Mediterranean world. *Also CPTC 504b, RLST 659b^U.*

HIST 532b^U, Jews in Muslim Lands: Seventh to 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 to be discussed 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.

HIST 533a, Augustine. Marcia Colish.

T 3.30–5.20

A reading and discussion seminar designed to familiarize students with a broad range of issues in the oeuvre of Augustine through the reading and discussion of selected Augustinian works written across his career. Students also give oral reports treating interpretive issues in the secondary literature and write a paper investigating some aspect of Augustine's thought and the historiography attached to it. Reading knowledge of Latin, French, and German required.

HIST 534b, The Augustinian Tradition in the Middle Ages. Marcia Colish.

T 3.30–5.20

Research seminar. After two initial weeks during which general reading is discussed, the seminar focuses on the individual research projects pursued by students on chosen aspects of Augustine's influence during the millennium following his death. His influence in the Renaissance may also be considered. Students present two oral reports on their projects, the first a progress report and the second reporting their final findings. The second report is written up after presentation as a formal paper. Prerequisites: HIST 533a or demonstration of equivalent background and a reading knowledge of Latin, French, and German. Knowledge of Italian desirable.

HIST 535a^U, History of Jewish Culture to the Reformation. Ivan Marcus.

TTh 11.30–12.45

Undergraduate lecture course open to graduate students with permission of instructor. *Also RLST 773a^U.*

HIST 536b, Martyrs, Prostitutes, and Fools: The Making of a Religious Saint.
Youval Rotman.

F 1.30–3.20

The seminar focuses on the question of the creation of a saint: the special character of the holy man in different religions throughout the Middle Ages, the social needs that call for the making of a saint, and the new role of hagiography as a medieval literature. The seminar starts with models of Byzantine saints of Late Antiquity and the Middle Ages, and offers a comparative approach in introducing different types of sainthood in Latin Christianity, Islam, and Judaism.

HIST 539b, 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 designated. *Also NELC 736b, RLST 661b.*

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 547b, Spain and Southern France in the Middle Ages. Paul Freedman.

T 1.30–3.20

Society, politics, and culture in the Iberian kingdoms (particularly but not exclusively Aragon-Catalonia), Provence, Languedoc, and other regions and principalities of what became southern France. Topics include church and society, heresy, trade, differing development of state institutions, and comparisons among rural conditions of tenure and lordship.

HIST 559b, The Life and Thought of Martin Luther. Ronald Ritters.

w 1.30–3.20

This course examines the intellectual biography of Martin Luther from a theological as well as a historical perspective. Its goal is to understand both the man and his ideas. The course stresses close reading of select theological treatises and critical engagement of recent trends in Luther scholarship. Enrollment is limited to fifteen graduate students. Permission of instructor required.

HIST 560a, Society and the Supernatural in Early Modern Europe. Carlos Eire.

T 1.30–3.20

Readings in primary texts from the period 1500–1700 which focus on definitions of the relationship between the natural and supernatural realms, both Catholic and Protestant. Topics include mystical ecstasy, visions, apparitions, miracles, and demonic possession. All assigned readings in English translation.

HIST 580a, Encounters: Ourselves and Others in the Early Modern World.
Stuart Schwartz.

M 1.30–3.20

An examination of the encounters between Europeans and other peoples 1480–1800, with attention to the role of perception, conceptions, and events on both sides of such meetings. Both the history of such encounters as well as the theories of alterity and cultural perception are discussed.

HIST 600a, Readings in Early Modern European History. Keith Wrightson, Francesca Trevellato.

T 10.30–12.20

Introduction to modern European history. Readings focus on major works and problems in the field as it has evolved from the nineteenth to the twenty-first century. This course also serves as an introduction to many Yale faculty members currently writing and researching the history of early modern Europe and its relations with the wider world.

HIST 609b, Mutualities and Obligations: Social Relationships in Early Modern England. Keith Wrightson.

Th 10.30–12.20

Relationships of mutual obligation were the most fundamental of all bonds in medieval society. In their various forms, they provided both the template of social relations and the coordinates of individual identity. In the course of the sixteenth and seventeenth centuries, many such bonds are deemed to have undergone transformation. The seminar reexamines this theme by discussing recent approaches to a variety of relationships of mutuality and obligation: relationships within the household; between kinsfolk, “friends,” and neighbors; in female networks and trade brotherhoods; in the institutional settings of manor and estate, the parish, voluntary associations, and the marketplace. The aim is to encourage fresh thinking about continuity and change in a range of vital social relationships; their conduct, their idioms, their defining contexts, and their meanings.

HIST 634a, Cultural and Intellectual History of European Modernism. Kevin Repp.

Th 1.30–3.20

Reading and discussion. The aim is to explore recent methodological approaches to intellectual and cultural history while also learning something about the state of historical research on twentieth-century European modernism. Topics include media, markets, and modernism; modernism and the First World War; “fascist modernism”; and “postmodernism.” Authors include Peter Fritzsche, Paul Fussler, Mark Antliff, Raymond Williams, Jürgen Habermas, Michel Foucault, and Pierre Bourdieu.

HIST 637a, Research Seminar in Modern French History. John Merriman.

T 10–12

HIST 648a, Civil Society in Nineteenth-Century Europe: A Transnational Perspective. Laura Engelstein, Ute Frevert.

M 1.30–3.20

This seminar examines the notion of civil society as developed in recent historiography and political theory, by comparing the cases of Germany and Russia in the nineteenth and early twentieth centuries. Topics include associational life, legal traditions and institutions, the public sphere, the gender system, commercial culture, civil-military relations, and political participation. Options of research or historiographical papers.

HIST 666a, Russia to 1725. Paul Bushkovitch.

W 1.30–3.20

The major phases of Russian history from the tenth century, covering the major historiographical controversies and sources. Russian or German helpful but not required.

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 theory in Russian history to 1825. For spring 2005 the topic is state and society of eighteenth-century Russia in theory and practice.

HIST 676b, Research Topics in Twentieth-Century Russian History.**Laura Engelstein.**

T 1.30–3.20

This seminar explores a variety of research avenues in the history of twentieth-century Russia. Readings sample innovative works of scholarship, but most of the course is devoted to students' own projects. Reading knowledge of Russian required.

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

TRH 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 faculty visit the class on a rotating basis. *Also AMST 700a.*

HIST 703b, Readings in Early National American History. Joanne Freeman.

T 1.30–3.20

This seminar is an introduction to the early national period and its scholarship, exploring major themes such as nationalism, national identity, the influence of the frontier, the structure of society, questions of race and gender, the creation of a national politics and a national culture, and the evolution of political cultures. *Also AMST 802b.*

HIST 704b, Readings on Early American History. John Demos.

T 1.30–3.20

Reading and discussion of the scholarly literature. *Also AMST 825b.*

HIST 708a, Readings in African American History to Emancipation.**Jennifer Baszile.**

Th 1.30–3.20

This seminar surveys classic and recent scholarship on the African diaspora in North America. Topics include regional and temporary varieties of slavery and freedom, gender, religion, race, work, resistance, and emancipation. Attention is given to urban and rural communities. *Also AFAM 758a, AMST 706a.*

HIST 715b, Readings in Nineteenth-Century American History, 1820–1877.**David Blight.**

W 1.30–3.20

This course explores recent trends and historiography on several problems through the middle of the nineteenth century: sectionalism; expansion; slavery and the Old South; northern society and reform movements; Civil War causation; the meaning of the Confederacy; why the North won the Civil War; the political, constitutional, and social meanings of emancipation and Reconstruction; violence in Reconstruction society; the relationships between social/cultural and military/political history; problems in historical memory; the tension between narrative and analytical history writing; and the ways in which race and gender have reshaped research and interpretive agendas. *Also AFAM 761b, AMST 715b.*

HIST 721b, Research Seminar in United States History. Jon Butler.

T 9–11

This seminar focuses on producing the draft of a publishable article based on original sources in any century or topic in U.S. history. Enrollment limited to eight students.

HIST 726b, The Culture of the Gilded Age. Cynthia Russett.

Th 1.30–3.20

Although the politics of the Gilded Age may seem somewhat jejune (who today has lively memories of Chester A. Arthur or James Garfield?) its society and culture were undergoing dramatic and challenging developments. Industrialization and urbanization brought new immigrants to our shores; labor unions grew and flexed their muscle in a series of major

strikes. In the world of thought the impact of Darwinism was still being absorbed, especially in the new academic disciplines of the social sciences: sociology, economics, and psychology. Some important names from the period: William James, Charlotte Perkins Gilman, Henry George, Andrew Carnegie, W. E. B. Dubois, Jane Addams, Edward Bellamy, Samuel Gompers (and, of course, many more). Research seminar. *Also AMST 798b.*

HIST 731b, Readings in Southern History since 1865. Glenda Gilmore.

W 10.30–12.20

The course revisits traditional themes in southern historiography, matching classics of southern U.S. history with recent work. The course expands the definition of “southerner”; challenges the narratives and periodization of Reconstruction, Jim Crow, and the Civil Rights Movement; and brings theories on the construction of gender and race into dialogue with southern history. The readings place the U.S. South in a global discourse of white supremacy, imperialism, Communism, Fascism, and Pan-Africanism. The course requires book reviews and an historiographical paper that reviews an issue in southern history and suggests opportunities for future research on the topic. *Also AFAM 721b, AMST 735b.*

HIST 735a, Readings in Twentieth-Century American Political and Social History. Jennifer Klein.

T 1.30–3.20

Readings in American social and political history from the late nineteenth century to the present, with an emphasis on political economy. Major topics include changing relationships between the state, economy, and communities over time; the role of social movements of the left and right in political, social, and economic transformations; definitions and boundaries of citizenship; development of social policy, labor policy, politics, and the “New Deal Order”; America’s rural and urban economies in regional, national, and international context. *Also AMST 717a.*

HIST 736a, Research in Twentieth-Century American Political and Social History. Glenda Gilmore.

W 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 709a, AMST 709a.*

HIST 742a, Readings in North American Environmental History. Steven Stoll.

W 10.30–12.20

Introduction to the essential scholarship of North American environmental history. The seminar assumes no previous course work, and students with a wide variety of backgrounds are welcome. We read books and articles with an eye to exploring the different themes, theories, and methods that have shaped environmental history. Our goal is to evaluate these works while trying to discover ways in which each approach might be helpful to our own work. At the same time, we use readings and discussions to think about the more general process of conceiving, conducting, and writing historical research. Subjects include colonialism, capitalism, American Indians, conservation, ecology, and environmentalism. *Also AMST 839a.*

HIST 744a, American Women’s History. Joanne Meyerowitz.

Th 3.30–5.20

Selected topics in American/U.S. women’s and gender history. Themes include concepts of womanhood and manhood; gendered hierarchies of citizenship and labor; class, racial/ethnic, and regional differences; and women’s participation in religion, politics, social reform, and women’s rights movements. Readings, writing assignments, and classroom discussions emphasize recent historical literature, historiographic trends and debates, and theoretical and methodological approaches. *Also AMST 786a.*

HIST 748b, American Conservatism in the Twentieth Century. Beverly Gage.

W 3.30–5.20

An examination of historical and historiographical problems in the study of American conservatism. Topics include mass politics, free-market ideology, neoconservatism, anticommunism, and the Christian right.

HIST 751a, Race and Races in American Studies. Matthew Jacobson.

M 1.30–3.20

This reading-intensive seminar examines influential scholarship across the disciplines on “race” and racialized relations in American culture and society. Major topics include the cultural construction of race; race as both an instrument of oppression and an idiom of resistance in American politics; the centrality of race in literary, anthropological, and legal discourse; the racialization of U.S. foreign policy; “race mixing”; vicissitudes of “whiteness” in American political culture; and “race” in the realm of popular cultural representation. A lengthy review essay due at the end of the term gives students a chance to explore in depth the themes, periods, and methods that most interest them. *Also AFAM 687a, AMST 701a.*

HIST 758a, Research Seminar in U.S. International and Transnational Histories.

Seth Fein.

M 11.30–1.20

This seminar emphasizes interdisciplinary methods and cultural analysis for research and writing based in a wide variety of primary (including audiovisual) sources about the history of the United States outside the United States and the history of other nations within the United States. Term project is a publishable, article-length essay. *Also AMST 777a.*

HIST 763a, Readings in Latina/o History. Stephen Pitti.

W 1.30–3.20

A reading of historical works that focus on Latino communities in the United States. We focus particular attention on Mexican American, Puerto Rican, and Cuban American communities, and we look at topics such as racial identity, border conflict, 1960s activism, patterns of residency and migration, transnationality and citizenship, labor struggles and class formation, and gender and sexuality. Readings bring together scholarship from several disciplines and emphasize both the critical importance of this developing field and its contemporary challenges. *Also AMST 649a.*

HIST 765a^U, Jews in America, 1654 to the Present. Paula Hyman.

MW 10.30–11.20

A survey of the development of American Jewry from the colonial period to the present. Topics include the Americanization of Judaism, constructing identity and community, political and economic participation, and Jews in American culture. *Also RLST 764a^U.*

HIST 766b^U, Jewish Immigration and American Society. Paula Hyman.

W 1.30–3.20

An exploration of the Jewish immigrant experience in America in the context of American immigrant history. Topics include work and family, constructing identity, the role of religion, and political and cultural participation in American society. *Also RLST 766b^U.*

HIST 768b, Asian American History and Historiography. Mary Lui.

M 1.30–3.20

This reading and discussion seminar examines new trends in Asian American history through a selection of recently published texts and older “classics” from the field. Major topics include the racial formation of Asian Americans in U.S. culture, politics, and law; U.S. imperialism; U.S. capitalist development and Asian labor migration; and transnational and local ethnic community formations. The class considers both the political and academic roots of the field and its evolving relationship to “mainstream” American history. *Also AMST 768b.*

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 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 807a, Resistance, Rebellion, and Survival Strategies in Modern Latin America and the Caribbean. Gilbert Joseph, Patricia Pessar.

Th 3.30–5.20

An interdisciplinary examination of new conceptual and methodological approaches to such phenomena as peasants in revolution, millenarianism, “banditry,” refugee movements, and transnational migration. *Also ANTH 510a.*

HIST 812b, Race, Nation, and Imperialism in Modern Latin America. Lillian Guerra.

HTBA

Focus on works exploring the relationship between interpretations of race, nation, and modernity in Latin American societies deeply affected by direct and indirect forms of U.S. imperialism. Topics covered include blackness, whiteness, and mestizaje as discursive constructions and political ideals in comparative processes of nation building. Reading knowledge of Spanish desirable.

HIST 829a^U, 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. *Also NELC 830a.*

HIST 837a, Becoming the Middle East. Abbas Amanat.

W 3.30–5.20

An inquiry into the emergence of the modern Middle East from the heterogeneous peoples and cultures 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 840b, Colonialism in Africa. Robert Harms.

W 1.30–3.20

Discussion of the theory and practices of colonialism in Africa. Topics include the motives for European expansion, the scramble for Africa, early colonialism, direct and indirect rule, “colonization of the mind,” the colonial state, the developmental state, late colonialism, and paths to decolonization.

HIST 844a, Memory and Orality in African History. Michael Mahoney.

Th 1.30–3.20

This graduate seminar introduces the student to oral research methodology, as well as to particular debates about that methodology within African historiography. We also discuss memory and popular historical understandings, and how this non-guild historiography interacts with what academics do. Though the focus is on Africa, we cover the material in a sufficiently general manner so that the course may be of interest to non-Africanists. In addition, the final project requires practical oral research, and this may very well be non-Africanist in nature, since so few African respondents are available in the area.

HIST 849a, Agrarian History of Africa. Robert Harms.

T 1.30–3.20

This course examines changes in African rural life from precolonial times to the present. Issues to be examined include land use systems, rural modes of production, gender roles, markets and trade, the impact of colonialism, cash cropping, rural-urban migration, and development schemes.

HIST 851b, The Vietnam Wars since 1920. Benedict Kiernan.

W 1.30–3.20

The origins, course, and aftermath of the Vietnamese-American conflict. War and society in Vietnam, from the formation of a national identity and French colonial rule, to the rise of communism, independence and division, the U.S. intervention, escalation and defeat, the postwar Cambodian conflict and the 1979 Chinese invasion, regional integration, and economic reform. Readings, discussion, and research.

HIST 857b, Intellectual Themes in the Warring States Period. Ann-Ping Chin.

M 3.30–5.20

The course focuses on those ideas and discussions in the Warring States period (481–221) that have become central to our understanding of Chinese political and moral thought. We consider the history of these ideas, their relation to society and politics, and how they overlapped or played against each other. We also consider the thinkers who took them to extraordinary heights—not just the cognitive powers of these men but also their skills of persuasion and their art as analogists and ironists. Readings include sources from the Confucian, Taoist, and Legalist traditions and also the recently excavated texts dated to the Warring States period. Knowledge of Chinese is not required.

HIST 861a, Issues in Tang, Song, and Yuan History. Valerie Hansen.

W 1.30–3.20

An introduction to the secondary literature in English about the major issues in Chinese history, 600–1400. Permission of instructor required.

HIST 867b, Social History of the Chinese Silk Routes. Valerie Hansen.

W 1.30–3.20

An introduction to artifacts and documents excavated from the most important sites on the Northern and Southern Silk Routes in China including Niya, Kizil, Turfan, and Dunhuang. All assigned readings in English, but given sufficient student interest, a separate section can be formed for those wishing to read documents in classical Chinese from Turfan and Dunhuang.

HIST 872b, Taiwan History, 1600 to the Present. Beatrice Bartlett.

M 1.30–3.20

Taiwan history from the first immigrations to the present. Topics include Koxinga and the Dutch, Qing pioneers and rebels, Taiwan as a Qing province, the Japanese colonial experience (1895–1945), Nationalist rule, the modern economic miracle, foreign relations, and democratization since the 1960s. Problems of conflicting historical interpretations. Reading and discussion.

HIST 924a, Bodies and Machines in Medicine and the Mind Sciences.**Susan Lanzoni.**

T 9.30 – 11.20

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. With 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^{II}.*

HIST 926a, The Grounding of Modern Medicine. John Harley Warner.

M 1.30 – 3.20

An exploration of the shaping of modern medical culture, focusing on the United States in the late nineteenth and early twentieth centuries. Readings engage the recent historiography. Themes include struggles over the place and meanings of “science,” and the intersection of lay and professional understandings of the body; shifting understandings of purity and danger in the social and physical environments; attention to region, gender, class, ethnicity, race, and religion; orthodox and alternative professional identities and consumer expectations in the medical marketplace; the role of imperialist ventures and European impulses in fashioning American biomedicine and public health; the medicalization of American society; and the ethical, epistemological, and aesthetic choices that were constitutive of medical modernity. *Also AMST 880a, HSHM 733a.*

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 use 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^{II}.*

HIST 928b, Infection, Public Health, and the State. Frank Snowden.

W 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, the sanitarian 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 732b.*

HIST 931b, Introduction to the History of Science. Daniel Kevles, 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 both 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 HSHM 702b.*

HIST 934a^U, Technology and Society from the Industrial Revolution. Ole Molvig.

W 3.30–5.20

Can the design of a printing press reveal as much as what it prints? This seminar explores the social impulses behind—and consequences of—technological innovation from roughly 1800 to 1975. Seminar members examine in depth three technological sectors: manufacturing, transportation, and communication. These explorations prepare participants for substantive research of their own. Sample topics include military equipment, medical instruments, domestic appliances, mass entertainment, and agricultural machinery. *Also HSHM 636a^U.*

HIST 938b^U, The Engineering and Ownership of Life. Daniel Kevles.

M 1.30–3.20

The development of biological knowledge and control in relation to intellectual property rights in living organisms. Topics include agribusiness, medicine, biotechnology, and patent law. *Also HSHM 676b^U, LAW 2144I.*

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, 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 HSHM 677a^U.*

HIST 944b^U, Science, Feminism, and Modernity. Naomi Rogers.

Th 9.30–11.20

This seminar examines scientists and science in post-1800 Europe and North America with a particular focus on interpretations of the transformation and “progression” of the natural world, drawing on recent feminist and science studies theorists including Donna Haraway, Sandra Harding, Evelyn Fox Keller, Londa Schiebinger, and Bruno Latour. Among questions raised: Has feminism changed science? Is there a feminist science? Is science multicultural? And were we ever modern? With an emphasis on biology, genetics, anthropology, and physics, we discuss the work and lives of women scientists, including analysis of their representations in popular culture. *Also HSHM 624b^U.*

HIST 945a^U, Science, Arms, and the State. Daniel Kevles.

T 1.30–3.20

A history of chemical, nuclear, and biological weapons in the twentieth century that focuses on the integration in the United States of national security policy making, scientific research, and military innovation, including its consequences for the scientific community, the civilian economy, public attitudes toward weapons of mass destruction, and political movements to control them. *Also HSHM 635a^U.*

HIST 946b, History of the Modern Sciences in Society. Ole Molvig.

MW 11.30–12.20

An introduction to the history of science from the Enlightenment to the present. The course focuses primarily on the physical sciences, but includes major developments within the life sciences. Topics include the clockwork universe, the Chemical Revolution, evolutionary theory, thermodynamics, and quantum theory as well as colonial empires, industry, professionalization, cultural modernism, and nuclear fear. *Also HSHM 623b^U.*

HIST 948a, Readings in the History of Psychology, Psychiatry, and Psychotherapy.**Susan Lanzoni.**

Th 1.30–3.20

This seminar examines the history of psychiatry, psychology, and psychotherapy, with special emphasis on epistemological, moral, and therapeutic views of empathy and social cognition in the late nineteenth and twentieth centuries. Topics include aesthetic theories of empathy; empathy as a source of knowledge and healing in psychotherapy and in the doctor-patient relationship; empathy as a gendered capacity in the mother-infant bond; and the psychopathology of autism. We also engage broader cultural and normative views of empathy and the understanding of others in photography, film, and popular culture. *Also HSHM 734a.*

HIST 951a^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 RLST 762a^U.*

HIST 956b, Canadian Women's History. Nicole Neatby.

T 3.30–5.20

An exploration of the history of Canadian women from the late nineteenth century to the present day. Special emphasis on the diversity of women's experience as it pertains to their class, age, ethnic origins, and place of residence in Canada, and to the various manifestations of feminist activism to emerge during the period.

HIST 965a, 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 ANTH 541a, F&ES 753a, PLSC 779a.*

HIST 971b, History and Memory. Jay Winter, Katerina Clark.

T 5.30–7.30

The seminar explores facets of the historical literature surrounding issues of individual memory, collective memory, and commemoration. The focus is on modern Europe, though the literature surveyed addresses issues beyond the confines of Europe. After a survey of interdisciplinary approaches to the field, focusing on social agency, representations, trauma studies, and cognitive psychological research, two different kinds of evidence are examined. The first relates to historical sites (monuments, ruins, battlefields, landscapes) as well as social spaces (families, trials, museums); the second to representations and languages of remembrance, through the narratives of trauma, fiction, memoir, testimonial literature, photography, and film. The focus is on civil society rather than primarily on the manipulation of commemorative forms.

HIST 974a, Identities: Aspects of American and European Social and Cultural History. Jay Winter, John Demos.

W 1.30–3.20

This seminar addresses the historical literature surrounding problems of identities, defined in a host of ways — racial, gendered, ethnic, regional, national, psychological, and age-related. Both American and European scholarship is considered. *Also AMST 823a.*

HIST 980a, Genocide: History and Theory. Benedict Kiernan.

Th 9.30–11.20

Comparative research and analysis of genocidal occurrences from ancient times to the present; theories and case studies; an interregional, interdisciplinary perspective. Readings and discussion, guest speakers, research paper.

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 2004. Research seminar. *Also PLSC 715a.*

HIST 985b, Studies in Grand Strategy, Part I. John Gaddis.

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. 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 met by regular courses.

HIST 999a/b, Directed Research. Faculty.

Offered by arrangement with instructor and permission of DGS to meet special requirements.

HISTORY OF ART

56 High, 432.2668

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

Chair

Edward Cooke, Jr. (102A AG, 432.2670, edward.cooke@yale.edu)

Director of Graduate Studies

David Joselit (204 OAG, 432.2666, david.joselit@yale.edu)

Professors

Brian Allen (*Adjunct*), Judith Colton, Edward Cooke, Jr., David Joselit, Diana Kleiner, Amy Meyers (*Adjunct*), Mary Miller, Alexander Nemerov, Jock Reynolds (*Adjunct*), Vincent Scully (*Emeritus*), Robert Thompson, Christopher Wood, Mimi Yiengpruksawan

Associate Professors

Christy Anderson, Timothy Barringer, Martin Berger (*Visiting*), Jonathan D. Katz (*Adjunct*)

Assistant Professors

Anne Dunlop, Björn Ewald, Sandy Isenstadt, Kellie Jones, Christine Mehring, Noa Steimatsky, Lillian Tseng

Lecturers

Mark Aronson, Karen Foster, Patricia Garland, Susan Greenberg, Katherine Haskins, John Marciari, Julia Marciari-Alexander, Susan Matheson

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 at the beginning of the first term, 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. By the end of the first term of the third year, the student is expected to have established a dissertation topic. A

prospectus outlining the topic must be approved by a committee at a colloquium. During the spring term of the third year the student is expected to take the qualifying examination. The candidate must demonstrate knowledge of his or her field and related areas, as well as a good grounding in method and bibliography. 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 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 Material 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 416. 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. David Joselit.

M 3:30–5:20

This seminar introduces first-year graduate students to some of the fundamental concepts and theorists of the discipline of art history. Clusters of assigned texts approach large methodological questions as they developed over time. For instance, in the category of “Form” we read Panofsky on perspective alongside Damisch on the same subject. Questions of history span the thinking of Riegl, Kubler, and Clark as well as Nochlin and Pollock. Semiotics is approached not only through recent theorists such as Derrida but in light of Panofsky’s concept of iconography and Warburg’s morphologies. Deleuze and Guattari’s notions of faciality are judged along with Fried’s recent interpretations of Manet.

HSAR 504b, Aspects of Connoisseurship and Conservation. Theresa Fairbanks.

T 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 580a, Everyday Romans in Extraordinary Times: The Art and Culture of the Non-Elite in Ancient Rome. Diana Kleiner.

T 1:30–3:20

Art and everyday Romans in Rome and Pompeii. A study of a half-century of scholarly discourse and its focus on non-elite Romans and their role as unique patrons and viewers. Case study analysis of the interaction between high and low art, the visibility of the “trickle-down” phenomenon, and the distinction between the portrayal of non-elites in imperialistic state-sponsored monuments and their own privately commissioned portraits and narrative scenes. *Also CLSS 878a.*

HSAR 585b, Iconography of Christian Art: The Image of Christ. Jaime Lara.

MW 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 first-century Palestinian Jewish male. Each successive epoch has “created” him anew in accordance with its own character. This course explores, from the first to the twenty-first century, what it was that each epoch found in Jesus and brought to its visual portrayal of him. *Also REL 835b.*

HSAR 586b, The House of the Lord: Twenty Centuries of Church Architecture.**Jaime Lara.**

TTH 1.30–2.50

This course is a historical survey of religious architecture, primarily the religious buildings of the Catholic, Protestant, and Eastern Orthodox traditions. Lectures, assigned readings, and class discussion emphasize architectural iconography and the way in which these buildings functioned for changing social or worship needs over the course of the centuries. After some initial consideration of sacred sites in general, we begin with the Jewish structures of the tent, Temple, and synagogue, and then move onto Christian house-churches, basilicas, monasteries, cathedrals, meeting houses, and mega-churches in Europe and the Americas. The last part deals with contemporary worship spaces designed for the renewed liturgies of the faith traditions. Class meetings are supplemented by visits to houses of worship in the New Haven area, and students may either write a research paper or create a project with scale model. *Also REL 847b.*

HSAR 600b, Dutch Painting and the Realist Novel. Ruth Bernard Yeazell.

TH 1.30–3.20

Studies in visual and verbal realism, which take their cue from the nineteenth-century practice of comparing the novel to seventeenth-century Dutch and Flemish painting. Readings include selected art theory and criticism from Reynolds to the present, and novels by Balzac, George Eliot, and Thomas Hardy. *Also CPLT 696b, ENGL 819b.*

HSAR 630b, Pontormo and the Florentine Renaissance. John Marciari.

T 1.30–3.20

This seminar studies Florentine art during the first half of the sixteenth century, using Jacopo da Pontormo as a focal point. Part of the term is spent looking at the frameworks that have been used to write the history of art for the period, ranging from a critical reading of Vasari to an examination of the concept of Mannerism as defined by modern scholars, to a consideration of the successes and shortcomings of style history. We also examine the special character of artistic practice in Pontormo’s Florentine milieu. The seminar incorporates close first-hand study of works by Pontormo and other artists including Bronzino, Allori, Salviati, and Vasari, including both drawings and paintings in the Yale Art Gallery and the works shown in the exhibition “Pontormo, Bronzino, and the Medici” at the Philadelphia Museum of Art in the winter of 2004–2005.

HSAR 635a, Fiction, Imitation, and Pre-Modern Images. Anne Dunlop.

TH 10–12

Convincing imitation of the real may be the oldest Western idea of art, yet it has always been an ambiguous one. At least since Plato the visual has been attacked — but also sometimes celebrated — as the realm of the false. Truth needed to be sought “behind” appearances, but images could deceive; and viewers were encouraged to imitate fictive doubles, but also to take pleasure in games of fictive space. This seminar focuses on the linked ideas of fiction and imi-

tation in theories of art before about 1500. Readings are drawn from both modern and pre-modern texts, from Aristotle and Augustine to Georges Didi-Huberman and Dan Brown. Topics include the problem of “true likeness” in images of holy figures, ekphrasis as a mode of response, the shifting relations of animation and illusionism as artistic goals, and the enduring idea that artworks conceal truth behind deceptive veils.

HSAR 639b, Mimesis, Magic, Art. Christopher Wood.

Th 1.30–3.20

Aesthetic, cultic, and magical practices are structured around symbols that promise a real connection to their objects. Yet art and the discourse on art are at the same time troubled by the power — imagined or real? — of the indexical sign, the relic, the talisman, the emotive gesture, mimicry, pure color or sound. This seminar addresses the myth and reality of the motivated sign from anthropological, philosophical, and art historical points of view. Readings include Benjamin, Adorno, Caillois, Bataille, Kristeva, Frazier, Durkheim, Taussig, Warburg, Yates, Belting, and Didi-Huberman.

HSAR 656b, The English Landscape Garden. Judith Colton.

Th 1.30–3.20

Study of eighteenth-century gardens against the backdrop of the English Enlightenment. The garden as the setting for, but also an instrument in, political and poetical debates, with links to freemasonry, Neopalladianism, earlier history (England’s “gothick” past, Greece and Rome), and landscape painting. The sixteenth- and seventeenth-century background, especially Italian and French gardens, comes in for consideration, as do current debates in garden history.

HSAR 692b, Abstraction and Decoration. Christine Mehring.

M 3.30–5.20

This seminar considers the relationship between decoration and abstract art produced in Western art in the course of the twentieth century. Many modern artists felt ambivalent about decoration, ornament, the applied arts, and design. Abstract artists were often apprehensive about their painting and sculpture approaching “mere” decoration, superficial and superfluous. Any suggestion of decoration threatened to undermine abstraction’s very identity as art and its new rationales of autonomy and self-reflexivity, of complexity and deep meaning. Yet some of these very same artists embraced these practices. Staples taken from decoration such as repetition, flatness, and bold color facilitated abstraction’s departure from mimetic modes of representation. Moreover, the connection of decorative work to the world at large appealed to abstract artists searching for a new motivation and social relevance. Materials and techniques of the decorative arts, such as textiles and weaving, were also appropriated for abstract art. Class discussions revolve around these constantly changing attitudes at different historical moments as well as around various foundational, theoretical texts. Students’ research may focus on individuals or groups of artists, themes or theoretical concepts beyond the ones specifically addressed, but should relate to the main questions in class.

HSAR 695b, Toward a Bioaesthetics: Burroughs, Warhol, Deleuze. David Joselit.

T 1.30–3.20

The vogue for organic forms and biological metaphors that has arisen from the recent discovery of the human genome is only the latest in a wave of “biologisms” in the twentieth century. Rather than tracing their history directly, this seminar approaches three major intellectual figures of the twentieth century, a writer (Burroughs), an artist (Warhol), and a philosopher (Deleuze), in order to lay down the tools for a twentieth-century bioaesthetics. In each of three units the texts (both visual and literary) associated with these figures are explored in depth. *Also CPLT 572b.*

HSAR 696a, 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 768a.*

HSAR 699b, Architecture Criticism. Sandy Isenstadt.

w 3.30–5.20

This course involves the reading and analysis of architectural criticism in an attempt to understand the bases on which buildings have been evaluated both recently and in the past and the way in which language guides judgments of form. Students are asked to read carefully and critique readings in class discussion. Regular writing assignments require students to make their own viewpoints as explicit and well argued as possible. Open to advanced undergraduates with permission of instructor.

HSAR 731a, Depicting Race. Martin Berger.

w 3.30–5.20

This seminar investigates the construction of blackness and whiteness in late-nineteenth- and twentieth-century American culture. With emphasis on how racial groups both promote and resist categorization, the seminar explores the structures, strategies, and representational systems through which race is fashioned. While emphasizing the distinct manner by which visual culture (in this case, painting, sculpture, and film) promotes and delimits personal and group identities, the seminar also considers the role of literature and popular culture.

HSAR 738a, William Morris: The Theory and Practice of Craft. Edward Cooke.

w 1.30–3.20

This seminar focuses upon the writings and works of William Morris (1834–1896), the legendary British arts and crafts activist. Readings focus upon him as a historian, social critic, designer, craftsman, preservationist, and writer, but will also provide a sense of his context as well as his influence in the twentieth century. This seminar also makes use of a special exhibition of Morris's design work at the British Art Center.

HSAR 747a, Sixteenth-Century Manuscripts. Mary Miller.

m 1.30–3.20

Aztec artists and scribes prepared pictorial manuscripts for both civil and religious authorities in New Spain from 1521 until about 1586. We work carefully with three major works, from three different periods: the Codex Borbonicus (before 1530), the Codex Mendoza (1541), and Florentine Codex (ca. 1577). Reading knowledge of Spanish required.

HSAR 778b^u, From West Africa to the Black Americas. Robert Thompson.

tth 11.30–12.45

Art, music, and dance in the history of key classical civilizations south of the Sahara — Mali, Asante, Dahomey, Yoruba, Ejagham, Kongon — and their impact on the rise of New World art and music. *Also AFAM 728b^u, AFST 778b^u.*

HSAR 779a^u, New York Mambo: Microcosm of Black Creativity. Robert Thompson.

tth 11.30–12.45

Rise, development, and philosophic achievement of the world of New York mambo and salsa. Emphasis on Palmieri, Cortijo, Roena, Harlow, and Colon. Examination of parallel traditions, e.g., New York Haitian art, Dominican merengue, reggae and rastas of Jamaican Brooklyn, and the New York school of Brazilian capoeira. *Also AFAM 729a^u.*

HSAR 781a, Problem and Theory in Afro-Atlantic Architecture I: Africa.**Robert Thompson.**

th 3.30–5.20

The seminar addresses a new frontier—rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture—Ituri Forest and Namibian spatial solutions, Berber casbah architecture and its interactions with the Jews on Djerba isle and in Morocco, the concept of the Muslim *assatayab* creolized into the Iberia *azotea* and the spread of this terrace-roof style throughout Latin America. Topics include the architecture of Djenné, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of African influence on the architecture of the Americas—the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Colombia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Colombia. The seminar ends with the shrine architecture of New World adherents of the classical religions of Dahomey. Also *AFAM 739a*, *AFST 781a*.

HSAR 781b, Problem and Theory in Afro-Atlantic Architecture II: The Black Americas. Robert Thompson.

th 3.30–5.20

A continuation of HSAR 781a. Also *AFAM 739b*, *AFST 781b*.

HSAR 790a, History and Memory in Chinese Art. Lillian Tseng.

th 1.30–3.20

The seminar explores how art objects shape memory and intervene in history in China. It first focuses on bronze vessels and stone steles, investigating how media, intention, and reception influence the operation of commemorative art. It then tackles painting and calligraphy, discussing how the fusion of personal and collective memory transforms the tangle of the past and the present. Chinese is not required.

HSAR 794b, Chinese Painting under the Mongols, 1260–1368. David Sensabaugh.

th 3.30–5.20

Chinese painting has been interpreted as having undergone a major redirection during the century of Mongol rule in China. This has been related to the rise of scholar painting. This seminar examines ways of viewing the history of Chinese painting during the Yuan dynasty, beginning with such artists as Qian Xuan and Zhao Mengfu and ending with the Four Masters of the Yuan.

HSAR 802b, The Textual and Visual Cultures of Heian Japan.**Mimi Yiengpruksawan, Edward Kamens.**

w 3.30–5.20

Topics in the study of the Heian period and the city-space/cultural center we call “Heian” explored through close examination of a variety of artifacts—works of art and architecture, historical and literary texts, both secular and religious. Primary documents in Japanese and Sino-Japanese (*kanbun*) are explored in depth; a reading knowledge of literary Japanese and of *kanbun* is required. Also *JAPN 710b*.

HISTORY OF MEDICINE AND SCIENCE

L-132 Sterling Hall of Medicine, 785.4338

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

Chair

John Harley Warner

Director of Graduate Studies

Daniel Kevles (201 HGS, 432.1356)

Faculty

Daniel Kevles (*History*), Susan Lanzoni (*Visiting, History of Medicine*), Susan Lederer (*History of Medicine*), Ole Molvig (*History*), David Musto (*Child Study*), 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 (*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*), 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 601a/602b 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 416–17.

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 601a/602b 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 623b^U, History of the Modern Sciences in Society. Ole Molvig.

MW 11.30–12.20

An introduction to the history of science from the Enlightenment to the present. The course focuses primarily on the physical sciences, but also includes major developments within the life sciences. Topics include the clockwork universe, the Chemical Revolution, evolutionary theory, thermodynamics, and quantum theory as well as colonial empires, industry, professionalization, cultural modernism, and nuclear fear. *Also HIST 946b.*

HSHM 624b^U, Science, Feminism, and Modernity. Naomi Rogers.

Th 9.30–11.20

This seminar examines scientists and science in post-1800 Europe and North America, with a particular focus on interpretations of the transformation and “progression” of the natural world, drawing on recent feminist and science studies theorists including Donna Haraway, Sandra Harding, Evelyn Fox Keller, Londa Schiebinger, and Bruno Latour. Questions include: Has feminism changed science? Is there a feminist science? Is science multicultural? and were we ever modern? With an emphasis on biology, genetics, anthropology, and physics, we discuss the work and lives of women scientists, including an analysis of their representations in popular culture. *Also HIST 944b^U.*

[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 9.30–11.20

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.]

HSHM 635a^u, Science, Arms, and the State. Daniel Kevles.

T 1.30–3.20

A history of chemical, nuclear, and biological weapons in the twentieth century that focuses on the integration in the United States of national security policy making, scientific research, and military innovation, including its consequences for the scientific community, the civilian economy, public attitudes toward weapons of mass destruction, and political movements to control them. *Also HIST 945a^u.*

HSHM 636a^u, Technology and Society from the Industrial Revolution. Ole Molvig.

W 3.30–5.20

Can the design of a printing press reveal as much as what it prints? This seminar explores the social impulses behind — and consequences of — technological innovation from roughly 1800 to 1975. Seminar members examine in depth three technological sectors: manufacturing, transportation, and communication. These explorations prepare participants for substantive research of their own. Sample topics include military equipment, medical instruments, domestic appliances, mass entertainment, and agricultural machinery. *Also HIST 934a^u.*

[HSHM 637a^u, Race and Medicine in America, 1800–2000.]

HSHM 676b^u, The Engineering and Ownership of Life. Daniel Kevles.

M 1.30–3.20

The development of biological knowledge and control in relation to intellectual property rights in living organisms. Topics include agribusiness, medicine, biotechnology, and patent law. *Also HIST 938b^u, LAW 2144i.*

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, 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 678a^U, Alcohol and Other Drugs in American Culture.]

[HSHM 701a, Introduction to the History of Medicine and Public Health.]

HSHM 702b, Introduction to the History of Science. Daniel Kevles, 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 both 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 723a, Making the Modern Body.]

[HSHM 725a, History of Disease and Public Health in Western Societies.]

[HSHM 726b, Medicine, Public Health, and Colonialism, 1750–1950.]

HSHM 732b, Infection, Public Health, and the State. Frank Snowden.

W 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 928b.*

HSHM 733a, The Grounding of Modern Medicine. John Harley Warner.

M 1.30–3.20

An introductory exploration of the shaping of modern medical culture, focusing on the United States in the late nineteenth and early twentieth centuries. Readings engage recent historiography. Themes include struggles over the place and meanings of “science” and the intersection of lay and professional understandings of the body; shifting conceptions of purity and danger in the social and physical environments, with attention to region, gender, class, ethnicity, race, and religion; orthodox and alternative professional identities and consumer expectations in the medical marketplace; the role of imperialist ventures and European impulses in fashioning American biomedicine and public health; the medicalization of American society; antimodernist currents, and the ethical, epistemological, and aesthetic choices that were constitutive of medical modernity. A reading seminar that may be taken as a research seminar with permission of the instructor. *Also AMST 880a, HIST 926a.*

HSHM 734a, Readings in the History of Psychology, Psychiatry, and Psychotherapy.
Susan Lanzoni.

Th 1.30–3.20

This seminar examines the history of psychiatry, psychology, and psychotherapy with special emphasis on epistemological, moral, and therapeutic views of empathy and social cognition in the late nineteenth and twentieth centuries. Topics include aesthetic theories of empathy; empathy as a source of knowledge and healing in psychotherapy and in the doctor-patient relationship; empathy as a gendered capacity in the mother-infant bond; and the psychopathology of autism. We also engage broader cultural and normative views of empathy and the understanding of others in photography, film, and popular culture. *Also HIST 948a.*

HSHM 735a, Nursing, Health, and Social Welfare in American History.

Cynthia Connolly.

T 4.30–6.20

A historical examination of the relationship between nursing and social reform in the United States between 1860 and 1992. The goal is to explore themes related to change and reform throughout nursing's history, both chronologically as well as thematically. Specifically, this elective focuses on the ways in which nurses have challenged and/or collaborated with prevailing social structures and ideologies across time and the results of those efforts. The course also considers the many variables (including race, ethnicity, class, and gender) that influenced particular events in which nursing played a role. *Also NURS 737a.*

[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

Paula Kavathas (*Acting*) (TAC S621, 785.3857, paula.kavathas@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

Akiko Iwasaki (*Epidemiology & Public Health*), 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 ensure that first-year students quickly become familiar with the variety of research opportunities available at Yale. Thesis research begins at the end of the first year, and students are encouraged to develop rigorous and creative approaches to examine significant problems in immunology and biology. At the end of the program, the completed research is presented in the form of a written dissertation and a formal seminar.

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 66–68).

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.

A seminar course is offered every term and covers special topics in immunology, emphasizing the methods and logic of research, i.e., how to read and critically evaluate the literature, and how to write a research proposal.

One seminar course can be taken for audit if the student has previously taken seven graded courses and has completed one of the above Immunobiology seminars 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.

Following successful completion of the prospectus examination, the student will be entitled to the M.Phil. degree. Once all the above 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.

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 Degree

M.S. may be awarded to a student who is in good standing upon completion of at least two terms of graduate study. Note that a High Pass average is required for obtaining a master's degree.

Our 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^u.*

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 536b, Advanced Immunology Seminar: Immunological Memory and Lymphocyte Homeostasis. Mark Shlomchik, Fadi Lakkis, Susan Kaech.

HTBA

In this seminar course we review classical and recent papers that have shed light on immunological memory. Topics include the generation of memory lymphocytes, factors that control their survival and longevity (relative to naïve cells), the unique differentiation state of the memory cell, and the function of memory cells and how they contribute to memory immune responses. CD4 and CD8 T cells as well as B cells are covered, with emphasis on similarities

and differences among these different lymphocyte types. In addition, it is clear that there is functional and phenotypic heterogeneity within these major types of lymphocyte memory populations and this is considered throughout the course. The format is discussion of several assigned papers in an approximately two-hour weekly session. Near the end of the term, students write and review a mini-grant on a relevant topic. Meeting time and location to be determined.

IBIO 539a, Advanced Immunology Seminar, “Innate Immunity.” Ruslan Medzhitov, Jeffrey Bender, Akiko Iwasaki.

w 4–6

The innate immune system has received broad attention in the past few years because of increasing understanding of its fundamental role in all aspects of host defense as well as in inflammatory and autoimmune diseases. This seminar course covers basic and advanced topics related to innate immunity, including the most recent findings in these areas. Specifically, the following aspects of innate immunity are covered in detail: innate immune recognition, cell types and tissues of the innate immune system, effector mechanisms of innate immunity, host-pathogen interactions, cytokines and chemokines, the inflammatory response, innate control of adaptive immunity, Toll-like receptors, NK cells, anti-viral and anti-bacterial immunity, innate immune system and disease. The seminar course focuses on fundamental concepts of innate immunity and primary literature that lead to these concepts. Students in this course are required to actively participate in discussions and presentations.

IBIO 600a, Introduction to Research. David Schatz and staff.

th 5

Introduction to the research interests of the faculty. Required for all first-year 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 603.*

INTERNATIONAL AND DEVELOPMENT ECONOMICS

Economic Growth Center
27 Hillhouse, 432.3621

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. With a few exceptions, students are from outside the United States, primarily from developing countries. Many 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 some enter the program directly from their undergraduate school.

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.

Preference is given to candidates recommended by their employing agencies or institutions and financed by their employers during the study leave. Yale fellowship funds are not available.

The course program requires the completion of eight term courses, five of which are specifically designed for the program and are required; the remaining three are electives. These required courses are designed to provide an understanding of the basic economic theory necessary for economic policy analysis.

An option of a second year of nondegree elective study is available to qualified students.

Joint program options for study with the School of Management and the School of Forestry & Environmental Studies are also available. Application to the participating professional school must be made simultaneously with the application to the IDE program. Admission to these joint programs is determined by the participating professional school and must be obtained prior to beginning either program. Joint-degree students earn both the Master of Arts degree and the Master of Business Administration or the Master of Environmental Studies degree.

Program materials are available upon request to the Kathryn Toensmeier, Administrative Assistant, International and Development Economics Program, Yale University, PO Box 208269, New Haven CT 06520-8269; e-mail, ide@yale.edu.

INTERNATIONAL RELATIONS

International Affairs Council
Yale Center for International and Area Studies
210 Luce Hall, 34 Hillhouse, 432.3418

M.A.

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*), William Burch, Jr. (*Forestry & Environmental Studies*), Paul Bushkovitch (*History*), David Cameron (*Political Science*), Amy Chua (*Law*), Deborah Davis (*Sociology*), Michael Dove (*Forestry & Environmental Studies*), 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*), Penelope Goldberg (*Economics*), Roger Gould (*Sociology*), Timothy Guinnane (*Economics*), Koichi Hamada (*Economics*), Valerie Hansen (*History*), Robert Harms (*History*), Oona Hathaway (*Law*), Paula Hyman (*History*), Gilbert Joseph (*History*), Donald Kagan (*History*), Efstathis Kalyvas (*Political Science*), Stephen Kellert (*Forestry & Environmental Studies*), William Kelly (*Anthropology*), Paul Kennedy (*History*), Daniel Kevles (*History*), Ilona Kickbusch (*Epidemiology & Public Health*), 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*), Curtis Patton (*Epidemiology & Public Health*), 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*), 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*)

Associate Professors

Campbell Craig (*Visiting, History*), Nora Groce (*Epidemiology & Public Health*), Lawrence King (*Sociology*), K. Geert Rouwenhorst (*Management*)

Assistant Professors

Michael Auslin (*History*), Jennifer Bair (*Sociology*), Kent Buse (*Epidemiology & Public Health*), Jose Cheibub (*Political Science*), Brian Cowan (*History*), Keith Darden (*Political Science*), Seth Fein (*History*), Anna Grzymala-Busse (*Political Science*), Mary Habeck (*History*), Galina Hale (*Economics*), Anastassios Kalandrakis (*Political Science*), Nathaniel Keohane (*Management*), Sharon Kinsella (*Sociology*), Kavesh Koshnood (*Epidemiology & Public Health*), Pierre Landry (*Political Science*), Richard Lindsey (*Management*), Pauline Jones Luong (*Political Science*), Ellen Lust-Okar (*Political Science*), Michael Mahoney (*History*), Rahini Pande (*Economics*), Mridu Rai (*History*), Rose Razaghian (*Political Science*), Linda-Anne Rebhun (*Anthropology*), Nicholas Sambanis (*Political Science*), Kenneth Scheve (*Political Science*), Andrew Schrank (*Sociology*), Timothy Snyder (*History*), Steven Stoll (*History*), Christopher Timmins (*Economics*), James Vreeland (*Political Science*)

Lecturers

Joerge Baten (*Economics*), Michael Boozer (*Economics*), Marian Chertow (*Forestry & Environmental Studies*), Giancarlo Corsetti (*Economics*), Cheryl Doss (*Economics*), Stuart Gottlieb (*Political Science*), Debbie Humphries (*Epidemiology & Public Health*), Jean Krasno (*Political Science*), Eric Mood (*Epidemiology & Public Health*), Beth Daponte Osborne (*Management*), Nancy Ruther (*Political Science*), James Sutterlin (*Political Science*)

Adjunct & Visiting Professors

Albert Fishlow (*Adjunct, Management*), 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 and should preferably do this by the October testing date; students whose native language is not English must pass the Test of English as a Foreign Language (TOEFL) in October 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 six 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); and two graduate-level courses in economics (one economic analysis and one international economics). In addition, all first-year students are required to take the workshop in international relations (see course description below for INRL 700a). 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 and a maximum of ten 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.

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. This may be done by successfully completing an approved research seminar or by demonstrating to the DGS that the student has completed a major research paper for another course.

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 councils, including African Studies, East Asian Studies, European Studies, Latin American and Iberian Studies, Middle East Studies, and Southeast Asia Studies, provide a wealth of research, teaching, and enrichment activities. M.A. degrees in African Studies, East Asian Studies, and Russian and East European 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 that may be outside the Law School to fulfill his or her professional qualifications in the field. With a human rights legal focus, four to six of these eight courses would concentrate on the topic.

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 semester 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.

Program materials are available upon request to International Relations, Yale University, PO Box 208206, New Haven CT 06520-8206.

Courses

INRL 531b, International Negotiation. Barry O'Neill.

M 3.30–6.20

Skillful negotiation is important among nations and within a government. The goal of this course is to develop a more articulated understanding of negotiation and a greater feel for it. It uses short role-playing exercises which are later discussed in class, writings from the literature of negotiation research, and to more limited extent, the record of past international negotiations.

INRL 542b, State Building in Comparative Perspective. Natalia Sobrevilla Perea.

W 3.30–5.20

This course examines the process of state formation in comparative perspective, by focusing on the experience of Latin American states from independence to the end of the 19th century. Using a comparative perspective, particular emphasis is given to the cases of Peru, Colombia, Mexico, Venezuela, Chile, Argentina, and Brazil. Topics include the recurrence of internal and external wars, tensions between the center and regions, the development of export markets and its links to the creation of stability, caudillismo, and the importance of ideology in state building. Special attention is given to political thought and how ideas from abroad were read and adapted, especially in the case of constitutionalism.

INRL 543a, Nation Building in Comparative Perspective. H. Zeynep Bulutgil.

Th 3.30–5.20

The course focuses on how the interaction between states and various minority groups produced different social outcomes. Some states granted cultural and political autonomy to minorities, some engaged in policies of forceful assimilation, and finally some chose to resort to mass deportations and genocide. We explore the conditions under which states selected these different paths. Special attention is given to methodological issues: how do we approach such questions? Although the focus will be on European cases, we will also examine non-European ones as well.

INRL 544a, U.S. Cold War. Campbell Craig.

Th 1.30–3.20

This course examines U.S. Cold War foreign policy during the period 1943–1989 as a discrete and concluded phenomenon. It focuses particularly upon some newer areas of inquiry, such as espionage, nuclear peacekeeping, the impact of domestic politics and ideas, and the question of American empire.

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 546b, Conflicts in International Relations. Vitaly Kozyrev.

M 1.30–3.20

Introduction to theoretical and practical approaches to conflicts and their resolutions. The course consists of two sections, focused on (1) the phenomenon of conflict in international relations in the late twentieth century and its theoretical interpretations (political, economic, ideological, religious, ethnic, national, territorial), and (2) the problem of conflict resolution through the peacemaking process. Special attention is paid to international humanitarian law and the concept of “military crime.” *Also E&RS 646b.*

INRL 555b, Theories of International Relations. Bruce Russett.

W 1.30–3.20

We analyze a variety of theories of international relations to evaluate their logical structure, empirical support, and relation to policy concerns and to other theories. Topics include theories under such categories as realism, liberal-institutionalism, and feminism. Open only to IR students.

INRL 559b, International Organization. Jean Krasno.

W 3.30–5.20

International organizations (IOs) have gradually increased in number since the end of World War II. Today, all states participate in international organizations at the regional and global level. IOs can be classified into intergovernmental organizations (IGOs) and nongovernmental organizations (NGOs). Organizations like the United Nations with its nearly universal membership are diffuse bodies focusing on a wide range of issues from security, health and economic development. Others, such as NATO, are issue-specific and regionally bound (at least in terms of membership if not territorial deployment). Issue-based regimes, such as those on the environment, may involve both NGOs and IGOs. They often have to cope with overlapping norms, rules of procedure, and standard operating behaviors emerging at times from very diverse constituencies, for example, North/South points of view. This course examines international organization in general and also looks at the history and development of specific organizations and how they network through regimes to leverage their goals.

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. *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. *Also ECON 708b.*

INRL 563b, Central Issues in American Foreign Policy. Stuart Gottlieb.

T 1.30–3.20

Examination of the historical and conceptual foundations of American foreign policy, with a special focus on the international challenges facing America since the end of the Cold War. Topics include America's two wars with Iraq; America's domestic and international responses to the threat of global terrorism; and what role the United States should play in the world economy and global institutions. Additional focus on how foreign policy issues play into presidential election campaigns.

INRL 567a, AIDS, Poverty, and Development in India. Siddharth Dube.

HTBA

India's failures on AIDS reflect larger shortcomings evident in its post-Independence development record. Despite its vibrant democracy, free press, administrative capacities and growing economy, it may soon have many more people with HIV/AIDS than any other country. This wide-ranging course studies India's response to HIV/AIDS within the framework of its record on chronic deprivation, drawing on political economy, public health, the media, sexuality, and human rights readings. *Also GHD 567a.*

INRL 700a, International Affairs: Core Issues and Approaches. Nancy Ruther, Theodore Bromund.

W 1–3.50

Current and traditional issues facing international-affairs professionals explored through case study analysis, simulation, readings, and discussion with faculty from related disciplines and professions as well as current practitioners. Focus on negotiation and strategic management tools for understanding and analyzing the complex interactions of different aspects of international affairs. Course emphasizes refining problem solving, presentation, and organizational skills needed by professionals entering the field. For first-year IR students.

INRL 730a^U, The United Nations and the Maintenance of International Security. James Sutterlin.

T 1.30–3.20

Consideration of the role of the U.N. in preventing 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. Theodore Bromund.

Th 2–5

The Yale Stimson Seminar is taught by a series of practitioners who address three major international policy themes in three modules from the perspective of government, NGOs, and business. Recent themes have included: information technology and diplomacy, investment and international development, government of the global environment, rethinking national and international security, and avoiding disaster in global public health. Open to all graduate and professional students. Admission is by application only.

INRL 900a or b, Directed Reading.

By arrangement with faculty.

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*), Fred Gorelick (*Internal Medicine*), Sharon Inouye (*Internal Medicine*), Thomas Kosten (*Psychiatry*), Harlan Krumholz (*Internal Medicine*), Eugene Shapiro (*Pediatrics*), Mary Tinetti (*Internal Medicine*), Elisabetta Ullu (*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 biomedical research. This program is designed to develop a broad knowledge base, analytical skill, creative thinking, and the hands-on experience demanded of clinical researchers devoted to disease-oriented and patient-oriented investigation. It will provide the candidate with individualized experience encompassing formal course work and practical experience, under the supervision and mentorship of a senior faculty member.

Trainees enter the program with a broad range of experience and interests. Trainees can undertake thesis work in a variety of disciplines, including: evaluating risk factor and interventions for disease using modern concepts in quantitative methods and clinical study design; investigating the biochemical, physiologic, and genetic basis for disease in the setting of a Clinical Research Center; or exploring the molecular basis for a disease from the laboratory standpoint.

Special Admissions Requirements

The Investigative Medicine program is designed for students with an M.D. degree who have completed two or more years of postgraduate clinical training. Application to the program may be made concurrently with application for subspecialty training in a clinical department at Yale. To be eligible for the Investigative Medicine program, the candidate must first be accepted into a subspecialty program (including General Medicine), at which point the candidate may apply to the Investigative Medicine program. Students will typically be involved in clinical training in their subspecialty for the first twelve to twenty-four months after arrival, and thus will enter the Investigative Medicine program after having completed two to five years of postgraduate clinical training. Prospective students who are already in a subspecialty clinical program at Yale may also apply to the Investigative Medicine program anytime during the first two years of that training (approximate).

The most important criterion for selection into the program is the commitment of the applicant to rigorous training in clinical investigation. Successful candidates will also need evidence of high academic achievement in undergraduate and medical-school courses and completion of residency training. Test scores from the USMLE are required, and (if available) the American Board of Internal Medicine, Pediatrics, Neurology, or other relevant subspecialty disciplines.

Special Requirements for the Ph.D. Degree

The minimum course requirements for the doctorate program are nine (9) courses. These consist of three one-term core courses: Principles of Clinical Research, Translational Research and Molecular Tools Part I, and Practical and Ethical Issues in Clinical Investigation; either Seminars in Clinical Investigation or The Molecular and Cellular Basis of Human Disease (CBIO 601); one intensive practical course; either Translational Research and Molecular Tools Part II or Methods in Clinical Investigation; an introductory biostatistics course; the independent reading course in Investigative Medicine; and a minimum of two electives in the specific research area. Full-time course work will extend over twelve months, usually starting in July. Students must enroll in a minimum of two courses each term. The majority of course requirements may be completed in twelve months, with elective courses often taken in the second year. To complete course requirements, students must achieve the grade of Honors in two courses (one course if a full-year course). When requirements are met (typically at the end of the first year), students submit their thesis proposal and undertake a qualifying exam. In order to be admitted to candidacy, students must pass written and oral examinations and submit a 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 trainees will complete the program in four years.

Courses

IMED 610a, Translational Research and Molecular Tools, Part II. Elisabetta Ullu, Christian Tschudi.

MTWThF 8.30–6

This is an intensive, full-time two-week lecture and laboratory course on cellular and molecular biology. The laboratory experience is designed to expose the students to strategies and methodologies through a series of experiments, rather than through technical demonstrations. The lectures complement and extend the laboratory experience. The laboratory course requires full-time commitment. Consent of instructor required. Two weeks, September.

IMED 620a, Translational Research and Molecular Tools, Part I. Karen Anderson.

MTWThF 2–4

Genomics: In this section, students learn how genomics is influencing both medical research and health care delivery, and illuminating the genomic discoveries being translated into diagnostic and therapeutic medical applications. This course takes an integrated approach, exploring how genomes are mapped and sequenced, how various computational methods convert this raw data into information about biology, and how new experimental methods can provide comprehensive information about the behavior and function of genes and their products. Lectures are supplemented with computer laboratory sessions to reinforce ideas and to provide

practical experience. The majority of the time is spent using computer applications of bioinformatics tools. The course is designed to provide practical training in bioinformatics methods including accessing the major public sequence databases, use of the BLAST tools to find sequences, analysis of protein and nucleic acid sequences, detection of motifs or domains in proteins, assembly of protein sequences from genomic DNA, detection of exons and finding intron-exon boundaries, aligning sequences (Clustal W), making phylogenetic trees, and comparative genomics. **Structure-Based Drug Design:** In this section, students learn the underlying principles in structure-based drug design. Lectures are supplemented with computer sessions devoted to practical learning of basic principles in protein structure determination, analysis, and relationship to molecular design. Clinically relevant examples of this approach are considered. Consent of instructor required. Two weeks, July.

IMED 625a, Principles of Clinical Research. Eugene Shapiro.

MTWThF 2–4

The purpose of this two-week intensive course is to provide an overview of the objectives, research strategies, and methods of 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; qualitative research methods; decision analysis. Sessions include lectures and discussion of readings distributed in advance. Consent of instructor required. Two weeks, July.

IMED 630a, Practical and Ethical Issues in Clinical Investigation. Henry Binder.

W 3:30–5

This term-long course addresses topics which 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. Fourteen sessions are required; dates/times by arrangement. Consent of instructor required.

[IMED 640a,b, Seminars in Molecular Medicine.]

IMED 650a,b, Seminars in Clinical Investigation. Eugene Shapiro.

M 2–4

This yearlong seminar course explores the interface between clinical strategies and methodologies used to investigate these topics. A variety of topics are covered in an interactive seminar format. Articles are selected by the faculty, and students review and discuss the articles at each session. In addition, students gain experience in critical evaluation of study designs and protocol development (in the fall term), and grant writing and reviewing (in the spring term). Attendance and active participation are required. The course gives new clinical investigators tools to conduct their own research project. Consent of instructor required. Prerequisite: biostatistics training.

IMED 660a,b, Methods in Clinical Research. 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.

ITALIAN LANGUAGE AND LITERATURE

82–90 Wall Street, 432.0595

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

Chair

Giuseppe Mazzotta

Director of Graduate Studies

Olivia Holmes (82–90 Wall, Rm 411, 432.8299, olivia.holmes@yale.edu)

Professors

Giuseppe Mazzotta, Francesco Casetti (*Visiting* [Sp])

Associate Professor

Olivia Holmes

Assistant Professors

Francesca Cadel, Kristin Phillips-Court

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 year, the progress of beginning students 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. Students who join the graduate program with an M.A. in hand, after consultation with the DGS, may get some 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. After 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 416–17). 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 505b, Literary Criticism and Rhetoric from Plato to Vico. Olivia Holmes.

M 1.30–3.20

A survey of major works about literature and rhetoric, with special concentration on the classical and Italian traditions. Critics have tried to answer such basic questions as what literature is, what purposes it serves, and whether it is a good thing. We examine alternating attitudes toward figurative language, which has been seen over time as a dangerous seduction, a tool for teaching ethics, and a necessary first step in understanding reality. Authors include Plato, Aristotle, Horace, St. Augustine, Boccaccio, Sidney, and Vico. *Also CPLT 584b^{ll}*.

ITAL 509a, The Sacred and the Profane in Italian Medieval Literature.

Olivia Holmes.

M 3.30–5.20

The realms of the sacred and the profane can never be readily or entirely separated in medieval literature. The sensual imagery of the *Song of Songs* permeates courtly love poetry, for instance, while the language of human lovers is echoed by Christian mysticism. We explore the divergence and intersection of these registers in a number of representative vernacular texts (in both prose and verse), mostly concentrating on authors usually considered “minor”: the poets of the Duecento, Brunetto Latini, Marco Polo, the anonymous authors of the “Novellino” and “Fioretti di San Francesco,” Saint Catherine of Siena.

ITAL 597b^{ll}, European Cinema in the Wake of Italian Neorealism.

Francesco Casetti.

W 3.30–5.20

World War II saw modernism enter cinema via Italian neorealism, leading to New Waves in France, England, Germany, and Eastern Europe. Famous auteurs exploited both the “realism” and the “reflexivity” of the medium. This seminar examines strategies of narration through a cultural approach. *Also CPLT 927b^{ll}, FILM 731b^{ll}*.

ITAL 634a, Baroque Bridges: Literature and Art of Transformation, Sixteenth and Seventeenth Centuries. Kristin Phillips-Court.

W 2.30–4.20

This reading course looks at transformation in poetry, drama, literature, and art through the paradigms of perspective and spectacle. We consider how diverse forms of representation usher into the visual world significant philosophical, theological, and historical shifts normally associated with “Renaissance,” “Mannerism,” and “Baroque.” Organized around questions of continuity and change, topics include the performative nature of text as play, literature and ideology, perspective in painting and poetry, drama and mimesis, philosophical dialogue, the *commedia dell’arte* and “maraviglia,” and the synthesis of the arts in lyric opera. Authors include Machiavelli, Ariosto, Ruzante, Trissino, Tasso, Michelangelo, Shakespeare, Guarini, Bruno, Campanella, Galileo, Della Valle.

ITAL 640b, Renaissance Epic. Giuseppe Mazzotta.

T 3.30–5.20

A study in some detail of three outstanding epics of the Italian Renaissance (Pulci’s *Morgante*, Boiardo’s *Orlando Innamorato*, and Ariosto’s *Orlando Furioso*). The course stresses such issues as the clashes between Christians and Moslems, the continuity of the epic tradition, the re-creation of medieval chivalric material, Renaissance theories of comedy, perspectivism. Guiding idea is the examination of the specific ways in which the three poets represent history, theology, and politics in their texts. The course also investigates the impact of the intellectual, historical, and political events of fifteenth-century Italy on the construction of the poems.

ITAL 685a, Power and Play in the Renaissance. Giuseppe Mazzotta.

T 3.30–5.20

The seminar probes the constant interaction between the two principles of power and play as defining foci of the Renaissance. After a brief survey of medieval forms of theology of play, the seminar examines the Florentine Neoplatonic circle and moves on to read some Renaissance plays, tractates, and Marino's *Adone*, as well as utopian texts. The seminar ends with a discussion of the scientific-utopian discourses developed at the beginning of the seventeenth century and their relation to theology.

ITAL 691a or b, Directed Reading.

By arrangement with faculty.

ITAL 810b, Cinema as Art, Institution, Discipline. Francesco Casetti.

M 3.30–5.20

Because cinema's status as an artform depends on the functions it serves in cultural contexts, it is also an institution with which spectators negotiate in a complex act of rhetorical communication. This seminar studies how cinema disciplined specific forms of viewing which shaped a gaze. This gaze adapted itself to cultural cues (the desire for a "total vision," the presence of individual perspective, the desire for heightened perception, the requirement of an organized look, etc.). Texts and films from 1910s to the 1960s are examined. *Also CPLT 932b, FILM 801b.*

JUDAIC STUDIES

451 College, 432.0843

Chair

Ivan Marcus

Professors

Steven Fraade (*Religious Studies*), Isaiah Gafni (*Visiting, Religious Studies*), Benjamin Harshav (*Comparative Literature*), Christine Hayes (*Religious Studies*), Paula Hyman (*History; Religious Studies*), Daniel Lasker (*Visiting, Religious Studies*), Ivan Marcus (*History; Religious Studies*), Tamar Ross (*Visiting, Religious Studies*), Joseph Yahalom (*Visiting, Religious Studies*)

Associate Professor

Gulie Arad (*Visiting, History*)

Lecturers

David Lambert (*Religious Studies*), Jonathan Ray (*History*)

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.

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

Gilbert Joseph (*History*)

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*), Vera Kutzinski (*American Studies; African American Studies; English*), Juan Linz (*Emeritus, Political Science; Sociology*), Florencio Lopez-de-Silanes (*School of Management*), Josefina Ludmer (*Spanish & Portuguese*), Enrique Mayer (*Anthropology*), Robert Mendelsohn (*Forestry & Environmental Studies*), Mary Miller (*History of Art*), Florencia Montagnini (*Forestry & Environmental Studies*), Gustav Ranis (*Economics*), Michael Reisman (*Law*), T. Paul Schultz (*Economics*), Stuart Schwartz (*History*), James Scott (*Political Science*), Robert Thompson (*History of Art*), Noël Valis (*Spanish & Portuguese*)

Associate Professors

José Cheibub (*Political Science*), Mary Habeck (*History*), Jaime Lara (*Divinity*), Patricia Pessar (*Adjunct, American Studies*), Stephen Pitti (*History*), Linda-Anne Rebhun (*Anthropology*), Lidia Santos (*Spanish & Portuguese*)

Assistant Professors

Elizabeth Amann (*Spanish & Portuguese*), Jennifer Bair (*Sociology*), Jennifer Baszile (*History*), Richard Bribiescas (*Anthropology*), Marcello Canuto (*Anthropology*), Seth Fein (*History*), Guillermo Irizarry (*Spanish & Portuguese*), Kellie Jones (*History of Art*), Oscar Martín (*Spanish & Portuguese*), Kathleen McAfee (*Forestry & Environmental Studies*), Fernando Rosenberg (*Spanish & Portuguese*), Alicia Schmidt-Camacho (*Spanish & Portuguese*), Andrew Schrank (*Sociology*), Michael Veal (*Music*)

Lecturer

Nancy Ruther (*Political Science*)

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 University's 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 term-long, thematically integrated lecture series and special seminars as well as 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 in 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. Information about supplemental resources and 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

Director of Graduate Studies

Laurence Horn (370 Temple St., Rm 208, 432.2457, laurence.horn@yale.edu)

Professors

Stephen Anderson (*on leave*), Paul Bloom, Carol Fowler (*Adjunct*), Roberta Frank, Louis Goldstein, Laurence Horn, Stanley Insler, Frank Keil, Hugh Stimson

Associate Professor

Dianne Jonas

Assistant Professors

Maria Babyonyshev (*on leave* [F]), Darya Kavitskaya, Maria Piñango, Charles Yang

Lector

Seema Khurana

Director, African Language Program

Ann Biersteker

Director, Center for Language Study

Nina Garrett

Supporting Faculty in Other Departments

Stephen Colvin (*Classics*), 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, Indo-European, Germanic linguistics, and African linguistics.

Special Admissions Requirements

Two terms of two ancient Indo-European languages, preferably Latin and Greek, are required for the Indo-European program.

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.

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 take an examination in some subfield of linguistics and also present samples of work demonstrating knowledge of the core areas of the field: syntax, phonology, and historical linguistics. By the end of the third year, the student should have presented 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. A 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 416.

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. Darya Kavitskaya.

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.

MW 1–2.15, 1 HTBA

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. Stanley Insler.

T 1.30–3.20

Location in space and time of the major branches of Indo-European; history of Indo-European studies, especially the development of methodology; sketch of the phonology, morphology, syntax, and lexicon of proto-Indo-European, with main developments of these in the daughter languages.

LING 515^u, Elementary Sanskrit I. Stanley Insler.

MWF 10.30–11.20

Careful study of Sanskrit grammar both in its historical development and as the synchronic systems attested in classical Sanskrit. Comparisons with other Indo-European languages. Close reading of later Sanskrit texts.

LING 516b^u, Hittite. Stanley Insler.

T 1.30–3.20

Introduction to the Hittite language. Explanation of grammar, with readings in transcription from old, middle, and new Hittite texts representing different literary genres. No knowledge of cuneiform is necessary, but familiarity with an inflected language (Latin, Greek, German, Russian) is essential.

LING 517a^u, Language and Mind. Maria Piñango.

TTh 2.30–3.45

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. Charles Yang.

TTh 2.30–3.45

An exploration of the origin and evolution of human language from an interdisciplinary perspective. Topics include the design features of language, the structure of evolutionary theory, cognitive continuity and discontinuity with other species, domain specificity and generality of

the language faculty, adaptationist and exaptationist approaches to language evolution, language learning in humans and other primates, and the evolution of particular languages with reference to linguistic typology. No prerequisites.

LING 532a^U, Introduction to Phonological Analysis. Darya Kavitskaya.

TTH 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. Darya Kavitskaya.

MW 2.30–3.45

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. Charles Yang.

MW 11.30–12.45

The computational study of natural language and the use of linguistic theories in applied problems. Topics include finite state tools, computational morphology and phonology, grammar and parsing, discourse models, machine translation, and language learning in children and machines. Prerequisite: LING 624a or CPSC 201a or b.

LING 546b^U, Language, Sex, and Gender. Laurence Horn.

TTH 1–2.15

Sex-based asymmetries in language structure and language use. Role of language as encoding/reflecting/reinforcing social attitudes and behavior; the Whorfian question. The “he/man” lexicon: sex-marking, reform, and resistance. Gender and sexual diversity as linguistic variables. Real and perceived differences between male and female dialects, conversational styles, and linguistic communities.

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 561a^U, Introduction to Psycholinguistics.]

LING 563b^U, Language Acquisition. Maria Babyonyshev.

TTH 11.30–12.45

Language learnability, acquisition of the lexicon. Development of syntactic knowledge. Parameter-setting model of language acquisition and maturation. Experimental methods in developmental psycholinguistics.

[LING 565a^U, Development of Phonology.]

LING 580b^U, Morphology. Maria Piñango.

TTH 11.30–12.45

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).

LING 582a^U, Introduction to Old Norse. Dianne Jonas.

MW 2.30–3.45

Introduction to Old Norse through a close study of Old Icelandic. Emphasis on all aspects of the grammar of Old Icelandic: Phonology, morphology, and syntax. Focus on the development of reading proficiency through a close reading of *Hrafnkels Saga*.

[LING 602b^U, Comparative Old Germanic.]**LING 603b^U, Comparative Scandinavian Syntax. Dianne Jonas.**

T 9.30–11.20

The comparative syntax of the Scandinavian languages. Topics include parametric variation, the role of case morphology, syntactic variation and change, acquisition of syntax, language contact, and dialect variation. Prerequisite: LING 153/553 (Syntax I), or permission of instructor.

LING 621b^U, The Relation of Speech to Language. Carol Fowler.

TTh 4–5.15

A study of the relation between the speech signal and the linguistic message it conveys. Special attention to those characteristics of speech that fit it to humans and make it a uniquely efficient vehicle of communication. Prerequisite: LING 120a. *Also PSYC 605b^U.*

LING 624a^U, Formal Foundations of Linguistic Theories. Charles Yang.

TTh 11.30–12.45

Mathematical methods in linguistics. Topics include: set theory, logic and formal systems, model theory, lambda calculus, formal language theory, elementary statistics and probability. Prerequisites: None.

LING 631b^U, Neurolinguistics. Maria Piñango.

TTh 4–5.15

The role of linguistic theory in understanding language-brain relations. The role of neuro-linguistic evidence (aphasia, neuroimaging) in understanding language knowledge.

[LING 636b^U, Articulatory Phonology.]**[LING 640a^U, Topics in Phonology: Sound Change.]****LING 642a^U, Topics in Phonology: Phonetic and Phonological Components of Syllable Weight. Darya Kavitskaya.**

W 1.30–3.20.

This course examines a number of current issues in phonological theory related to syllable weight. The first part of the course concentrates on issues of phonological representation vs. phonetic duration, whereas the latter part focuses on the Optimality-theoretic approaches to prosody. Topics include sonority constraints on moraicity; prosodic phenomena sensitive to syllable weight such as stress, tone, consonant gradation, and compensatory lengthening; and some morphological processes which are sensitive to phonological units such as the syllable, foot, or minimal word.

[LING 647b^U, Structure of Swahili.]**[LING 649b^U, Structure of Korean.]****[LING 650b, Structure of Warlpiri.]****LING 654b^U, Syntax II. Staff.**

TTh 1–2.15

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 656b^U, Grammatical Relations.]**LING 660a^U, Topics in Syntax: The Mental Lexicon. Maria Piñango.**

M 1.30–3.20

What is lexical knowledge? Views on the lexicon: repository of information vs. a “generative” system. The case of idioms. The lexicon and the grammar-conceptual structure interface. Acquisition of the lexicon. *Also PSYC 650a^U.*

[LING 661b^U, Topics in Syntax: Celtic Syntax.]**LING 662b^U, Topics in Syntax: Bilingualism. Maria Babyonyshev.**

T 1.30–3.20

An investigation of the interactions between the two grammars of a bilingual speaker. Emphasis on the changes that may occur in the grammar of the native language as a result of bilingualism and their implications for syntactic theory. Topics include syntactic transfer, first language attrition, and lexical transfer. (May be retaken for credit by students who have taken this course with different content.) Prerequisite: one course in syntax or permission of instructor. *Also PSYC 649b^U.*

LING 663a^U, Semantics. Laurence Horn.

TTh 2.30–3.45

Lexical and truth-conditional semantics. Word meaning and semantic roles. 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.

[LING 675b^U, Pragmatics.]**[LING 680a^U, Topics in Morphology: Clitics.]****LING 690b^U, Negation and Polarity. Laurence Horn.**

W 1.30–3.20

The grammar and meaning of negation and negative polarity. The asymmetry of negation vs. affirmation. Semantic and pragmatic factors in the meaning of negative sentences: contradictory vs. contrary opposition; conditions on affixal negation; metalinguistic vs. descriptive uses of negation. The cross-linguistic representation of sentence negation; NegP and negative heads; the Neg-criterion. Negative concord and double negation. The roles of configuration, scope, entailment, and implicature in the licensing of polarity items. Prerequisite: some background in syntax, semantics, and/or pragmatics, or permission of instructor.

LING 720b^U, Basics of Digital Signal Processing and Speech Acoustics.**Louis Goldstein.**

W 1.30–3.20

A gentle introduction to concepts of digital signal processing for those without strong mathematics, engineering, or programming backgrounds. Application to techniques for acoustic analysis and synthesis of speech. Vocal tract acoustics. Course is taught through regular programming exercises in MATLAB, but no prior programming experience is assumed.

[INDC 751b, Indian Grammarians.]**LING 777b, Current Research in Phonetics. Louis Goldstein.**

F 2.30–4.20

Intensive discussion of selected research topics in phonetics, primarily in the areas of gestural structure and coordination, dynamical modeling, and articulatory-acoustic relations. Experimental, analytical, and simulation methods are evaluated. Students are expected to have ongoing research projects and to present regular reports on their progress.

LING 790a, Research Methods in Linguistics. Charles Yang.

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.

HINDI 515^U, Elementary Hindi. Seema Khurana.

TTH 1–2.15, W 4–5.15, 1 HTBA

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, this course provides cultural insights and is geared toward increasing proficiency in understanding, speaking, reading, and writing Hindi. Emphasis is placed on spontaneous self-expression in the language.

HINDI 530^U, Intermediate and Advanced Hindi. Seema Khurana.

W 2.30–3.45, M 1 HTBA

Through extensive use of cultural documents including feature films, radio broadcasts, as well as graded literary and nonliterary texts, this course continues to build students' proficiency in understanding, speaking, reading, and writing Hindi. Provides a space for meaningful interaction with authentic materials and their related cultures. Furthers the student's appreciation of cultural nuances. Introduces various Hindi literary traditions in the second half of the course. Prepares the student for further academic and nonacademic use of Hindi. Emphasis is placed on spontaneous self-expression in the language. After HINDI 515 or satisfactory placement test.

HINDI 557b^U, Topics in Hindi Literature: Comparative Study of Representative Writers of 1940–1970. Seema Khurana.

TTH 4–5.15, W 1 HTBA

An advanced language course designed to develop overall language skills through selected readings of Hindi literature and the study of popular culture of colonial India through early years of interdependent India. Focus on the works of Prem Chand, Mannoo Bhandhari, and Mohan Rakesh, among others; various art forms including theater and films; debates informing the political, social, and cultural dimensions as found in news articles and television programs. After HINDI 530 or satisfactory placement test.

The following courses are also of particular value to students in Linguistics:

ANTH 513b^U, Language, Culture, and Ideology. J. Joseph Errington.**ANTH 533a^U, Bilingualism in Social Context. J. Joseph Errington.**[ANTH 669a^U, Language, Nationalism, and Ideology.]

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, Florencio Lopez-de-Silanes, 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, Ivo Welch, Dick Wittink

Associate Professors

Arturo Bris, Peter Schott, K. Sudhir

Participating Faculty from the School of Management

On Amir, Keith Chen, Martijn Cremers, Erica Dawson, Stanley Garstka, Roger Ibbotson, Nathaniel Keohane, Jonathan Koppell, Erin Mansur, Dina Mayzlin, Brian Mittendorf, Ganapathi Narayanamoorthy, Nathan Novemsky, Rodney Parker, Antti Petajisto, Jiwoong Shin, Sandra Spataro, Heather Tookes

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 is required by the Graduate School. The GMAT Test may be accepted in some cases. 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 413–14), 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 702a and MGMT 700b, Seminar in Accounting Research III and I.

Rick Antle, Brian Mittendorf, Ganapathi Narayanamoorthy, Shyam Sunder, Jacob Thomas.

F I - 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 703b, Experimental Economics. Shyam Sunder.

This term-long seminar introduces participants to experimental methods in economics research and conducts a survey of experimental results. Depending on the interests of the participants, we may cover topics from auctions, asset markets, game theory, monetary theory, public goods, corporate finance, market microstructure, and institutional economics, etc. The seminar participants are expected to design and conduct their own experiment, and write a term paper.

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 2.40–4

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 743b, Empirical Workshop in Accounting and Financial Economics.

William Goetzmann, Jacob Thomas.

This is a doctoral-level course in the empirical analysis of financial data. The course reviews the historical development of empirical accounting and finance, beginning with the early development and tests of the efficient market paradigm and extending through modern evidence on market efficiency, trading profits and information-based arbitrage. The course requires the reading of three to five research papers per week, regular presentations and discussion, and an empirical study of financial data.

MGMT 750b, Seminar in Marketing I. K. Sudhir.

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. On Amir.

F 11.30–1

MGMT 753a, Behavioral Decision Making I. Nathan Novemsky.

T 4.10–7.10

This seminar examines research on the psychology of decision making focusing on choice. 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 decision framing and mental accounting, prospect theory and loss aversion, context effects, task effects, goal-directed choice, preference reversals, intertemporal choice, behavioral economics, 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 553a.*

MGMT 780a and b, Ph.D. Student Research Workshop. Subrata Sen.

M 4.10–5.10

MGMT 781a and b, Accounting/Finance Workshop. Arturo Bris.

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

Directors of Graduate Studies

Gregg Zuckerman [F]; Roger Howe [Sp]

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, Serge Lang, Alexander Lubotzky (*Adjunct*), Benoit Mandelbrot, Gregory Margulis, Yair Minsky, Vincent Moncrief (*Physics*), Steven Orszag, David Pollard (*Statistics*), Vladimir Rokhlin (*Computer Science*), David Sattinger (*Adjunct*), Gregg Zuckerman

Gibbs Assistant Professors

Serguei Arkhipov, Baris Coskunzer, Tsachik Gelander, Paul Hacking, Harald Helfgott, Yosi Keller, Daniel Krashen, Alina Marian, Tim Riley, Jose Rodrigo, Song Wang

Gibbs Instructor

Greg Friedman

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 page 412).

Master's Degrees

M.Phil. In addition to the Graduate School requirements (see page 416), 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.

MWF 1.30–2.20

MATH 501b^U, Modern Algebra II. Gregg Zuckerman.

TTh 2.30–3.45

MATH 515b^U, Intermediate Complex Analysis. Serge Lang.

MW 2.30–3.45

MATH 520a^U, Measure Theory and Integration. David Sattinger.

TTh 1–2.15

MATH 525b^U, Introduction to Functional Analysis. Gregory Margulis.

TTh 1–2.15

MATH 544a, Introduction to Algebraic Topology. Andrew Casson.

HTBA

MATH 545b, Introduction to Algebraic Topology II. Andrew Casson.

HTBA

Each term between ten and twelve advanced courses in different fields of study are offered by junior and senior faculty. In addition to the graduate courses, there are regular weekly seminars in algebra, analysis, topology, discrete mathematics, Lie groups, applied mathematics, and mathematical physics.

MECHANICAL ENGINEERING

Dunham Laboratory, 432.4250

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

Chair

Marshall Long

Professors

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, Lisa Pfefferle, Daniel Rosner, Ronald Smith, Mitchell Smooke, Katepalli Sreenivasan (*Adjunct*), George Veronis, Peter Wegener (*Emeritus*), Forman Williams (*Adjunct*)

Associate Professors

Jacek Cholewicki, Udo Schwarz, Wei Tong, 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; experimental, theoretical, and computational studies of turbulence; chaos; fractals; aerodynamics; kinetic theory of gases and mixtures; electrospray theory and characterization; combustion and flames; computational methods for fluid dynamics and reacting flows; laser diagnostics of reacting and nonreacting flows; atmospheric turbulence, climate, theoretical and laboratory modeling of large-scale ocean circulation.

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; biomechanics of the heart; electromigration in metallic interconnects; transient nucleation in multicomponent systems; jamming in particulate systems such as glasses, colloids, and granular materials.

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

Roberta Frank

Professors

Robert Babcock, R. Howard Bloch, Gerhard Böwering, Carlos Eire, Margot Fassler, Roberta Frank, Paul Freedman, Walter Goffart, Harvey Goldblatt, Beatrice Gruendler, Dimitri Gutas, Valerie Hansen, Traugott Lawler, Bentley Layton, Ivan Marcus, Dale Martin, John Matthews, Giuseppe Mazzotta, María Rosa Menocal, Lee Patterson, Barbara Shailor

Associate Professors

Matthew Giancarlo, Jaime Lara, Anders Winroth

Assistant Professors

Jessica Brantley, Mark Burde, Olivia Holmes, Dianne Jonas, Nicole Rice, Ronald Rittgers, Youval Rotman

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 416. 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 must 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 551a, Music in Medieval Britain: The Use of Sarum. History, Sources, Modern Survivals. Margot Fassler.

F 3.15–5.15

Various aspects of the Sarum Use, including study of the rites it supplanted after the destruction of Anglo-Saxon culture by the Anglo-Normans. Studies of both liturgical and musical sources, with attention to the ways in which major historical changes are supported and redefined through the liturgy and its music. Knowledge of Latin and ability to read music not required. The class reconstructs an office from the Sarum rite, with attention to music, language, gesture, and liturgical vestments. This evening class closes each day with the singing of Compline from the Sarum sources. *Also MUSI 715a.*

MICROBIOLOGY

336 Boyer Center for Molecular Medicine, 737.2404
M.Phil., Ph.D.

Director of Graduate Studies
Joann Sweasy

Professors

Sidney Altman (*Molecular, Cellular & Developmental Biology*), Norma Andrews (*Microbial Pathogenesis*), Kim Bottomly (*Immunobiology*), Yung-chi Cheng (*Pharmacology*), Donald Crothers (*Chemistry*), Daniel DiMaio (*Genetics*), 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 Ruddle (*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

Serap Aksoy (*Epidemiology & Public Health*), Susan Baserga (*Therapeutic Radiology*), Michael Cappello (*Pediatrics*), Erol Fikrig (*Internal Medicine*), Durland Fish (*Epidemiology & Public Health*), Margaret Riley (*Ecology & Evolutionary Biology*), Craig Roy (*Microbial Pathogenesis*), Joann Sweasy (*Therapeutic Radiology*), Christian Tschudi (*Epidemiology & Public Health; Internal Medicine*)

Assistant Professors

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*), Barbara Kazmierczak (*Internal Medicine*), Walther Mothes (*Microbial Pathogenesis*), Paul Turner (*Ecology & Environmental 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 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 416. 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.

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.

Norma Andrews, Peter Tattersall.

w 5–6.30

A required course for Microbiology first- and second-year students; not for credit. Students present and discuss papers describing fundamental discoveries in areas related to microbiology. The goal is to familiarize students with the process of scientific discovery, and with the history of major developments in the field. Topics include important discoveries involving major human pathogens, fundamental processes in molecular biology, and the development of technology that had a major impact in current biomedical research.

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. Daniel DiMaio.

^{TTh 1.30–2.45}

Lecture course with emphasis on mechanisms of viral replication, oncogenic transformation, and virus-host cell interactions. *Also GENE 734a.*

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

Abbas Amanat (*History*)

Professors

Abbas Amanat (*History*), Harold Attridge (*Religious Studies*), Gerhard Böwering (*Religious Studies*), Adela Yarbro Collins (*Divinity*), John J. Collins (*Divinity*), 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*), Frank Hole (*Anthropology*), Stanley Insler (*Linguistics*), Bentley Layton (*Religious Studies*), Ivan Marcus (*History*), Ashgar Rastegar (*Medical School*), W. Michael Reisman (*Law*), Lamin Sanneh (*History*), Harvey Weiss (*Near Eastern Languages & Civilizations*), Robert Wilson (*Religious Studies*)

Associate Professor

John Darnell (*Near Eastern Languages & Civilizations*)

Assistant Professors

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

Ayala Dvoretzky, Bassam Frangieh, Fereshteh Amanat-Kowssar

Lectors

Kahar Barat, Neta Stahl

Postdoctoral Associate

Rola el-Husseini (*Sociology*)

Librarians

Simon Samoeil (*Sterling Memorial Library*), Ulla Kasten (*Babylonian Collection*), Susan Matheson (*Yale University Art Gallery Ancient Arts*), Persian Bibliographer, TBA

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, mbb.grad@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*), Simon Mochrie (*Physics; Applied Physics*), Peter Moore (*Chemistry*), Thomas Pollard (*Molecular, Cellular & Developmental Biology*), Anna Pyle, Charles Radding (*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, David Ward (*Genetics*), Kenneth Williams (*Adjunct, Research*)

Associate Professors

Susan Baserga, Mark Gerstein, Michael Koelle, Anthony Koleske, Andrew Miranker, Mark Solomon, Sandra Wolin (*Cell Biology*)

Assistant Professors

Thomas Biederer, João Cabral, Enrique De La Cruz, Lise Heginbotham, Vinzenz Unger

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 66–68).

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 720a, 721b, 730b, 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, usually from the department faculty, 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, 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 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 page 412).

Master's Degree

M.Phil. See Graduate School requirements, page 416. 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 (granted to students who are not continuing in the Ph.D. program). Note that a High Pass average is required for obtaining a master's degree.

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.

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 600a^U, Principles of Biochemistry I. Michael Koelle, Donald Engelman, Thomas Biederer.

TTTH 11.30–12.45

Rigorous introduction to the major concepts of biochemistry and to the process of discovery in this discipline, with emphasis on macromolecular conformation and physical processes in biochemistry. 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.

TTTH 11.30–12.45

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, Thomas Biederer, Thomas Pollard, Graham Warren, et al.

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, Richard Lifton, Michael Stern, Kevin White.

TTTH 1–2.15

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 graduate students.

MB&B 675a, Seminar for First-Year Students. Lise Heginbotham,
Andrew Miranker.

F 4

Required for all first-year 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 during the spring term, run in a seminar/discussion format. Required for all first-year 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.

MW 9.30–10.45

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* C&MP 710b.

MB&B 720a^U, Macromolecular Structure and Biophysical Analysis.

Andrew Miranker, João Morais Cabral, Donald Engelman, 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,
João Morais Cabral, Enrique De La Cruz, Andrew Miranker, Lynne Regan.

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 730b, Methods and Logic in Molecular Biology. Mark Solomon,
Anthony Koleske, Lynne Regan.

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. 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 GENE 743b.*

MB&B 749a^U, Medical Impact of Basic Science. Joan Steitz, Enrique De La Cruz,
Mark Hochstrasser, Andrew Miranker, Lynne Regan.

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. Vinzenz Unger, 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 752b^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 CPSC 752b^U, MCDB 752b^U.*

MB&B 760b3, Principles of Macromolecular Crystallography. João Morais Cabral,
Thomas Steitz.

MW 9.30–10.45

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 765a^U, Enzyme Mechanisms. Enrique De La Cruz, Gary Brudvig, Anna Pyle,
Thomas Steitz, Scott Strobel.

MW 9–10.15

An advanced course on the structure, function, and reaction mechanisms of protein and nucleic acid enzymes. Topics include the classic metabolic enzymes; molecular motors, polymerases, and machines; electron transfer, redox enzymes, and their higher-order complexes; ribozymes and DNA enzymes; allosteric regulation in protein and RNA enzymes; and the

design and selection of novel enzymes. These topics are integrated with discussion of catalytic strategy by enzymes, and enzymological analysis using steady-state kinetics, pre-steady-state kinetics, and single-molecule methods. Prerequisites: physical chemistry (may be taken concurrently) and biochemistry.

MB&B 800a, Advanced Topics in Molecular Medicine. Susan Baserga and staff.

M II – I

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.

Directed reading course in biophysics. Term paper required. By arrangement with faculty.

MB&B 902a or 903b, Reading Course in Molecular Genetics.

Directed reading course in molecular genetics. Term paper required. By arrangement with faculty.

MB&B 904a or 905b, Reading Course in Biochemistry.

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

Frank Slack (936 KBT, 432.3492, frank.slack@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*), 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 (*Physiology*), Michael Snyder, Robert Wyman

Associate Professors

Craig Crews, Savithramma Dinesh-Kumar, Vivian Irish, Archibald Perkins (*Pathology*), Weimin Zhong

Assistant Professors

Scott Holley, Christine Jacobs-Wagner, Frank Slack, 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 an interest-based track within the interdepartmental graduate program in the Biological and Biomedical Sciences (see pages 66–68).

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 required, 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 page 412).

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.

Program materials are available upon request to the Director of Graduate Studies, Department of Molecular, Cellular, and Developmental Biology, Yale University, PO Box 208103, New Haven CT 06520-8103.

Courses

MCDB 500a^U, Biochemistry. L. Nicholas Ornston, Ronald Breaker.

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, Charles Radding, Joann Sweasy.

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 and staff.

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, 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, ENAS 570b^U.*

MCDB 570b^U, Biotechnology. 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 615b^U, Genetics and Molecular Biology of Plant Development.]**MCDB 625a^U, Basic Concepts of Genetic Analysis.** Tian Xu, Michael Koelle, Richard Lifton, Michael Stern, Kevin White.

TTh 1–2.15

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.

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. Elke Stein.

MW 2.30–3.45

Interpretation of primary literature including recent reviews and basic research papers in the areas of neuron generation and regeneration, neuron phenotype determination, axon guidance systems, and the role of activity in organizing and increasing the efficiency of synaptic connections. *Also NSCI 504b.*

MCDB 750a, Core Topics in Biomedical Informatics. Perry Miller and staff.

T 1.30–3.20

Introduction to common unifying themes that serve as the foundation for different areas of biomedical informatics, including clinical, neuro-, and genome informatics. Emphasis is on understanding basic principles underlying informatics approaches to biomedical data modeling, interoperation among biomedical databases and software tools, standardized biomedical vocabularies and ontologies, and other topics of interest. The course involves lectures, class discussions, student presentations, and programming assignments. Prerequisite: previous computer programming experience and permission of the instructor.

MCDB 752b^U, Genomics and Bioinformatics. Dieter Söll, Mark Gerstein.

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 CPSC 752b^U, MB&B 752b^U.*

[MCDB 861b^u, Global Problems of Population Growth.]**MCDB 900a, First-Year Introduction to Research. Frank Slack, 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 end of this course, students complete a detailed prospectus describing their thesis project, and the work completed thus far. An oral and written presentation of this prospectus is evaluated by the adviser and two faculty members; the evaluation will determine whether the student may continue in the program.

MCDB 595, Intensive Research in MCDB for B.S./M.S. Candidates.

A four-credit course (two credits each term) that is similar to MCDB 495 and spans the last two terms (i.e., typically the senior year). During this course, students give an oral presentation describing their work. At the end, a comprehensive thesis is turned in and evaluated by the adviser and two other faculty members. Students must earn a B grade or higher in this course in order to receive the M.S. degree.

MUSIC

143 Elm, 432.2985
M.A., M.Phil., Ph.D.

Chair

Patrick McCreless

Director of Graduate Studies

Daniel Harrison (143 Elm, 432.2992, daniel.harrison@yale.edu)

Professors

Margot Fassler, Michael Friedmann (*Adjunct*), Daniel Harrison, James Hepokoski, Patrick McCreless, Robert Morgan, Leon Plantinga, Ellen Rosand, Craig Wright

Associate Professors

Kathryn Alexander, David Clampitt, John Halle, Richard Lalli (*Adjunct*), Kristina Muxfeldt

Assistant Professors

Ian Quinn, Michael Veal

Lecturer

Robert Holzer

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 416.

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 702a, Theory and Aesthetics: 1600–1800. Robert Holzer.

F 10–12

A survey of major writings on music from the seventeenth and eighteenth centuries and the scholarly literature about them. Special emphasis is placed on the relationship between musical thought and practice of the period.

MUSI 704b, Theory and Aesthetics: The Twentieth Century. Robert Morgan.

Th 1.30–3.30

Examination of writings by prominent twentieth-century figures who have addressed musical issues: composers, theorists, historians, philosophers, social critics, cultural theorists, and others. The course is organized by topic, with class time devoted to discussion of the week's reading and presentation of papers.

MUSI 710a, Theory and Practice of Ethnomusicology. Michael Veal.

T 1.30–3.30

A reading-based survey of the historical development of the field of ethnomusicology and the major issues with which it has been concerned *Also AFAM 843a.*

MUSI 715a, Music in Medieval Britain: The Use of Sarum. History, Sources, Modern Survivals. Margot Fassler.

F 3.15–5.15

Various aspects of the Sarum Use, including study of the rites it supplanted after the destruction of Anglo-Saxon culture by the Anglo-Normans. Studies of both liturgical and musical sources, with attention to the ways in which major historical changes are supported and redefined through the liturgy and its music. Knowledge of Latin and ability to read music not required. The class reconstructs an office from the Sarum rite, with attention to music, language, gesture, and liturgical vestments. This evening class closes each day with the singing of Compline from the Sarum sources. *Also MDVL 551a.*

MUSI 721b, Cycles, Returns, and Memory in Early Romantic Music. Kristina Muxfeldt.

F 10–12

An investigation of the Romantic concept of cycle and its manifestations, principally in the songs and instrumental music of Beethoven, Schubert, Mendelssohn, and Schumann. The seminar addresses a range of matters, from formal and analytic issues to inquiries into usages of the concept of cycle in music, literature, and art histories, including the role of the fragment as a Romantic critical category. How and when did the concept of “return” come to be associated with cycle? How have returns been understood in relation to memory or other cognitive processes? Interdisciplinary approaches to the study of memory in the arts and sciences. Where relevant, we also take up implications of the compositional process, revisions at publication, and matters of reception history.

MUSI 801b, An Introduction to the Chant and Liturgy of the Western Church.

Craig Wright.

Th 10–12

An introduction to the chant and liturgy of the Western (Latin) Church. The central task is to gain a familiarity with the Mass and office of the monastic rite (Benedictine at St. Gall) and of the cathedral (secular usage at Chartres and Paris). Toward the end of the course, attention turns briefly to the incorporation of chant in sacred polyphony of the Renaissance and, finally, to a representative work of Mozart.

MUSI 808a, Petrarch and the Italian Madrigal. Ellen Rosand.

W 1.30–3.30

More than any single poet, Petrarch remained a constant focus for composers of secular music of the Italian renaissance. The stylistic development of the Italian madrigal, from its birth in the early sixteenth century to its demise some hundred years later, can be measured through the changing interpretation of Petrarch’s poetry, in particular, with respect to the exploration of the poet’s conception of the self. Using Petrarch as a lens, the seminar considers a variety of settings, ranging from popular music of the fifteenth century for solo voice with lute accompaniment, to the more substantial polyphonic styles for three to six voices developed in the major musical centers of Italy.

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 832a, Schubert’s Goethe Songs. Leon Plantinga.

Th 1.30–3.30

A study of the seventy-odd songs of Schubert composed to texts of Goethe. Topics include a consideration of various subgenres in Goethe’s poetry (“folksong”; ballad and poetic narrative; soliloquy and dramatic monologue; lyrical poems) and the composer’s distinctive responses to these types. There is also some reflection on the history of the *Lied*, its social status and uses, and Schubert’s unique place in the growth of this genre.

MUSI 845b, Methodological Issues in Music History and Analysis.**James Hepokoski.**

W 1–4

Foundational concerns in confronting a piece of music and the context in which it is embedded. These include: the nature and status of the artwork as an object of interpretation; the existence of multiple voices and layers of implication within a single work; the role of the observer in producing aesthetic or cultural meanings; contending constructions of history into which the work might be interwoven. Carl Dahlhaus's *Foundations of Music History* serves as one of the texts from which we radiate outward to several issues: phenomenological hermeneutics, cultural materialism, structuralism and poststructuralism, postmodernism, claims of aesthetic autonomy and relative autonomy, objectivity and evidence, political interpretation and advocacy positions, and so on.

MUSI 902a, Post-Tonal Analysis I. Michael Friedmann.

T 10–12

Introduction to a range of approaches to the analysis of post-tonal twentieth-century music. The theoretical core material is “set theory,” which finds its primary application in analyzing pitch structures and transformational processes but also deals with rhythm and contour. Critical readings of theory and analysis are complemented by the study of works by Schoenberg, Webern, Stravinsky, Bartók, Varèse, and others.

MUSI 902b, Post-Tonal Analysis II. Ian Quinn.

T 10–12

Continuation of MUSI 902a. Further study of contemporary music-theoretic formulations, with analytical applications to a broad range of twentieth-century music.

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 935b, The Analysis of Chromatic Music. Patrick McCreless.

M 1–4

A study of the use of chromaticism in selected tonal repertoires from C.P.E. Bach to the early twentieth century. Although the seminar focuses more on analytical practice than on mastery of theoretical systems, it also engages the work of a number of theorists, both historical (Hugo Riemann, Ernst Kurth, Heinrich Schenker) and more recent (Gregory Proctor, Richard Cohn, Daniel Harrison, Fred Lerdahl).

MUSI 942a, Tonality after the Common Practice. Daniel Harrison.

Th 10–12

Engagement with music-theoretical issues and problems posed by tonal music written after the “emancipation of the dissonance.” Previous theories and modes of explanation are examined, critiqued, and engaged experimentally in musical analysis. Creative adaptation and modification of previous theory is welcome — as is new construction — in order to accommodate to the conditions of tonality after the common-practice era.

MUSI 998a, Prospectus Workshop. Robert Morgan.

T 4–5:30

MUSI 999b, Dissertation Colloquium. Robert Morgan.

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

Eckart Frahm (319 SML, 432.5584, eckart.frahm@yale.edu)

Professors

Benjamin Foster, Beatrice Gruendler, Dimitri Gutas, Bentley Layton, Harvey Weiss

Associate Professor

John Darnell

Assistant Professors

Eckart Frahm, Hala Nassar

Lecturers

Adel Allouche, Karen Foster

Senior Lectors

Fereshteh Amanat-Kowssar, Ayala Dvoretzky, Bassam Frangieh

Lectors

Kahar Barat, Siam Bhayro, Samer Traboulsi, 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 416. 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 (see page 416), 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. Bassam Frangieh.

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. Bassam Frangieh.

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. Samer Traboulsi.

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.

[ARBC 511a, Greco-Arabic Seminar.]

ARBC 521b, Seminar in the Philosophy of Avicenna. Dimitri Gutas.

M 3.30–5.20

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. *Also HIST 829a^u.*

ARBC 564b, Poetic Motif and Literary Theft. Beatrice Gruendler.
W 2.30–4.20

Next to poetic genres, motifs, or *ma`ani*, are essential (and often self-sufficient) elements in medieval Arabic literary criticism and performance practice. They are assembled in thematic motif collections as well as in works on literary borrowings (*sariqat*). Representatives of both are read and discussed in the light of invention and intertextuality.

[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 846b, Seminar in the Philosophy of Avicenna.

ARBC 849a or b, Directed Readings: Arabic.

ARBC 850a, Introduction to Arabic and Islamic Studies. Beatrice Gruendler.
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.]

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. Bentley Layton.
T 2.30–4.20

The history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity, with special attention to the eastern Mediterranean world. *Also HIST 531b, RLST 659b^u.*

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. *Also HIST 539b, RLST 661b.*

EGYP 501^U, Introduction to Classical Hieroglyphic Egyptian. Colleen Manassa.

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.****Cara Sargent.**

Close reading of Napatan historical texts, including the inscription of Karimala, the Piye Stela, the Dream Stela of Tanutamun, the Stela of Enthronement, the Stela of Excommunication, and the Stela of Harsiotef. Discussion of the historical significance of the texts; analyses of grammatical material touching upon Nubian perceptions of Middle and Late Egyptian grammar and early Demotic grammar; hieratic-inspired orthographies.

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 and staff.**

501-1 MTWTHF 9.30–10.20 (for beginners)

501-2 MTWTHF 9.30–10.20 (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.

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.**]

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.** Samuel Adams.

TTh 11.30–12.45

MESO 501^U, **Elementary Akkadian.** Harold Vedeler.

MWF 11.30–12.45

MESO 502, **Advanced Akkadian.** Benjamin Foster.

[**MESO 531**, **Beginning Sumerian.**]

[**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^U**, **Tales from Before Homer: An Introduction to Sumerian and Babylonian Literature.**]

MESO 572a, **Prophecy in Mesopotamia.** Eckart Frahm.

T 3–5

An overview of the prophetic traditions of ancient Mesopotamia, with readings from the Old-Babylonian and Neo-Assyrian state letters, the Assyrian collections of prophecies, literary predictive texts, and other relevant documents. Students wishing to participate must have some knowledge of Akkadian.

MESO 573b, **Neo-Babylonian and Late-Babylonian Texts.** Eckart Frahm.

T 3–5

Reading and discussion of letters, economic texts, and royal inscriptions from the Neo-Babylonian and Late-Babylonian periods. Students wishing to participate must have some knowledge of Akkadian.

NELC 516b^U, **Mythology of the Ancient Near East.** Eckart Frahm.

MW 2.30–3.45

Introduction to ancient Near Eastern tales about gods and heroes. Topics include creation, the cosmic order, sacred marriage, divine battles, death, and the interaction between gods and humans. The course focuses on myths from Mesopotamia, with comparison to Egyptian, biblical, and classical traditions.

NELC 520a^U, **Parallel Worlds: Ancient Egypt and Mesopotamia.** John Darnell, Eckart Frahm.

TTh 1–2.15

The course provides an overview of the history of Ancient Egypt and the Near East, from the origins of writing in the fourth millennium B.C.E. to the Hellenistic age. Focus on historical developments that occurred contemporaneously in both civilizations.

PERS 501^U, Elementary Persian (Farsi). Fereshteh Amanat-Kowssar.

MWF 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. Siam Bhayro.

WF 1–2.15

SMTC 511, Introduction to Ugaritic. Siam Bhayro.

Th 10–12

SMTC 521^U, Elementary Syriac. Siam Bhayro.

WF 9–10.15

The Mesopotamian Christian form of Aramaic widely used in the Roman and Byzantine Near East. Thorough grounding in grammar and vocabulary as a basis for reading biblical, historical, poetic, and theological texts.

[SMTC 522a, Syriac Poetic Texts.]

[SMTC 531a^U, Aramaic Survey I: First Millennium B.C.E.]

[SMTC 532b^U, Aramaic Survey II: Dialects of the Common Era.]

[SMTC 542b, Ethiopic.]

TKSH 501^U, Elementary Turkish. Kahar Barat.

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. Kahar Barat.

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. Kahar Barat.

MW 4–5

TKSH 507b, Old Turkic Literature. Kahar Barat.

MW 4–5

[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. Benjamin Foster.****[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.****John Darnell, Michael Fischer, Beatrice Gruendler.**

TTh 11.30–12.45

An exploration of the five pivotal stages in the development of human communication throughout world history: pictographic and syllabic ways of writing, the consonantal or phonetic alphabet, the invention of paper, movable type, and acoustic/electronic/digital media and the Internet. These technologies are considered for their innovative features, new capabilities, social and ideological implications, and the instrumental roles they played in contemporary periods of change.

[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 politicoeconomic vulnerabilities, resiliencies, and adaptations in the face of abrupt climate change, anthropogenic environmental degradation, resource depletion, “barbarian” incursions, or class conflict.

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 C314, 785.4324, michael.schwartz@yale.edu)

Professors

Colin Barnstable, Benjamin Bunney, Nigel Daw, Charles Greer, Susan Hockfield, 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, Amy Arnsten, 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 pay-off 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 2 ½ 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 416. 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. 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.]

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 neuropharmacological 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*) (LSOG 221, 785.4034, charles.greer@yale.edu)

Professors

George Aghajanian (*Psychiatry; Pharmacology*), Colin Barnstable (*Ophthalmology & Visual Science; Neurobiology*), Linda Bartoshuk (*Surgery; Epidemiology; Psychology*), Walter Boron (*Cellular & Molecular Physiology*), Benjamin Bunney (*Psychiatry; Pharmacology*), 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*), Charles Greer (*Neurosurgery, Neurobiology*), Susan Hockfield (*Neurobiology*), Marcia Johnson (*Psychology*), 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*), Frederick Naftolin (*Obstetrics & Gynecology; Molecular, Cellular & Developmental Biology*), Angus Nairn (*Psychiatry*), Pasko Rakic (*Neurobiology*), J. Murdoch Ritchie (*Pharmacology*), 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 (*Epidemiology; Cellular & Molecular Physiology*), Gordon Shepherd (*Neurobiology*), Frederick Sigworth (*Cellular & Molecular Physiology*), Stephen Strittmatter (*Neurology; Neurobiology*), Allan Wagner (*Psychology*), Stephen Waxman (*Neurology; Pharmacology*), Robert Wyman (*Molecular, Cellular & Developmental Biology*), Steven Zucker (*Computer Science*)

Associate Professors

Meenakshi Alreja (*Psychiatry; Neurobiology*), Amy Arnsten (*Neurobiology*), Charles Bruce (*Neurobiology*), R. Todd Constable (*Diagnostic Radiology; Neurosurgery*), Nihal de Lanerolle (*Neurosurgery; Neurobiology*), Paul Forscher (*Molecular, Cellular & Developmental Biology*), James Howe (*Pharmacology*), Anthony Koleske (*Molecular Biophysics & Biochemistry*), Marina Picciotto (*Psychiatry; Pharmacology; 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; Neurobiology*), Tian Xu (*Genetics*)

Assistant Professors

Patrick Allen (*Psychiatry*), Thomas Biederer (*Molecular Biophysics & Biochemistry*), Hal Blumenfeld (*Neurology; Neurobiology*), Angélique Bordey (*Neurosurgery*), Wei Chen (*Neurobiology*), Maria Donoghue Velleca (*Neurobiology*), Reiko Maki Fitzsimonds (*Cellular & Molecular Physiology*), Karyn Frick (*Psychology*), Lise Heginbotham (*Molecular Biophysics & Biochemistry*), Mark Laubach (*Neurobiology*), David LaVan (*Mechanical Engineering*), Erin Lavik (*Biomedical Engineering*), Christy Marshuetz (*Psychology*), Russell Matthews (*Neurobiology*), Dhasakumar Navaratnam (*Neurology; Neurobiology*), Michael Nitabach (*Cellular & Molecular Physiology*), Vincent Pieribone (*Cellular & Molecular Physiology*), Maria Mercedes Piñango (*Linguistics*), Laurie Santos (*Psychology*), Glenn Schafe (*Psychology*), Nenad Sestan (*Neurobiology*), 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*), Weimin Zhong (*Molecular; Cellular & Developmental Biology*)

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 66–68).

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 three core courses (Principles of Neuroscience, Neurobiology, and Structural and Functional Analysis 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 Analysis 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 416.

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. 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, 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 NBIO 501a.*

[NSCI 502b, Cell Biology of the Nerve Cell.]

[NSCI 503b, Molecular Neurobiology.]**NSCI 504b, Seminar in Brain Development and Plasticity. Elke Stein.**

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 505b, Sensory Systems.]**[NSCI 506b, Introduction to Brain and Behavior.]****[NSCI 507b, Cellular and Molecular Mechanisms of Neurological Disease.]****[NSCI 508a, Functional Properties of Cortical Neurons and Circuits.]****[NSCI 509, Neuroimmunology: Neural and Immune Cell Adhesion Molecules.]****NSCI 510b, 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 pertaining to major neurological and psychiatric disorders. *Also NBIO 500b.*

[NSCI 511b, Neurobiology of Drug Addiction.]**[NSCI 512a, Genes and Behavior.]****[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 529b, Computational Neuroscience.]****[NSCI 530b, Neurobiology of Schizophrenia.]****[NSCI 539b, Synaptic Organization of the Nervous System.]****[NSCI 540a, Introduction to Statistics in Psychology.]****[NSCI 550a, Introduction to Neuroinformatics.]****[NSCI 560b, Genomics and Proteomics of the Nervous System.]****[NSCI 570a, Cellular and Network Dynamics of Sensory and Motor Functions.]****[NSCI 600a, Experimental Methods in Neuroscience.]****[NSCI 605b, Pathways of Discovery in Neuroscience.]****[NSCI 610b, Neurophysiology: Theory and Practice.]****NSCI 611b, Neurophysiology. Thomas Brown.**

T 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 614a, Neurobiology of Learning and Memory.]

[NSCI 634b, Behavioral Neuroendocrinology.]

[NSCI 645a, Foundations of Behavioral Neuroscience.]

[NSCI 646, Advances in Cognitive Neuroscience: Prefrontal Cortex and Memory.]

[NSCI 647b, Cellular Analysis of Learning: In Vitro.]

[NSCI 666b, From Neurons to Behavior.]

[NSCI 674b, Psychopharmacology.]

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.

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, Guiseppe Pizzorno, Todd Verdoorn (*Adjunct*)

Assistant Professors

David Calderwood, Michael DiGiovanna, Marina Picciotto, Ya Ha

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 66–68).

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 416.

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 510b, Life Science Business. Gregory Gardiner.

Exploration of where the life sciences intersect with finance and the law from a variety of perspectives including those of industry, academia, and the communications media.

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.

Chairs

Karsten Harries (*Acting*) [F]

Michael Della Rocca [Sp]

Directors of Graduate Studies

Sun-Joo Shin (*Acting*) [F] (107 Connecticut Hall, 432.1682, sun-joo.shin@yale.edu)

Karsten Harries [Sp] (107 Connecticut Hall, 432.1682, karsten.harries@yale.edu)

Professors

Keimpe Algra (*Visiting* [F]), Seyla Benhabib, Susanne Bobzien, J. Baird Callicott (*Visiting*), Jules Coleman, Michael Della Rocca, Keith DeRose, Samuel Gorovitz (*Visiting*), John Hare, Karsten Harries, Robin Jeshion, Shelly Kagan, Sun-Joo Shin

Assistant Professors

Katalin Balog, Troy Cross, Jonathan Gilmore, James Kreines, Michael Nelson, Matthew Smith, Michael Weber

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 416.

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 567a^U, Mathematical Logic. Sun-Joo Shin.

TRH 1–2.15

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 600b^U, Descartes. Michael Della Rocca.

T 1.30–3.20

A close examination of Descartes's views on skepticism, perception, philosophy of mind, causation, and the nature of the physical world. Consideration of writings from throughout his career as well as influential secondary literature.

PHIL 601b^U, Aristotle. John Hare.

TTH 2.30–3.45

A close reading of selected portions of Aristotle's *Nicomachean Ethics* in the Greek. Also *GREK 712b^U*.

PHIL 602a^U, Hellenistic Philosophical Theology. Keimpe Algra.

T 3.30–5.20

This seminar focuses on the philosophical theologies of Stoics, Epicureans, and Sceptics, largely on the basis of the debates recorded in Cicero's *On the Nature of the Gods*, against the background of ancient philosophical theology in general.

PHIL 625b^U, Consciousness—Philosophical Issues. Katalin Balog.

TH 1.30–3.20

The problem of consciousness is considered by most philosophers of mind the “hard problem,” i.e., the difficult part of the mind-body problem. Arguments against physicalism, i.e., the view that everything is, or is composed of, physical stuff, often take consciousness as their starting point. Discussion of these arguments as well as physicalist proposals for a theory of consciousness.

PHIL 626a^U, Singular Thought. Robin Jeshion.

T 1.30–3.20

We examine theories of language and mind that aim to explain how we refer to and think about objects in the world. We focus on understanding a distinction between *de dicto* and *de re* thoughts: thoughts that are purely discursive (conceptual) and thoughts that are singular in that they are, in a certain sense, directly about objects.

PHIL 627a^U, Demonstratives in Thought and Language. Michael Nelson.

T 7–8.50

Some sentences seem to depend on context. Classic examples involve indexicals (the sentence “I am happy,” for example) and demonstratives (the sentence “That is a book,” for example). Similarly, some thoughts seem to depend on context. In this seminar we look at theories of the

relationship between what a sentence says and context, on the one hand, and the content of a mental state and context, on the other.

PHIL 628b^U, Philosophy of Logic. Sun-Joo Shin.

M 3.30–5.20

An examination of some basic philosophical issues in logic. Topics include justifications of deductive and inductive reasoning, connectives, quantifiers, paradoxes, modal logic, many-valued logic, and diagrammatic logic.

PHIL 629a^U, Vagueness and the Sorites Paradox. Susanne Bobzien.

Th 1.30–3.20

We study some of the main approaches to the Sorites paradox and examine what semantics (if any) can be given for vague expressions as well as what role pragmatic considerations ought to play in an account of vagueness.

PHIL 630b^U, Appearance and Reality. Troy Cross.

T 3.30–5.20

An investigation of the nature of ultimate reality and the relations between the fundamental and the derivative. Theories of ultimate reality include physicalism, idealism, atomism, and monism. Dependence relations between the fundamental and the derivative include mereological composition, reduction, supervenience, and emergence.

PHIL 631a^U, Psychological Explanations. Katalin Balog.

Th 1.30–3.20

A critical philosophical examination of two kinds of psychological explanation: commonsense psychological explanations and those offered by Freudian psychoanalysis. We evaluate the scope and relationship of these different modes of explanation and assess their scientific status. We also discuss related issues including self-deception and irrationality, transformation and therapy.

PHIL 633b^U, Nonconceptual Content. Robin Jeshion.

M 1.30–3.20

Can we have any perceptual experiences of the world that are not conceptually mediated? An exploration of this question with an eye toward understanding what it means for a theory of mental representation.

PHIL 651a^U, Ethics, Health Policy, and the Law. Samuel Gorovitz.

W 1.30–3.20

Examination of issues at the intersection of health care, ethics, and public policy; e.g., regulation of supplements (liberty vs. safety), control of medical information (efficiency vs. privacy), infectious diseases — SARS, bio-terrorism (civil rights vs. public health).

PHIL 655b^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 656b^U, The Environment: Aesthetics and Ethics. J. Baird Callicott, Stephen Kellert.

M 3.30–5.20

A study of natural aesthetics and its ethical implications, from eighteenth-century concepts of the sublime and the beautiful to contemporary concepts of topophilia, biophilia, and cognitive, imaginative, and narrative modes of environmental perception.

PHIL 657a^U, Rational Choice Theory. Michael Weber.

W 3.30–5.20

A philosophically sophisticated introduction to the theory of rational choice that underlies orthodox treatments of decision-making behavior in economics, political science, and other social sciences. Some of the paradoxes of rational choice theory are examined, including the Prisoner's Dilemma, the Allais Paradox, and Newcomb's Problem, in an attempt to derive conclusions about the nature of practical reason. Topics also include the use and alleged misuse of rational choice theory in the social sciences.

PHIL 659a^U, Freedom of Expression. Jonathan Gilmore.

T 3.30–5.20

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 660b^U, Property. Matthew Smith.

W 3.30–5.20

This course is about property: what it is, how it works, and how it can be justified. We read diverse texts, including philosophical works, decisions by the Supreme Court and other courts, and papers discussing recent developments in social psychology.

PHIL 700a, Contemporary Critical Theory. Seyla Benhabib.

W 3.30–5.20

Is Habermas's theory of communicative ethics a moral theory or a theory of legitimation? Contemporary critics have argued that it fails in both respects. This course examines challenges to communicative ethics through a group of thinkers whom we may name "ethical pluralists" and "political agonists." Readings from Juergen Habermas, Charles Taylor, Bernard Williams, Barbara Herman, Isaiah Berlin, A. Honneth, R. Forst, James Bohman, Chantal Mouffe, and others. *Also PLSC 583a.*

PHIL 701b, Epistemology. Keith DeRose.

W 1.30–3.20

A study of some prominent issues in current epistemology. Topics may include skepticism, internalist vs. externalist accounts of knowledge and of justification, the structure of knowledge and justification (foundationalism vs. coherentism), contextualism in epistemology, and the "relevant alternatives" account of knowledge.

PHIL 702a, Kant's *Critique of Judgment*. Karsten Harries.

T 10.30–12.20

PHIL 703b, Descent of the Logos: Heidegger's Way from Logic to Poetry.**Karsten Harries.**

T 10.30–12.20

At the very center of Heidegger's thinking is a concern with *logos*, and that means also with logic. But what *logos* and logic meant to him changed: If the young Heidegger wanted to free logic from grammar, *Being and Time* argued for a liberation of grammar from logic. Continuing reflection led him to turn from logic to poetry and to reconsider his theological beginning, in which his logical reflections had their origin. Readings in *Being and Time*, *Introduction to Metaphysics*, "The Origin of the Work of Art," "Poetically Man Dwells," "Hölderlin and the Essence of Poetry," "Building Dwelling Thinking," *On the Way to Language*.

PHIL 704a, Complexity: Theory of Meaning and the Literary Text.

Benjamin Harshav.

W 1.30-3.20

The course presents a comprehensive and systematic theory of works of literature as the highest sign-complexes in human culture. Departing from the basic concepts of meaning and reference in linguistics and philosophy of language, a theory of semantic integration is developed. Departing from the basic assumptions of narratology and the philosophy of fictional worlds, a theory of works of literature as complex and open-ended constructs is offered. *Also CPLT 541a^{II}.*

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

Yoram Alhassid, Thomas Appelquist, Charles Bailyn (*Astronomy*), Charles Baltay, Sean Barrett, D. Allan Bromley, Richard Casten, Richard Chang (*Applied Physics*), Paolo Coppi (*Astronomy*), David DeMille, Michel Devoret (*Applied Physics*), Paul Fleury (*Applied Physics*), Moshe Gai (*Adjunct*), Steven Girvin, Robert Grober (*Applied Physics*), Martin Gutzwiller (*Adjunct*), John Harris, Victor Henrich (*Applied Physics*), Jay Hirshfield (*Adjunct*), Francesco Iachello, Martin Klein, William Marciano (*Adjunct*), Simon Mochrie, Vincent Moncrief, Peter Parker, Daniel Prober (*Applied Physics*), Nicholas Read, Subir Sachdev, Jack Sandweiss, Michael Schmidt, Robert Schoelkopf (*Applied Physics*), Ramamurti Shankar, Charles Sommerfield, A. Douglas Stone (*Applied Physics*), John Tully (*Chemistry*), C. Megan Urry, John Wettlaufer (*Geophysics*), Michael Zeller

Associate Professors

Charles Ahn (*Applied Physics*), Colin Gay

Assistant Professors

Helen Caines, Richard Easter, Bonnie Fleming, Jack Harris, Andreas Heinz, Sohrab Ismail-Beigi (*Applied Physics*), Daniel McKinsey, Priyamvada Natarajan (*Astronomy*), Homer Neal, Corey O'Hern (*Mechanical Engineering*), Witold Skiba

Senior Research Scientists

Robert Adair, Satish Dhawan, Richard Majka, Andrew Szymkowiak, N. Victor Zamfir

Lecturers

Stephen Irons, Henry Kasha

Fields of Study

Fields include atomic physics; 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. Prior equivalent course work may reduce the course requirement 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 416.

M.S. (en route to the Ph.D.). Students who complete the first-year graduate courses with a satisfactory record (i.e., at least 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 1–2.30

Newtonian dynamics, Lagrangian dynamics, and Hamiltonian dynamics. Small oscillations and rigid bodies. Strings, membranes. Fluids.

PHYS 502b, Electromagnetic Theory I. Nicholas Read.

MW 9–10.30

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. 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 Easther.

MW 9–10.30

Survey of mathematical techniques useful in physics. Includes vector and tensor analysis, group theory, complex analysis (residue calculus, method of steepest descent), differential and integral equations (regular singular points, Green's functions), and selected advanced topics.

PHYS 508a, Quantum Mechanics I. Thomas Appelquist.

MW 10.30–12

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 10.30–12

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. Yoram Alhassid.

HTBA

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.]

PHYS 524a, Introduction to Nuclear Physics. Richard Casten.

MW 10.30–12

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 9–10.30

Basic concepts of differential geometry (manifolds, metrics, connections, geodesics, curvature); Einstein's equations and their application to cosmology, gravitational waves, black holes, etc.

PHYS 548a^u and 549b^u, Solid State Physics I and II. Victor Henrich [F],**Robert Schoelkopf [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 ENAS 850a^u, 851b^u.*

[PHYS 570b^u, High-Energy Astrophysics.]**[PHYS 600b, Cosmology.]****PHYS 602a, Classical Field Theory. Jack Sandweiss.**

TTh 9–10.30

Covariant formulation of electrodynamics, radiation phenomena, and introduction to general relativity.

PHYS 608b, Quantum Mechanics II. Thomas Appelquist.

MW 10.30–12

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. Witold Skiba.

TTh 10.30–12

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, Many-Body Theory of Solids. A. Douglas Stone.

TTh 10.30–12

Solids as many-particle systems. Second quantization. Green's functions, quantum statistical mechanics, linear response theory. Hartree-Fock theory, perturbation theory, Feynman diagrams at finite temperature. Theory of the electron gas, electron-phonon coupling, BCS theory of superconductivity. *Also ENAS 852b.*

PHYS 624b^u, Group Theory. Francesco Iachello.

MW 1–2.20

Lie algebras, Lie groups, and some of their applications. Representation theory. Explicit construction of finite-dimensional irreducible representations. Invariant operators and their eigenvalues. Tensor operators and enveloping algebras. Boson and fermion realizations. Differential realizations. Quantum dynamical applications.

[PHYS 628a, Statistical Physics II.]**PHYS 630b, Relativistic Field Theory II. Witold Skiba.**

TTh 9–10.30

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. Daniel Prober.**

MW 10.30–12

The fundamentals of superconductivity, including both theoretical understandings of basic mechanisms, and description of major applications. Topics include historical overview, Ginzburg-Landau (mean field) theory, critical currents and fields of type II superconductors, BCS theory, Josephson junctions and microelectronic and quantum-bit devices, and high T_c oxide superconductors. *Also ENAS 863b.*

[PHYS 634a, Mesoscopic Physics.]**PHYS 650a, Theory of Solids I. Sohrab Ismail-Beigi.**

WF 10.30–12

Theoretical techniques for the study of the structural and electronic properties of solids, with applications. Topics include band structure, phonons, defects, transport, magnetism, and superconductivity. *Also ENAS 856a.*

[PHYS 651b, Theory of Solids II.]**SPECIAL TOPICS COURSES****[PHYS 661b, The Art of Data Analysis.]****[PHYS 662a, Special Topics in Particle Physics.]****PHYS 663b, Special Topics in Cosmology and Particle Physics. Richard Easter.**

MW 9–10.30

Introduction to theoretical cosmology, and the physics of the very early universe. The course begins with the “standard model” of the big bang, and current observational constraints on cosmological models. Subsequent topics include inflationary models, the generation of perturbations in the primordial universe, the cosmological implications of string theory, and brane-world models of the universe.

PHYS 664b, Special Topics in Nuclear Physics. Richard Casten.

TR 9–10.30

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: Quantum Hall Effect and Conformal Field Theory. Nicholas Read.

MW 10.30–12

Aspects of the quantum Hall effect, particularly the fractional effect, and conformal field theory, plus the connections between the two. Quantum Hall states, composite particles, quasiparticles, fractional charge and statistics. Future applications to rotating trapped atoms. Conformal symmetry in two dimensions, applications to classical critical phenomena, 1+1 quantum field theory. Nonabelian quantum Hall states and the relation with conformal field theory and Chern-Simons gauge theory. Background required: statistical mechanics, and either many-body theory or quantum field theory. *Also ENAS 860a.*

[PHYS 668b, Special Topics in Geometry and Modern Field Theory.]

PHYS 671b, Special Topics in Experimental Nuclear and Particle Physics.**Colin Gay.**

MW 10.30–12

Propagation of particles and photons in matter, modern detection techniques, types of detectors, large detector systems, accelerators, and seminal experiments are studied. The subject spans the range of energies from low-energy nuclear physics through high-energy 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. Richard Chang.

TTh 11.30–12.45

Comprehensive treatment of the optical and electronic properties of semiconductor alloys and quantum structures. Physical models of blackbody radiation, spontaneous emission, stimulated emission, absorption, and polarization. Quantitative analysis of the effects of temperature, pressure, stress fields, and electric and magnetic fields. *Also ENAS 917a^{II}.*

PHYS 677a, Noise, Dissipation, and Amplification. Michel Devoret.

TTh 9–10.30

Graduate-level equilibrium and non-equilibrium statistical physics applied to quantum electronics/optics phenomena. The aim is to explain the fundamental link between the random fluctuations of a physical system in equilibrium and the response of the same system to an external perturbation. Several key examples where noise appears as a resource rather than a limitation are treated: spin relaxation in nuclear magnetic resonance (motional narrowing), Johnson-Nyquist noise in solid state transport physics (noise thermometry), photon correlation measurements in quantum optics (Hanbury Brown-Twiss experiment), and so on. The course explores both passive and active systems. It discusses in particular the ultimate limits of amplifier sensitivity and speed in physics measurements. *Also ENAS 817a.*

POLITICAL SCIENCE

124 Prospect, 432.5241

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

Chair

William Foltz

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, Peter Swenson, Ivan Szelenyi (*Sociology*), John Wargo (*Forestry & Environmental Studies*), Elisabeth Wood, Michael Wallerstein

Associate Professors

Jose Cheibub, Anna Grzymala-Busse, Nicholas Sambanis

Assistant Professors

Khalilah Brown-Dean, Keith Darden, Bryan Garsten, Jacob Hacker, Ange-Marie Hancock, Gregory Huber, Pierre-François Landry, John Lapinski, Ellen Lust-Okar, Rose Razaghian, James Vreeland, 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 examina-

tion 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.

TR 9–10.30

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, while 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, etc.

PLSC 504b, Special Topics in Advanced Quantitative Methods. Donald Green.

M 1.30–3.20, TH 10–12

This course provides an extensive treatment of the likelihood theory of statistical inference that underlies many of the statistical methods used in political science. After the foundational material is presented, we introduce a large variety of statistical models. These include dichotomous and polychotomous response models, models for censored and truncated data, sample selection models, duration models, and models for count data. We also cover methods for time series and pooled time-series-cross-sectional data with an emphasis on approaches for limited dependent variables. Finally, the course introduces some basic ideas and methods from Bayesian data analysis. 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 first- and second-term statistics, including basic probability theory and linear regression.

PLSC 517a, Fundamentals of Modeling. John Roemer, Michael Wallerstein.

TH 10.30–12.30

Topics include: preferences, utility functions, Pareto efficiency, economic equilibrium, voting for public goods, Nash equilibrium, Downs-Nash political equilibrium, Wittman-Nash political equilibrium, social welfare functions, the Arrow Impossibility Theorem, the prisoners' dilemma, elements of probability, von Neumann-Morgenstern utility, Harsanyi's veil of ignorance, games in extensive form, subgame perfect Nash equilibrium. The necessary mathematics is introduced as needed, but students are advised to review elementary calculus before the class begins.

PLSC 540a, 541b, Research and Writing. David Mayhew, Jose Cheibub.

T 9–11

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 553a, Justice. Bruce Ackerman.

MT 4.10–6

Examines contemporary theories, together with an effort to assess their practical implications. *Also LAW 20104.*

PLSC 556a, Democracy and Social Justice. Ian Shapiro.

M 3.30–5.20

An exploration of recent arguments about democracy and distributive justice with particular attention to (1) the relations between the two, and (2) their practical significance. The course is organized around students' research papers. These deal with the implications of arguments about democracy, social justice, or both, for the critical understanding of some domain of social life. The students are encouraged to work on domains — such as family, workplace, education, and religion — that have been relatively under-attended to by political theorists in recent decades. The paper may be either an application of existing theory to novel domains of social life, or an attempt to develop a new theoretical argument.

In the first half of the course we read works by John Rawls, Michael Walzer, Amartya Sen, Robert Dahl, William Riker, Adam Przeworski, and others. During this period students also select the particular domain of social life they plan to investigate. Before October 15 each student turns in a two-page paper prospectus and discusses it with the instructor in office hours. In the second half of the course the seminar becomes a workshop. Participants present drafts of their papers for discussion by the group, supplying opportunities for constructive collective effort and for revision of what will become the final papers. There are no prerequisites.

PLSC 573b, Theory and Practice. Bruce Ackerman.

W 2.10–4

A writing seminar devoted to the exploration of the practical significance of the theories of justice considered in the fall-term course Justice, which is generally a requirement for admission into this seminar. Students with exceptional backgrounds in political philosophy may be admitted directly upon satisfying the instructor that they have in fact read and pondered the texts discussed in the fall-term course. *Also LAW 21130.*

PLSC 575a, Political Competition. John Roemer.

W 10–12

Political competition in democracies is party competition. We develop, from the formal viewpoint, theories of party competition in democracies. The familiar “median voter theorem” of A. Downs is the simplest example of such a theory, but it is inadequate in several ways. We develop a theory in which parties (1) compete over several issues, not just one issue, as in Downs; (2) are uncertain about how citizens will respond to platforms; and (3) represent interest groups in the population. Applications, particularly to the theory of income distribution and taxation, are studied. *Also ECON 788a.*

PLSC 583a, Contemporary Critical Theory. Seyla Benhabib.

W 3.30–5.20

Is Habermas's theory of communicative ethics a moral theory or a theory of legitimation? Contemporary critics have argued that it fails in both respects. This course examines challenges to communicative ethics through a group of thinkers whom we may name “ethical pluralists” and “political agonists.” Readings from Juergen Habermas, Charles Taylor, Bernard Williams, Barbara Herman, Isaiah Berlin, A. Honneth, R. Forst, James Bohman, Chantal Mouffe, and others. *Also Phil 700a.*

POLITICAL PHILOSOPHY**PLSC 602a^U, Ancient and Medieval Political Thought. Robert Wokler.**

TTH 1–2.15

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 608a^U, Democratic Rhetoric: Demagogy, Persuasion, and Deliberation.**Bryan Garsten.**

MW 11.30–12.20

A consideration of the political problems surrounding the democratic practice of persuasion. Does democracy tend to devolve into an "aristocracy of orators"? Readings include classic texts of political thought, recent writings on deliberative democracy, and reflections on contemporary rhetoric, including rhetoric of the ongoing presidential campaign.

PLSC 610b^U, Political Philosophy as Education: Plato and Rousseau. Steven Smith.

W 1.30–3.20

An examination of Plato's *Republic*, Rousseau's *Emile*, and Dewey's *Democracy and Education* as forms of political pedagogy. Particular emphasis is given to the relation between democracy and education.

PLSC 618b^U, Political Judgment. Bryan Garsten.

T 3.30–5.20

What is good judgment, and what is its role in politics? An examination of two competing traditions of thought on this topic, Aristotelian and Kantian, together with other sources from both recent and ancient political philosophy (including Plato, Cicero, Vico, Gadamer, Habermas, and Rawls).

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 638b^U, The Philosophy of Freedom: Berlin, Oakeshott, Strauss. Steven Smith.

M 1.30–3.20

This course examines the philosophy of freedom in the thought of three of the twentieth century's major political philosophers: Berlin, Oakeshott, and Strauss. The course focuses on an in-depth textual analysis of a selection of their most important writing, but it also attempts to situate their thought in the cross-currents of contemporary politics to which they respond. Berlin's theory of "negative liberty" and his views on the ultimate pluralism of values, Oakeshott's conception of tradition and the role of authority in securing liberty, and Strauss's rehabilitation of the "quarrel between the ancients and the moderns" were all attempts to articulate the basic grounds of a viable idea of liberty in the modern age. Among the topics to be covered in the course are the legacy of the Enlightenment and the Counter-Enlightenment, the critique of the social sciences, the proper relation between liberalism and moral pluralism, the relation between the authority of tradition and the rise of individualism, and the connection, if any, between the ancient tradition of civic and moral virtue and the modern defense of liberal democracy.

INTERNATIONAL RELATIONS

PLSC 655a^U, Nationalism and Identity. Keith Darden.

T 1.30–3.20

Exploration of the formation of national identity and the expression of nationalist sentiments through ethnic parties, autonomy movements, resistance to occupation, and warfare. Particular focus on Europe and post-Soviet Eurasia.

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 661a, 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 672b^U, NATO in the Post-Cold War World: Adaptation or Decline? Jolyon Howorth.

W 1.30–3.20

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 679b^U, Theories, Methods, and Approaches in the Study of International Relations. Keith Darden.

T 1.30–3.20

This course examines theories of international relations and the methods used for evaluating them. The course begins with a review of different philosophies of science, surveys the main theoretical traditions in IR, and then examines the different empirical methods that can be used to identify causation, using examples from IR. The course is designed to marry comprehensive conceptual training with the tools to do original research. Students gain practical experience in selecting a problem, developing or selecting a theory, coding and analyzing their own data, and demonstrating causation with a case study.

PLSC 684a^U, War and Public Health. Bruce Russett.

w 3:30–5:20

The immediate combat casualties in wars represent only the tip of the iceberg of long-term casualties due to malnutrition, disease, and social disruptions that derive indirectly from war. We examine how these casualties arise and their humanitarian and political implications. This is a research seminar, following some common readings with major papers.

PLSC 688a^U, European Union: U.S. Relations since the End of the Cold War. Jolyon Howorth.

T 3:30–5:20

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 689a^U, Secession and Political Boundaries. Nicholas Sambanis.

w 7–8:50

This course analyzes the political economy of decentralization, secession, and political boundaries (both internal to states and international). We explain why some countries have stable systems of political decentralization and others do not. We develop a framework to explain why (and which) regions demand more self-determination and where these demands might lead to violent conflict.

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 2004. 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 711b^U, Comparative Equality. Michael Wallerstein.**

w 3:30–5:20

Investigation of the causes of differences between countries over time in the distribution of income and wealth before taxes, and in the design and generosity of social insurance policies. Consideration of the relationship between democracy and economic inequality, between inequality and economic performance, and between inequality and poverty.

PLSC 712b, Comparative Political Economy. Frances Rosenbluth.

F 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 714a, Corruption, Economic Development, and Democracy.

Susan Rose-Ackerman.

W 2.10–4

A seminar on the link between political and bureaucratic institutions, on the one hand, and economic development, on the other. A particular focus is the impact of corruption on development and the establishment of democratic government. Paper or self-scheduled examination. Enrollment limited to fifteen. Permission of instructor required. (Taught on the Law School schedule; first class September 8.) *Also LAW 20098.*

PLSC 720a^U, Sexual Violence and War. Elisabeth Wood.

M 7–8.50

In this seminar we analyze patterns of sexual violence in war. While sexual violence occurs to at least some degree in most wars, it occurs to sharply varying extent and in radically different patterns. We study a number of cases in detail, including Rwanda and Bosnia where sexual violence was extremely widespread; Colombia and Guatemala where it was frequent on the part of one of the factions of the war; Sierra Leone and Liberia where it included sexual slavery; and El Salvador and Sri Lanka where it was relatively limited. We also examine two well-documented cases of sexual violence in interstate wars, by the Soviet Army in World War II and the Japanese in Nanking. We analyze how well the relevant literatures in sociology, political science, criminology, psychology, biology, and gender studies account for these patterns.

PLSC 722a^U, Authoritarian Regimes. Pierre Landry.

W 3.30–5.20

The course introduces students to the key literature on authoritarian regimes and their political evolution.

PLSC 723b, Comparative Political Institutions. Jose Cheibub.

M 1.30–3.20

The seminar covers in turn basic modern democratic institutions including electoral systems, political parties, party systems, parliamentary government, government formation, presidential institutions, courts and judicial power, bicameralism, legislative committees, federalism, and so on. Readings include both classic and contemporary comparative politics literature including Cox, Duverger, Laver, Lijphart, Powell, Sartori, Shepsle, Strom, Tsebelis.

PLSC 730b^U, Decentralization in Developing Countries. Pierre Landry.

W 1.30–3.20

A comparison of decentralization strategies and their political consequences. Focus on developing countries with authoritarian or transitional regimes as well as on stable democracies.

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 744b^U, 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 INRL 545b.

PLSC 749b^U, The Political Economy of Gender. Frances Rosenbluth.

T 9.30–11.20

This course examines gender using standard analytical tools of political economy. The course is divided into three parts: The first reviews classical and modern political theories of gender. The second takes up neoclassical and bargaining models of gender. The third lays out a sequence of topics from historical and contemporary cases including gender gaps in wages, career trajectories, and political representation for theoretical evaluation.

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.

T 3.30–5.20

An examination of the origins, development, institutions, contemporary policy-making 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.

M 1.30–3.20

Subjects include the influence of pre-colonial systems and colonial rule on contemporary politics, states and statelessness, the politics of economic performance, communal conflict, and attempts at regional and sub-regional unity. Students prepare two bibliographic essays, one on the politics of an African country, one of an analytic problem area. Also AFST 759a.

PLSC 770a^U, Party Politics. Anna Grzymala-Busse.

M 3.30–5.20

This is an advanced undergraduate/graduate seminar to examine party politics, their development, and its ramifications for democratic governance. Main topics of the course include the rise of political parties, electoral laws and their effects, parties as organizations, parties and patronage/corruption, fragmented political systems, consociational arrangements, and the roles of parties in ethnic conflict. Broader theoretical themes addressed in the course include the specificity of political party organizations, "difficult choices" (responsiveness to the elec-

torate versus responsibility as the government), and the threats to democracy from the parties themselves, both in the interwar period and at the end of the twentieth century. Principal readings include Kitschelt, *The Transformation of European Social Democracy*; Sartori, *Parties and Party Systems*; Horowitz, *Ethnic Groups in Conflict*. As a graduate seminar, the format includes a research/theoretical paper, suitable for publication or a conference presentation. There may be student presentations.

PLSC 777a, Comparative Politics I: Research Design. Elisabeth Wood.

T 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.

HTBA

See description under PLSC 777a.

PLSC 779a, 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 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 780a^U, Institutions and Transitions of Democracy. Ellen Lust-Okar.

T 3.30–5.20

An examination of the institutional choices of regime transitions and their implications. Consideration of why some states create presidential systems and others parliamentary ones; the choices of various electoral rules; and political implications of these institutions for future regime change.

PLSC 783a^U, The IMF at the Crossroads. James Vreeland.

M 1.30–3.20

The International Monetary Fund is at a crossroads. Originally intended to provide exchange rate stability, the IMF has gradually become involved in the economic policies of most countries in the world. Since the East Asian financial crisis, however, the IMF has come under closer scrutiny than ever before. For the first time, calls for its reform and even its dissolution come from across the political spectrum. Many argue that the IMF has failed in its mission and that its fundamental goals should be altered. In this course we study the purposes of the Fund, the effects of its economic programs, and the various reform arguments.

PLSC 784b^U, Africa and the Disciplines. William Foltz.

W 1.30–3.20

This seminar is designed to introduce students to the study of Africa from the perspective of the several disciplines, specifically history, anthropology, politics and economics, law, literature, linguistics, and art history. It examines how Africa has been studied from the perspectives of the different disciplines, and also shows how the study of Africa has in turn contributed to the disciplines themselves. *Also AFST 764b^U.*

PLSC 790b, Workshop on Political Economy. John Roemer.

w 4–6

In this seminar, outside speakers present their recent work in the area of formal political economy. Students present previews of upcoming papers or related material.

PLSC 793b, Chinese Politics. Pierre Landry.

T 1.30–3.20

This seminar examines key theoretical and empirical approaches to the study of Chinese politics and political economy in the post-Mao era. Readings and seminar discussions are intended to familiarize students with the core literature in Chinese politics but also help them formulate an original research design, due at the end of the term. In addition, participants are expected to write four analytical essays, each critiquing a set of weekly readings.

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 J. Madison, A. de Tocqueville, R. Putnam, T. Skocpol, S. Skowronek, D. Mayhew, J. Zaller, R. Dahl, R. Neustadt, J. Gerring, R. Fenno, D.R. Kiewiet, R. Erikson, A. Downs, M. Olson, and K. Krehbiel. 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 813a, Intersecting Identities: Nation, Race, and Gender.**Ange-Marie Hancock.**

T 1.30–3.20

This seminar explores the value of approaching political identity from an intersectional perspective, using feminist theory, critical race studies, and other empirical approaches that explore the politics of identity. *Also AFAM 809a.*

PLSC 822a, Research Topics in American Politics. Gregory Huber.

w 12–1.30

This course meets (every other week) 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 826a, Public Opinion. Khalilah Brown-Dean.

M 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 828a, American Political Development. Stephen Skowronek.

w 3.30–5.20

An examination of patterns of political change and institutional development in the United States. The course considers patterns of reform, the political construction of interests and movements, problems of political culture, party building, and state building.

PLSC 842b, The Constitution: Philosophy, History, and Law. Bruce Ackerman.

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. *Also LAW 21046.*

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 871b, Health Law and Policy. Theodore Marmor.

This course provides a general introduction to health law, policy, and politics. Topics include access to health care, the financing of care, patients' rights, the meaning and effects of "managed care," the relationship of health care to public health, and selected issues in bioethics. Treatment of these issues in the health care systems of other industrialized democracies — especially Canada, Germany, Holland, and Britain — is analyzed to provide competing perspectives on U.S. domestic issues. Scheduled examination with a limited paper option. *Also LAW 21416, MGT 661b.*

PSYCHOLOGY

2 Hillhouse, 432.4500

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

Chair

Kelly Brownell (432.4545, kelly.brownell@yale.edu)

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Marcia Johnson (432.6761, marcia.johnson@yale.edu)

Professors

Woo-kyoung Ahn, J. Truett Allison (*Veterans Administration Medical Center*), Stephen Anderson (*Linguistics*), John Bargh, Linda Bartoshuk (*Surgery; Otolaryngology*), Sidney Blatt (*Psychiatry*), Paul Bloom, Thomas Brown, Kelly Brownell, Marvin Chun, 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 Studies*), James Leckman (*Pediatrics*), Lawrence Marks (*Epidemiology & Public Health*), Susan Nolen-Hoeksema, David Pauls (*Child Study Center*), Donald Quinlan (*Psychiatry*), Peter Salovey, Robert Sternberg, Fred Volkmar (*Child Study Center*), Victor Vroom (*School of Management*), Allan Wagner, Karen Wynn

Associate Professors

Larry Davidson (*Psychiatry*), Elena Grigorenko (*Child Study Center*), Jeannette Ickovics (*Epidemiology & Public Health*), Robert Kerns (*Veterans Administration Medical Center*), Linda Mayes (*Child Study Center*), Mary Schwab-Stone (*Child Study Center*), Kathleen Sikkema (*Psychiatry*), Jane Taylor (*Psychiatry*)

Assistant Professors

David Armor, Maria Babyonyshev (*Linguistics*), Geoffrey Cohen, William Corbin, Richard Eibach, Karyn Frick, Walter Gilliam (*Child Study Center*), Jeremy Gray, Joan Kaufman (*Psychiatry*), Joseph Mahoney, Christy Marshuetz, Douglas Mennin, Nathan Novemsky (*School of Management*), Maria Piñango (*Linguistics*), Valerie Purdie-Vaughns, Laurie Santos, Mark Schaefer (*Child Study Center*), Glenn Schafe, Brian Scholl, Golan Shahar (*Psychiatry*), Teresa Treat, Robin Weersing (*Child Study Center*)

Lecturers

Marc Brackett, James Charney, Nancy Close, Nelson Donegan, Carla Horwitz, Kristi Lockhart, Michelle Patterson, 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.]

PSYC 503a, Memory. Marcia Johnson.

T 9.30–12

A consideration of major theoretical ideas and empirical findings about human memory.

[PSYC 504b, Cognitive and Social Neuroscience.]

[PSYC 505a, Creativity.]

[PSYC 506b, Introduction to Brain and Behavior.]

PSYC 507a, Health Psychology: Clinical and Social Foundations. William Corbin.

T 1.30–3.20

Introduction to theory and empirical approaches in health psychology. Consideration of the role of psychological variables in the etiology and treatment of disease and in the maintenance of health. Emphasis is placed on current basic research in selected areas of health psychology and on the application of this knowledge base to health care delivery.

PSYC 509b, Social Cognition. John Bargh.

Th 1.30–3.20

A course in contemporary social cognition theory and research, in which students fully participate in each week's class discussion of the assigned readings. The goal of the course is to bring students up to speed, not only as to the major themes and programs of research today, but also the historical roots and context of that research as well—in other words, why that research is being done in the first place.

[PSYC 510a, Self and Identity.]

[PSYC 511b, Cognitive Development.]

[PSYC 512b, The Cognitive Sciences.]

[PSYC 513b, Personality Development and Psychopathology.]

[PSYC 514b, Applied Developmental Science.]

[PSYC 515b, Structural Equation Modeling.]

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.]

PSYC 521b^U, Multivariate Data Analysis with Observable Variables.

Elena Gringorenko.

M 3.30–5.20, I HTBA

A survey of multivariate data techniques for analyzing the structure of data sets with several dependent variables, including multiple regression, multivariate analysis of variance, canonical correlation, and discriminant analysis. The elements of matrix algebra are introduced, as well as the computer packages needed for the analysis. Prior exposure to a course such as analysis of variance is preferred.

PSYC 523b, Cognitive Neuroscience. Jeremy Gray.

W 1.30–3.20

The aim of this course is to provide an overview of cognitive neuroscience at an introductory graduate level. We cover principles, methods, and key research findings in multiple topic domains (e.g., language, memory, vision, attention, working memory/executive control, movement control, emotion and reward, social processes). The course emphasizes behavioral and neural processes, with some discussion of computational approaches.

[PSYC 525a, The Minds of Infants.]

[PSYC 527a, Psychotherapy: Historical and Scientific Foundations.]

[PSYC 530b, Advanced Quantitative Methods.]

[PSYC 533, The Nature of Cognition.]

[PSYC 534a, Theories of Development.]

[PSYC 535, Foundations of Behavioral Neuroscience.]

PSYC 539b, Psychopathology and Its Treatment. Douglas Mennin.

M 1.30–3.20

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 540b, Changing Behavior in Applied Settings.]

[PSYC 541b, Research Methods in Psychology.]

PSYC 553a, Behavioral Decision Making. Ravi Dhar, Nathan Novemsky.

T 4.10–7.10

This seminar examines research on the psychology of judgment and choice. Although the normative issue of how decisions should be made is relevant, the course focuses mainly on the descriptive issue of how decisions are made. Topics of discussion include choice, judgment heuristics and biases, decision framing, prospect theory, mental accounting, context effects, task effects, regret, and other topics. The goal of the seminar is threefold: to foster a critical appreciation of existing knowledge in behavioral decision theory, to develop students' skills in identifying and testing interesting research ideas, and to explore research opportunities for adding to that knowledge. *Also MGMT 753a.*

[PSYC 554b, Human Intelligence and Its Development.]

[PSYC 556, Developmental Psychopathology.]

PSYC 569a, Psychology's Contribution to Gender and Vice Versa.

Marianne LaFrance.

T 3.30–5.20

This course considers how psychology has affected and been affected by research on women, gender, and sexuality.

[PSYC 570b, Nonverbal Communication.]

PSYC 571b, Neurophysiology. Thomas Brown.

T 1.30–4

This introduction to neurophysiology is based on the fourth edition of John Nicholls's classic, *From Neuron to Brain* (2001), which is supplemented by original research papers and reviews. The course begins with the properties of neurons and glia and ends by considering multiple memory systems, behavior, and cognition.

[PSYC 572a, Neurobiology of Learning and Memory.]

PSYC 573b, Moral Psychology. Paul Bloom.

TR 1.30–3.20

An advanced introduction to the sciences of good and evil. Topics include the evolution of altruistic thought and action, moral development in babies and children, the neuroscience of morality, and (most of all) the study of moral reasoning in adults. Readings are eclectic and plentiful.

PSYC 605b^U, The Relation of Speech to Language. Carol Fowler.

TR 4–5.15

A study of the relation between the speech signal and the linguistic message it conveys. Special attention to those characteristics of speech that fit it to humans and make it a uniquely efficient vehicle of communication. Prerequisite: LING 120a. Also LING 621b^U.

[PSYC 607a^U, Human Thinking and Reasoning.]

[PSYC 608b, Behavior Genetics.]

[PSYC 612a^U, Neuroimaging Analyses Techniques.]

[PSYC 614b^U, Neurobiology of Learning and Memory.]

PSYC 616b^U, Psychopathology and Cognitive Processing. Teresa Treat.

TR 9–10.15

Theoretical and measurement approaches to evaluating the role of cognition in psychopathology from a cognitive psychological perspective.

[PSYC 617b^U, Evolutionary Psychology.]

[PSYC 618b, Visual Cognition and Attention.]

[PSYC 620, Topics in Cognitive Development.]

[PSYC 622a^U, Social Intervention.]

[PSYC 626b, Modularity and Cognition.]

PSYC 627a^U, Topics in Infant Studies. Karen Wynn.

W 2.30–4.20

This course investigates selected advanced topics in infant cognitive, social, and/or emotional development. The topic varies from year to year. Some examples are: infants' concept of object, concept of number, early social cognition, and early emotional development. Students should check with Professor Wynn about the topic for 2004.

[PSYC 628a^U, Working Memory, Attention, and Executive Processing.]

PSYC 630b, Graduate Seminar in Writing. Susan Nolen-Hoeksema.

HTBA

The goals of this seminar are to help graduate students improve their professional writing skills. Several types of professional writing are addressed, including research statements, empirical articles, review articles, research proposals, and dissertations. Some class time is devoted to discussion of readings on good writing, but the majority of class time is spent discussing samples of writing by class members in small groups and in the larger class. Students should be prepared to produce samples of writing throughout the term and willing to have their samples discussed by the class. This seminar is intended for graduate students in psychology who are in their second through fifth year of the graduate program.

[PSYC 632b, Comparative Psychology.]

PSYC 636b^U, Psychological and Methodological Approaches to Diversity.**Valerie Purdie-Vaughns.**

T 9.30–11.20

This course explores both the psychological and the political underpinnings of diversity, emphasizing social psychology methods and approaches. The course first examines theoretical approaches to intergroup relations, specifically how group identities and sociocultural institutions shape psychological processes. The course next explores how diversity is defined and socially constructed in society. This section focuses on critiquing arguments in support of and against diversity as a tool for intergroup relations. The final section considers practical applications of the study of diversity.

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.

T 3.30–5.20

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. Marlene Schwartz.

T 9.30–11.20

This course focuses on the theoretical underpinnings of psychological assessment as well as covering the administration of major cognitive, projective, and personality instruments and the basics of report writing.

PSYC 644b^U, Neurobiology of Emotion. Glenn Schafe.

T 9.30–11.20

This course focuses on the brain circuitries involved in emotion and emotional learning and memory. We begin by considering the emotion research in a historical context, then discuss progress that has been made in understanding the neurobiology of emotion in both laboratory animals and humans.

[PSYC 648b, Cellular Analysis of Learning and Memory: Model Systems.]**PSYC 649b^U, Topics in Syntax: Bilingualism. Maria Babyonyshev.**

T 1.30–3.20

An investigation of the interactions between the two grammars of a bilingual speaker. Emphasis on the changes that may occur in the grammar of the native language as a result of bilingualism and their implications for syntactic theory. Topics include syntactic transfer, first language attrition, and lexical transfer. (May be retaken for credit by students who have taken this course with different content.) Prerequisite: one course in syntax or permission of instructor. *Also LING 662b^U.*

PSYC 650a^U, Topics in Syntax: The Mental Lexicon. Maria Piñango.

M 1.30–3.20

What is lexical knowledge? Views on the lexicon: repository of information vs. a “generative” system. The case of idioms. The lexicon and the grammar-conceptual structure interface. Acquisition of the lexicon. *Also LING 660a^U.*

[PSYC 651b^U, Object Cognition.]

[PSYC 652a^U, Topics in Cognitive Neuroscience.]

PSYC 654b^U, Sensory Information Processing. Lawrence Marks.

T 9.30 – 11.20

A functional examination of the ways that sensory systems transduce stimulus energies and information. Topics include sensory anatomy and physiology, psychophysical analysis of the qualitative dimensions of sensory experience, selective attention, and interactions among sensory, perceptual, and cognitive mechanisms.

PSYC 657a, Social and Behavioral Influences on Health. Jeannette Ickovics.

T 10 – 11.50

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 biomedical sciences. *Also CDE 505a.*

PSYC 659a^U, Addictive Behaviors. William Corbin.

T 2.30 – 4.20

This seminar course introduces students to important issues in the field of addictive behaviors. Three areas of focus include: defining, assessing, and diagnosing addictive behaviors and reviewing epidemiological research on alcohol and drug abuse and negative consequences of normative alcohol and drug use; examining factors that contribute to alcohol and drug-related problems, including genetic, physiological, neurochemical, cognitive, and social factors; and evaluating current prevention and treatment approaches for addictive behaviors.

[PSYC 661a, Clinical Diagnostic Evaluation of Children.]

PSYC 662a, Abilities, Competencies, and Expertise I. Robert Sternberg.

T 4.30 – 6

This seminar is a forum for students to discuss contemporary issues related to intelligence and thinking. In some classes, we discuss the work of researchers outside Yale. Occasionally there are presentations from researchers outside our community. Most of the classes consist of informal presentations by seminar members aimed at helping them clarify their ideas for theory and research.

PSYC 663b, Abilities, Competencies, and Expertise II. Robert Sternberg.

T 4.30 – 6

For description, see PSYC 662a.

[PSYC 669b, Neurochemical and Hormonal Modulation of Learning and Memory.]

PSYC 671b^U, Concepts and Categorizations. Woo-kyoung Ahn.

Th 2.30 – 4.20

This seminar explores how people learn and represent concepts. Topics include prototype, exemplar, and “theory” theories of conceptual representation, computational models of concept acquisition, how concepts are changed and created, expert/novice differences in categorization, levels of concepts, natural kinds and artifacts, and applications of some of the issues.

[PSYC 672, Concepts, Categories, and Word Meanings.]

[PSYC 673b^U, Clinical Cognitive Neuroscience.]

[PSYC 677b^U, Introduction to Computational Neuroscience.]

[PSYC 682a, Child and Adolescent Peer Relations.]

PSYC 684a, Psychotherapy Technique: Process and Outcome. Michelle Patterson.

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.

PSYC 684b, Case Conceptualization and Diversity. Michelle Patterson.

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 688b, Psychotherapeutic Process: Clinical and Research Perspectives.]

PSYC 689a, Psychopathology and Diagnostic Assessment. Douglas Mennin.

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, Clinical Ethics and Practice. Michelle Patterson.

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. Jeremy Gray.

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. Karyn Frick [F], Glenn Schafe [Sp].

F 4–5.30

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 consists of both presentations and discussions of recent readings.

PSYC 708, Current Work in Developmental Psychology. Faculty.

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. Marianne LaFrance.

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 711, Current Work in Child Development and Social Policy. Edward Zigler.

F 11.30–12.30

Guest lectures and discussion on recent topics in child development and social policy, and its influence on public policy in the United States.

PSYC 718b, Ethnic and Cultural Diversity: Current Work in Clinical Psychology.**Faculty.**

Th 12–1.30

Examination of the current status of research and scientific knowledge bearing on issues of cultural and ethnic diversity as they relate to clinical practice. Weekly speakers present research, which is examined methodologically, and recent significant journal articles or technical books are also reviewed.

PSYC 720a, Current Work in Clinical Psychology. Faculty.

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 724, Research Topics in Child Development and Social Policy. Edward Zigler.

M 5–6

The course focuses on major policy issues pertaining to children and families (particular issues are determined by course participants). The goal of the course is to fully investigate the policy issues under study, discovering what is occurring at several different levels (federal policy, state policy, international policy, best practices, and research) on the issues. The knowledge gained is used to develop a written product by the end of the term or academic year (e.g., journal article, book chapter, monograph). 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 Emotion Regulation. Susan Nolen-Hoeksema.

HTBA

We examine models of how people regulate their emotions, and the empirical research testing these models. Particular emphasis on adaptive versus maladaptive emotion regulation strategies, and the links between these strategies and depression, anxiety, and unhealthy behaviors such as substance abuse.

PSYC 728, Research Topics in Prevention Research. Joseph Mahoney.

F 10–11.30

The course discusses current theory and research on social intervention research and social policy. Format involves student presentation and discussion of original research, student- and

faculty-led discussions of current topics in prevention research and social policy, and student development and career training in social intervention research and policy.

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. Woo-kyoung Ahn.

HTBA

This seminar explores how people learn and represent concepts. Topics include prototype, exemplar, and "theory" theories of conceptual representation, computational models of concept acquisition, how concepts are changed and created, expert/novice differences in categorization, levels of concepts, natural kinds and artifacts, and applications of some of the issues.

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 749, Research Topics in Memory. Marcia Johnson.

HTBA

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 10.30–12.30

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 772, Research Topics in Self and Social Judgment. David Armor.

HTBA

Weekly lab focusing on current research projects in self-evaluation, social judgment, and decision making.

[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. Michelle Patterson.

HTBA

Supervised practicum in the assessment and treatment of mood disorders, with an emphasis on cognitive-behavioral perspectives.

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

Dale Martin

Director of Graduate Studies

Harry Stout (432.0828, harry.stout@yale.edu)

Professors

Harold Attridge (*Divinity School*), Gerhard Böwering, Jon Butler, Adela Collins (*Divinity School*), John J. Collins (*Divinity School*), Carlos Eire, Margaret Farley (*Divinity School*), Steven Fraade, Christine Hayes, Paula Hyman, Serene Jones (*Divinity School*), David Kelsey (*Divinity School*), Bentley Layton, Ivan Marcus, Dale Martin, Thomas Ogletree (*Divinity School*), Gene Outka, Harry Stout, Miroslav Volf (*Divinity School*), Robert Wilson

Assistant Professors

Shannon Craigo-Snell, Stephen Davis, Frank Griffel, Ludger Viefhues

Lecturer

Hugh Flick, Jr.

Fields of Study

Students must enroll in one of the following fields of study: American Religious History, Hebrew Bible/Old Testament, History of Ancient Christianity, Islamic Studies, Judaic Studies, New Testament, Philosophy of Religion, Religious Ethics, and Theology. (Buddhist Studies, normally included, is admitting no 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 416–17. 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 505b^u, Apocalyptic Religion in Cross-Cultural Perspective. Robert Wilson.

th 1.30–3.20

An examination of millennial and “end-time” beliefs in a variety of cultures around the world. Attention given to Jewish and Christian texts as well as Native American traditions, African and Pacific Islander movements, and modern manifestations such as Jonestown, the Branch Davidians, and Heaven’s Gate.

RLST 510a, Theories in the Study of Religion: Postcolonial Theory and Religion.

Ludger Viehues.

^t 4–5.50

This seminar explores current works on the intersection of postcolonial theory and religious studies. After introducing poststructuralist and postcolonial theorists (e.g., Anderson, Derrida, Spivak, Kristeva, Bhabha), we study how religious identity is produced on the intersection of gender, race, and class within contexts marked by globalization.

RLST 605a, Greco-Roman Environment of the New Testament. Dale Martin.

^w 4–5.50

An introduction for advanced students to the religious, philosophical, and cultural milieu in which the New Testament took shape. The course requires extensive readings in primary sources and selected secondary literature. Students not in the Ph.D. program may be admitted with permission of instructor.

RLST 615b, Ancient Apocalypticism. Adela Collins.

w 3.30–5.30

Students are expected to become familiar with the primary texts of ancient apocalypses in English translation and to consult those texts in the original languages as far as possible. Important secondary literature should also be read. Students are also expected to master the issues involved in the debate about the apocalypse genre and the definitions of apocalyptic eschatology and apocalypticism. All Ph.D. students in New Testament and Ancient Christianity who are in residence are required to participate and to give a presentation. Students are encouraged to prepare their presentations and the related papers on a topic that relates the phenomenon of apocalypticism to their own research interests. This course is required for doctoral students in the Ph.D. programs in New Testament and Ancient Christianity. It is open to other students only with the permission of the instructor.

RLST 659b^u, Seminar: The Making of Monasticism. Bentley Layton.

T 2.30–4.20

The history of Christian monasteries, hermits, ascetics, and monastic institutions and values in late antiquity, with special attention to the eastern Mediterranean world. *Also CPTC 504b, HIST 531b.*

RLST 661b, 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. *Also HIST 539b, NELC 736b.*

RLST 675b, Ancient Judaism. Christine Hayes.

T 9.30–11.20

An in-depth survey of the history and literature of Judaism in late antiquity through the rabbinic period. Special attention is given to the problems and possibilities of employing rabbinic sources for the purposes of historical reconstruction in the period that saw the emergence of the Gospels and the formation of Christianity. This course is designed primarily for students in the Ph.D. program in New Testament and Ancient Christianity. Doctoral students in Hebrew Bible and Ancient Judaism are also welcome.

RLST 710b, The Theology of al-Ghazali. Frank Griffel.

w 2.30–4.20

Al-Ghazali (d. 1111) was one of the most influential Muslim theologians active at a time when Sunni theology had just passed through its consolidation and entered a period of intense challenges from Shi'i Isma'ili theology and the tradition of Arabic Peripatetic philosophy. Yet, despite his influence, interpreters are still divided on the nature of his theology. Has al-Ghazali been faithful to the theological system of Sunni Ash'arism or has he been won over by the cosmology of the *falasifa*? We read key texts by al-Ghazali that have been discussed in this dispute and see how they are represented in the secondary literature. Readings include newly discovered texts like ms. London, Or. 3126, and the so-called Maragha manuscript. Prerequisite: reading knowledge of Arabic.

RLST 720a, Seminar on the Qur'ān. Gerhard Böwering.

Th 4–5.50

Intensive study of the Qur'ān. Readings in Sufi commentaries on the Qur'ān. Special emphasis on textual and hermeneutical problems included in sūra 7 (al-Arāf) and sūra 20 (Tā-Hā). Prerequisite: reading knowledge of Arabic; permission of the instructor.

RLST 720b, Seminar on Islamic Religious Thought. Gerhard Böwering.

Th 4–5.50

Intensive study of Islamic religious texts. Selected readings in classical Arabic and Persian sources, e.g., Sarrāj, Kitāb al-luma', Kubrā, Fawā'ih, Ibn al-Arabi, Fusus al-hikam, Aziz-I Nasafi, Kashf ul-haqa'iq. Prerequisite: reading knowledge of Arabic; permission of the instructor.

RLST 752b^U, Mishnah Seminar: Tractate Rosh Hashanah. Steven Fraade.

Th 9.30–11.20

Mishnah Berakhot, dealing with the recitation of public and private prayers and blessings. Legal traditions as they reflect rabbinic attitudes toward worship in historical context. Prerequisite: reading knowledge of Hebrew.

RLST 755a^U, The Literature of the Rabbis. Steven Fraade.

Th 9.30–11.20

An examination of the several genres of rabbinic “textuality” as “oral Torah”: midrash, targum, mishnah, tosefta, and gemara (Talmud). For each, sections of primary texts closely studied, with consideration of traditional and modern critical views of their histories, forms, and functions. Topics include similarities and differences between genres; antecedents; uses for historical purposes; relation of form to contents and narratives to laws. No prior background assumed.

RLST 756b, The Required Second Temple Judaism Seminar: Ancient Jewish Historiography. Isaiah Gafni.

W 1.30–3.20

An examination of historical consciousness and the historiographical enterprise in the variegated literary works of Jews in late antiquity. Considers the different contexts and systems employed to encourage a historical consciousness and explores the nature of classical rabbinic literature as a possible reflection of contemporary historical reality.

RLST 757a^U, The Dead Sea Scrolls and the History of Ancient Judaism: The Damascus Document. Steven Fraade.

T 9.30–11.20

Study of one of the most important of the Dead Sea Scrolls. Attention to its place within the history of biblical interpretation and ancient Jewish law, the nature and rhetorical function in relation to the central sectarian writings of the Qumran community. Prerequisite: reading fluency in ancient Hebrew.

RLST 762a^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 951a^U.*

RLST 764a^U, Jews in America, 1654 to the Present. Paula Hyman.

MW 10.30–11.20

A survey of the development of American Jewry from the colonial period to the present. Topics include the Americanization of Judaism, constructing identity and community, political and economic participation, and Jews in American culture. *Also HIST 765a^U.*

RLST 766b^U, Jewish Immigration and American Society. Paula Hyman.

W 1.30–3.20

An exploration of the Jewish immigrant experience in America in the context of American immigrant history. Topics include work and family, constructing identity, the role of religion, and political and cultural participation in American society. *Also HIST 766b^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 between Judaism, Christianity, and Islam. An overview of Jewish society and culture in its biblical, rabbinic, and medieval settings. *Also HIST 535a^u.*

RLST 774b^u, History of Jewish Culture, 1500 to the Present. Paula Hyman.

TTh 10.30–11.20, 1 HTBA

A broad 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.

RLST 776b, 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 sub/cultures 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 HIST 541b.*

RLST 801a, Hebrew Bible/Old Testament Bible Seminar: Problems in the Book of Ezekiel. Robert Wilson.

M 1.30–3.20

A close reading of the Hebrew text of Ezekiel, with special attention to the literary structure and theological argument of the book. Various contemporary approaches to the book are considered, but the focus is on the biblical text. Prerequisite: two years of Biblical Hebrew or the equivalent; reading knowledge of German helpful but not required.

RLST 851b, Contemporary Protestant and Roman Catholic Ethics. Gene Outka, Margaret Farley.

T 1.30–3.20

The seminar critically explores literature in contemporary Protestant and Roman Catholic ethics; it analyzes issues and trends, and it encourages engagement with instructors in constructive work in contemporary Christian ethics.

RLST 855b, Lutheran Ethics in a Comparative Context. Gene Outka.

W 1.30–3.20

Representative themes in ethics in the Lutheran tradition, centering on “faith active in love,” with selected comparisons with the Roman Catholic and Reformed traditions. Special attention to two twentieth-century topics: comparative responses to the rise of Nazism in Germany and associated issues about anti-Semitism; and the content of social policy statements that Lutheran church bodies in America have issued since World War II.

RLST 857a, Love and Justice. Gene Outka.

Th 1.30–3.20

An examination of how love and justice as basic normative standards are construed in themselves and related to one another. Claims across a spectrum are examined from love and justice as opposed, to love and justice as distinguished, to love and justice as equated. Readings from theological and philosophical literature, both historical and contemporary, are canvassed.

RLST 861a, Theological Ethics. Thomas Ogletree.

TTH 11.30–12.45

The course offers a comprehensive framework for critical reflection in theological ethics, engaging contemporary appropriations of classic Roman Catholic and ecumenical Protestant traditions, including the distinctive contributions of independent African American traditions, and feminist and womanist perspectives. Lectures are organized around three discrete yet interrelated foci of inquiry: (1) an exposition of normative moral standards and substantive moral values that regulate and guide human actions and practices; (2) accounts of instruction and nurture that facilitate the moral formation of persons, equipping them to honor their basic moral obligations, to exercise discriminating moral judgment in complex situations, and to maintain value priorities appropriate to their personal life callings; and (3) an analysis of the social arrangements that structure the primary spheres of collaborative human actions and practices: churches and faith-based communities, families, neighborhoods, community organizations, civic associations, culture bearing institutions, economic structures, and political systems.

RLST 864a, Ethics and the Economy: Theological-Ethical Reflection on Economic Policy in an Expanding Global Market. Thomas Ogletree.

M 1.30–3.30

The course is an advanced seminar in Christian social ethics critically assessing U.S. economic policy within the context of expanding global markets. Attention is given to the work of economists, political economists, philosophers concerned with public ethics, and specialists in theologically grounded treatments of social ethics, including formal ecclesiastical documents that represent Roman Catholic, Ecumenical Protestant, and Evangelical Protestant traditions. Much of the work of the seminar focuses on clarifying the dynamics of a free-market economy, drawing upon contemporary studies in economic theory. The task is to discern how a free-market economy works, and the contributions such an economy can make to the common social good. Attention is also given to ways in which free-market economies tend to produce harm, in particular, irreversible damage to the natural environment, and disparities of income and wealth that generate an underclass of disadvantaged persons.

RLST 913b, Theology of Karl Rahner. Shannon Craigo-Snell.

M 1.30–3.20

This course explores in depth the theology and spirituality of Karl Rahner, focusing on his theological anthropology. Particular attention is paid to the influence of Ignatius of Loyola and Rahner's historical placement in the trajectory of twentieth-century theology.

RLST 921b^U, History, Hope, and the Self: Modern Christian Thought. Shannon Craigo-Snell.

TTH 10.30–11.20, 1 HTBA

An overview of important developments in Western religious thought during the nineteenth and twentieth centuries. Topics include changing understanding of the significance and movement of history, challenges posed to religious traditions by growing historical knowledge, shifting conceptions of the human person, and contrasting estimation of the role of religious persons in secular and political life. Connections between philosophy, theology, and social history are addressed. Authors include Hegel, Marx, Barth, and Gutierrez. No background assumed.

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, Annabel Patterson, David Quint, John Rogers, Ellen Rosand, Paolo Valesio, Christopher Wood

Faculty Associated with the Program

Rolena Adorno, Christy Anderson, Leslie Brisman, Judith Colton, Anne Dunlop, Paul Freedman, Karsten Harries, Olivia Holmes, Blair Hoxby, K. David Jackson, Maija Jansson, James Kearney, Lee Patterson, 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.

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, Benjamin Harshav (*Comparative Literature*), Michael Holquist (*Comparative Literature*), Tomas Venclova

Associate Professors

Hilary Fink, Robert Greenberg (*Adjunct*)

Assistant Professor

John MacKay

Lecturer

Kate Holland

Senior Lectors

Irina Dolgova, Rita Lipson

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 courses in linguistics) 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) another Slavic literature; (5) 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, based on specific fields of concentration and on topics designed by the student in consultation with the faculty, 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, and the prospectus defense must take place no later than December 1 of the same term. 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 416. 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 644b, Dostoevsky and the Theory of the Novel. Kate Holland.

T 1.30–3.20

This course examines the place of Dostoevsky's novels in Russian and European theoretical debates about the nature of the novel as a genre. We explore the ways in which Dostoevsky engages with Romantic and Realist theories of the novel, look at how he responds to some central problems of novelistic representation, and consider how and why Dostoevsky's novels have been so influential for the development of novel theory in the twentieth century. Readings include a selection of the novels; critical works by Dostoevsky scholars such as Dolinin, Ivanov, and Komarovich; and the novel theory of F. Schlegel, Bakhtin, Lukacs, Girard, Moretti, and others.

RUSS 680b, Acmeism. Tomas Venclova.

F 1.30–3.20

Acmeist ideas and values within their historical and cultural context. Close readings of poems by Gumilev, Mandelstam, Akhmatova, and others.

RUSS 689a, Russian Symbolist Poetry. Tomas Venclova.

M 3.30–5.20

Theory and history of symbolism. Close readings of poems by Bryusov, Blok, Ivanov, Annensky, and others.

RUSS 696b, Post-Stalin Literature and Film. Katerina Clark.

W 1.30–3.20

The main developments in Russian and Soviet literature and film from Stalin's death in 1953 to the present.

RUSS 744b^U, Russian Film. John MacKay.

Th 7–8.50 P.M., screenings M 9 P.M.

An historical overview of the development of Russian film with special attention to the classics of directors like Eisenstein and Vertov. Russian film examined in terms both of its contribution to film theory and practice and of the specific historical and cultural contexts of the major films. *Also CPLT 916b^U, E&RS 692b^U, FILM 773b^U.*

RUSS 746a, Art and Ideology. Katerina Clark.

W 1.30–3.20

Examination of texts identified as ideological art, focusing on the relationship between the conventions they use and the ideology they seek to advance. Theoretical readings include works by Benjamin, Jameson, Lukacs, Bakhtin, Marx, Althusser, and Judith Butler; literary works by Balzac, Brecht, Tretiakov, Ostrovsky, Orwell, Koestler, and others; films by Eisenstein, Leni Riefenstahl, and others. *Also CPLT 527a, FILM 828a.*

RUSS 833, Advanced Russian Conversation and Composition: Topics in Contemporary Russian Press and Media. Rita Lipson.

MW 12.30–1.20

A course designed to equip students with advanced language skills necessary to comprehend complexities of contemporary Russian press and media. Accompanied by a grammar review.

RUSS 834a, Aspects of Russian Grammar and Teaching Methodologies.

Irina Dolgova.

T 1.30–3.20

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 851b, 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.

MW 4–5.15

Examination of the linguistic and cultural history of the Slavs from the period of their 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.

TRH 11.30–12.45

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.

MW 4–5.15

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 805b, History of the Russian Literary Language. Harvey Goldblatt.

W 10.30–12.20

This course traces the different types of literary language used in the Russian lands from the medieval period to modern times. Special attention is devoted to the relations between language and culture in general and literary codification and formal techniques in particular.

SLAV 900, Directed Reading.

By arrangement with faculty.

SOCIOLOGY

140 Prospect, 432.3323

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

Chair

Jeffrey Alexander

Director of Graduate Studies

Ron Eyerman

Professors

Julia Adams, Jeffrey Alexander, Scott Boorman, Deborah Davis, Ron Eyerman, Paul Gilroy, Phil 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*), Andrew Schrank, Rachel Sherman, Philip Smith, Peter Stamatov

Lecturers

Ulrich Schreiterer, Vron Ware

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 complete fourteen term courses and demonstrate competence in sociological theory, statistics, and research methods, competence in which may be demonstrated by passing two term courses in each area. After completion of courses, students prepare written and oral comprehensive examinations in two selected fields 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 joint 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, joint-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 416.

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 501a, Foundations of Sociological Theory.]

SOCY 502a, Contemporary Sociological Theory: Durkheimian Sociology.

Philip Smith.

th 2–4

The course looks at the work of Emile Durkheim and his legacy for both social theory and empirical sociology. In the first part we look at Durkheim's major writings and key concepts. Next an exploration is made of the multiple and often contending ways these have been taken up and interpreted over the past century. Particular emphasis is given to the decline in functionalist and positivist readings of Durkheim and his emergence as a major cultural theorist in recent decades. Consideration is given to the contributions of Mass, Bataille, Goffman, Victor Turner, Collins, Lukes, Douglas.

SOCY 502b, Contemporary Sociological Theory: Pierre Bourdieu. Phil Gorski.

th 1–3

This course provides an intensive introduction to sociological and anthropological work of the late Pierre Bourdieu. We examine how Bourdieu defines the master concepts of "habitus," "capital," and "field," how his "theory of practice" relates to other universalizing theories, such as rational choice, and how he and his followers have applied the theory of practice to various fields, including consumption, education, the state, political contestation, gender, literature, sports, and art. And we ask whether Bourdieuan theory could provide the paradigmatic foundations for a renewed sociology, and whether such foundations are desirable or necessary.

SOCY 504a, Research Methods: Design and Data Collection. Deborah Davis.

F 9.30–11.20

Survey of (re-)current debates, problems, and innovations in qualitative and quantitative empirical research, including both data collection and data analysis issues. Focus on assessing and improving validity and generalizability within the theoretical and practical limits of social science research. Aims at developing a set of skills necessary for everyone who is interested in designing empirical fieldwork. Familiarity with statistics may be helpful but is not required.

SOCY 506b, Research Methods: Applied Data Analysis. Hannah Brueckner.

T 4–6

Focus on practical experience with analyzing complex data, including data management, exploration, description, and multivariate analysis. Familiarity with the basics of research methodology and statistical inference is required. Special emphasis is given to issues of comparisons across time and space with both descriptive and analytic methods. A second theme throughout the class is how to measure, describe, and explain changes/differences in inequality. The class covers basic statistics as well as multivariate regression models for continuous and categorical dependent variables.

[SOCY 509a, Advanced Methods of Ethnographic Field Research.]**SOCY 522a^U, The Sociology of Development. Andrew Schrank.**

W 3:30–5:20

This seminar examines the social and political underpinnings of national development in comparative and historical perspective. Topics to be covered include class formation, entrepreneurship, industrialization, urbanization, and political development.

SOCY 525a, Cultural Sociology: Theory and Research Programs. Jeffrey Alexander.

W 3–5

After a review of a broad range of contemporary perspectives, the seminar proceeds to examine in depth, and in its variations, the strong program in cultural sociology. This includes looking at theoretical ideas about hermeneutics and interpretation, critical theory, semiotics, structuralism and post-structuralism, social drama and ritual, performance studies, and social approaches to symbolic process. It also includes looking at empirical studies that apply cultural methods to such issues as politics, violence, civil society, and collective trauma.

SOCY 526a, Social Stratification. Ivan Szelenyi.

Th 9–11

Social and economic inequalities based on social class and status are a major dimension of individual life chances and life aspirations as well as of the structure and dynamics of societies and the world system. The course is intended to cover the current state of the field in regard to academic and policy debates, theories, methods, crucial research findings, as well as comparative analyses.

[SOCY 529b, Legislation.]**SOCY 536a, Colonialism and Empire. Julia Adams.**

T 10–12

This seminar explores the dynamics of imperial states, societies, and subjectivities, as well as the theoretical literature addressing problems of colonialism and empire. We survey current debates over the question of the imperial status of the contemporary United States, as well as ranging over historical imperial contexts including the Roman and Ottoman empires; the overseas empires of the early modern Western European states; the struggle for imperium in the late nineteenth-century world; twentieth-century colonial empires; and decolonization and imperial aftermath in both the post-state socialist and third worlds. We pay particular attention to the thorny issue of how and why empires are made, cohere, or come apart. The reflections and experiences of both those who operate empires and those who live within their borders are threaded throughout the course.

[SOCY 543b^U, Sociology of Education.]**SOCY 544b, Social Movements. Ron Eyerman.**

W 10–12

The course covers the dynamic field of social movement research from its origins to the present day. We discuss developments in theory and methodology primarily from European and American (North and South) perspectives, but touch on others as well. The course is open to graduate students and advanced undergraduates; some knowledge of sociological theory is

helpful, but not required. The course is run as a seminar, which requires active participation. Instruction includes the use of film and music.

[SOCY 545a, Reading Karl Marx.]

SOCY 546b^u, Sociology of Higher Education. Ulrich Schreiterer.

T 9.30–11.20

Examination of institutional features of higher education: “Bird’s-eye view” of system development. Peculiarities of “the city of intellect” — disciplines, organizational saga, the academic profession, power, and governance. Changes reflecting new types of knowledge production, educational services, and marketing.

[SOCY 548a, The Sociology of the Arts: Classical and Contemporary Perspectives.]

[SOCY 550a, Sociology of Work and Labor Markets.]

SOCY 553b^u, Empires and Imperialism. Peter Stamatov.

Th 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 557b, Political Sociology. Julia Adams.

M 2–4

This course engages central problems in understanding political action and institutions. It also serves as an introduction to the broad field of political sociology. We survey the panoply of major theoretical orientations toward power and politics. Substantive topics include collective action, political movements, and revolutions; political identities, including the dimensions of class, race, and gender; forms of political representation; the constitution of selves and subjectivities in politics; war; the formation and dissolution of states, empires, and nations; and the political imaginary.

SOCY 560a, 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 PLSC 734a.*

SOCY 560b, Comparative Research Workshop. Phil 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 567b^u, Cultural Performances. The Whitney Seminar on New Perspectives in the Social Sciences and Humanities. Jeffrey Alexander.

w 3.30–5.20, Lect. w 7

“Performance” has become a major new topic in both the humanities and the social sciences, and provides a new bridge for interrelating the disciplines that compose them. Performance allows textual emphasis to be related to contingency and context, symbolic action to be related to power and control, and dramatic production to be related to audience response. In this seminar, we examine the critical texts of this movement and host, in person, some of its most prominent students and practitioners. *Also WHIT 971b^u.*

[SOCY 577a, Topics in Multivariate Data Analysis.]

[SOCY 578a, Logic of Social Inquiry.]

[SOCY 580a^U, Introduction to Statistics in Sociology.]

[SOCY 581b, Multivariate Methods for the Social Sciences.]

[SOCY 585b, Life Course Research: Theoretical Foundations and Empirical Approaches.]

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.

Th 9.30–11.20

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. Jeffrey Alexander, Ron Eyerman, Philip Smith.

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. Jeffrey Alexander, Ron Eyerman.

F 12–2

Continuation of SOCY 628a; see 628a for course description.

SOCY 631b^u, Economic Sociology. Lawrence King.

Th 9.30–11.20

The course focuses on the difference between neoclassical economics and the emerging field of economic sociology. We explore the origin and evolution of capitalism as a global phenomenon and examine economic change in the post-communist and reforming communist systems.

[SOCY 637b, The Transition to Democracy and Capitalism in Eastern Europe.]

[SOCY 643b^u, Topics in Comparative Political Economy.]

SOCY 644a, Theorizing the Racial Formation of the United States in the Late Twentieth Century. Paul Gilroy.

T 9.30–11.20

A designated core course for students in the joint Ph.D. program; also open to students in African American Studies and American Studies. The interdisciplinary seminar includes readings from the fields of anthropology, critical legal studies, cultural studies, literary history, history, politics, and sociology. *Also AFAM 505a, AMST 643a.*

[SOCY 647b, Social Processes.]

SOCY 650b, Modernity and Its Others: Self, Subject, and Cultural Differences. Paul Gilroy.

T 9.30–11.20

This social theory course explores aspects of the political, philosophical, and sociological debates that have emerged around the concept of modernity. It looks particularly at articulations of modernity and “race” following four interlinked lines of inquiry: how has the subject of modernity been imagined and articulated; what attributes and experiences have qualified that subject as properly human and rational; where has identity been recognized as coming from, culturally and materially; and where has cosmopolitan loyalty emerged as a demand to see and act beyond the boundaries of immediate particularity? *Also AFAM 712b.*

COUNCIL ON SOUTHEAST ASIA STUDIES

Luce Hall, 34 Hillhouse, 432.3431, seas@yale.edu

Chair

J. Joseph Errington (*Anthropology*)

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*), 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

Roberto González Echevarría

Director of Graduate Studies

Rolena Adorno [F] (432.1154, rolena.adorno@yale.edu)

Fernando Rosenberg (*Acting* [Sp]) (432.1158, fernando.rosenberg@yale.edu)

Director of the Language Program

María Martino Crocetti

Professors

Rolena Adorno, Roberto González Echevarría, K. David Jackson, Josefina Ludmer,
María Rosa Menocal, Noël Valis

Associate Professor

Lidia Santos

Assistant Professors

Iván Fernández Peláez, Óscar Martín, Fernando Rosenberg

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 416. 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 960a^u, World Cities and Narratives. K. David Jackson.

Th 9.30–11.20

World cities and the narratives that best describe, belong to, or represent them, from the European/Iberian capitals that give rise to the urban novel to the fictional worlds of selected Asian, African, Brazilian, and Spanish American cities. In English. Texts available in original languages.

PORT 972b, Cosmopolitan Brazilian and Spanish American Writings: A Comparative Perspective. Lidia Santos.

Th 4–5.50

This course focuses on new trends in contemporary Brazilian and Spanish American narrative, taking cosmopolitanism as a theoretical axis. Comparative readings of Fernando Vallejo and Paulo Lins, Jorge Volpi and Silviano Santiago, César Aira and Ferrez, among others. Readings in the original languages. In Portuguese or Spanish. *Also SPAN 946b.*

PORT 991a, Tutorial.

By arrangement with faculty.

PORT 991b, Tutorial.

By arrangement with faculty.

SPAN 516b^u, Literary Encounters of Muslims, Christians, and Jews in Medieval Spain. María Rosa Menocal.

T 1.30–3.20

The literature of encounters (linguistic and literary, religious and intellectual) in the polycultural world of medieval Iberia. A wide variety of genres and perspectives are read: the bilingual poetry (Arabic/Romance, Hebrew/Romance) of the eleventh and twelfth centuries that made al-Andalus famous throughout the Arab world and helped create the Golden Age for Jews; the dialogues of the Catalan polymath Ramon Llull; mystical poems from all three faiths on ecumenical themes; the Alfonsine translations from Arabic that invented Castilian as a written language; and many other writings depicting interactions of the three faiths. In English, although all texts available in original languages as well.

SPAN 525a, Reading the *Romancero*. Oscar Martín.

T 1.30–3.20

This course focuses on the popular narrative ballad tradition, originating in medieval times but surviving into the present, known as the Hispanic *Romancero*. We study this poetry as it developed on both sides of the Atlantic, as well as how it was carried by the Sephardic community to new Mediterranean locations. We cover issues such as the medieval origins of the *Romancero*, the relation to other medieval poetic genres, formal structures, thematic cycles, oral transmission, printed transmutations, and social and ideological functions. In Spanish.

SPAN 711b, Clarín/Galdós: *La Regenta* and *Fortunata y Jacinta*. Noël Valis.

Th 1.30–3.20

An in-depth reading of two nineteenth-century Spanish narrative masterpieces. We analyze the texts as literary aesthetic achievements and explore their cultural-historical contexts. In Spanish.

SPAN 790b, Methodologies of Modern Foreign 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 812a, Chronicles of Conquest, Polemics of Possession. Rolena Adorno.

M 1.30–3.20

Five writers whose works have earned them a place in the Spanish American colonial literary canon: Álvar Núñez Cabeza de Vaca, Bernal Díaz del Castillo, Alonso de Ercilla, El Inca Garcilaso de la Vega, and Bartolomé de las Casas. Their narrative art, their literary relationships, and their legacies today. In Spanish.

SPAN 938a, Latin American Poetics. Fernando Rosenberg.

w 4–5.50

In this class we look at Latin American poetry with special attention to *modernismo* and *vanguardia*, inasmuch as these two movements set the tone for any further discussion of poetic modernity in Latin America. Problems of literary techniques are considered with regard to the creative incorporation of traditions and the pressure to innovate them. We read the poetic production of the continent as a field of discussion, with constant reference to their aesthetic position as an intellectual intervention. In Spanish.

SPAN 942b, Fiestas cubanas. Roberto González Echevarría.

w 2.30–4.20

A study of the fiestas marking the Cuban calendar from the nineteenth century to the present, how they respond to cultural and political transformations, and how they are inscribed in literature, particularly the narrative. The feast as the representation of time and social and political change. The work of anthropologists and theorists of literature such as Claude Lévi-Strauss, Marcel Mauss, Arnold van Gennep, and Mikhail Bakhtin, along with that of Latin American and Cuban anthropologists and writers such as Fernando Ortiz, Lidia Cabrera, José Arrom, Manuel Moreno Fraginals, Miguel Barnet, and Octavio Paz. Fiction by Cirilo Villaverde, Alejo Carpentier, José Lezama Lima, Severo Sarduy, Reinaldo Arenas, Daína Chaviano, and others. In Spanish. *Also CLPT 941b.*

SPAN 946b, Cosmopolitan Brazilian and Spanish American Writings: A Comparative Perspective. Lidia Santos.

th 4–5.50

This course focuses on new trends in contemporary Brazilian and Spanish American narrative, taking cosmopolitanism as a theoretical axis. Comparative readings of Fernando Vallejo and Paulo Lins, Jorge Volpi and Silviano Santiago, César Aira and Ferrez, among others. Readings in the original languages. In Portuguese or Spanish. *Also PORT 972b.*

SPAN 962a, The Bildungsroman in Latin American Literature. Josefina Ludmer.

th 2.30–4.20

A close reading of narratives dealing with rites of passage to adult life, with particular attention to the ways these reflect upon the construction of identities in Latin America. In Spanish.

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

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 417.

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, susan.jackson-mack@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.]

STAT 530b^U, Introductory Data Analysis. John Hartigan.

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. Hannes Leeb.

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, Andrew Barron.

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. Joseph Chang.

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 probability 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.

TTh 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. David Pollard.

HTBA

Martingales in discrete and continuous time, Brownian motion, sample path properties, predictable processes, stochastic integrals with respect to Brownian motion and semimartingales, stochastic differential equations. Applications mostly to counting processes and finance. Knowledge of measure-theoretic probability at the level of STAT 600b is a prerequisite for the course, although some key concepts, such as conditioning, are reviewed. After STAT 600b.

STAT 605a, Foundations of Statistics. John Hartigan.

This course investigates philosophical and historical issues in the foundations of statistics. The origins and evolution of probability. The Bayesian-frequentist dichotomy. Is decision theory necessary or useful? Is robustness possible? Are asymptotic results applicable? How are independence assumptions justified, and what to do if they are not? Puzzles and paradoxes. The likelihood and invariance principles. Fiducial inference. Practical probability.

STAT 607b, Inequalities for Probability and Statistics. David Pollard.

HTBA

A guided tour of some inequalities useful in statistical and probabilistic problems. The course is broken down into independent segments, each treating a specific method and an illustrative application. Acquaintance with probability at the 600 level is helpful for some segments. Possible topics: convexity arguments; tail bounds for martingales and independent summands; metric entropy and maximal inequalities; VC dimension and combinatorial methods; distances between probability measures; majorizing measures and generic chaining; isoperimetric inequalities; concentration inequalities; Gaussian processes. Applications to: statistical inference; asymptotic theory; minimax rates of convergence; machine learning; complexity.

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.

TTh 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 Hartigan, John Emerson.

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, John Hartigan.

Individual one-term projects, with students working on studies outside the department, under the guidance of a statistician.

STAT 627b, Statistical Consulting. John Emerson, John Hartigan.

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 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.

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 Emerson.

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. Edmund Yeh.

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.

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 674a^u, Analysis of Spatial and Time Series Data.]

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.

THE WHITNEY SEMINARS

Coordinator

Jeffrey Alexander (*Sociology*) (104 Urban Hall, 432.3320)

The Whitney Seminars, a series of graduate courses inaugurated in 2002–2003, are sponsored by the Whitney Humanities Center in association with various departments in the social sciences and humanities. Designed to speak across disciplinary lines and to broad public and intellectual issues, the format of the program includes both the weekly seminar and a series of coordinated public lectures on cultural performance as a new organizing concept in the social sciences and humanities. The lectures, open to the Yale and local community, follow the seminar meetings.

Seminar

WHIT 971b^u, Cultural Performances. The Whitney Seminar on New Perspectives in the Social Sciences and Humanities. Jeffrey Alexander.

w 3.30–5.20, Lect. w 7

“Performance” has become a major new topic in both the humanities and the social sciences, and provides a new bridge for interrelating the disciplines that compose them. Performance allows textual emphasis to be related to contingency and context, symbolic action to be related to power and control, and dramatic production to be related to audience response. In this seminar, we examine the critical texts of this movement and host, in person, some of its most prominent students and practitioners. *Also* SOCY 567b^u.

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*), Paul Gilroy (*Sociology; 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 School; 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 School*), 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*), Hala Nassar (*Near Eastern Languages & Civilizations*), Linda-Anne Rebhun (*Anthropology*), Naomi Rogers (*History of Medicine & Science; Women's, Gender & Sexuality Studies*), Lidia Santos (*Spanish & Portuguese*), Michael Trask (*English*), 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*), 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

Sarah Bilston (*Women's, Gender & Sexuality Studies*), Geetanjali Singh Chanda (*Women's, Gender & Sexuality Studies*), Seth Silberman (*Women's, Gender & Sexuality Studies; African American Studies*), Megan Sinnott (*Women's, Gender & Sexuality Studies; Visiting*), Rebecca Tannenbaum (*History*), Vron Ware (*Sociology; Women's, Gender & Sexuality Studies*)

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 School; 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*), Seth Silberman (*Women's, Gender & Sexuality Studies; African American 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 the Chair, Women's, Gender, and Sexuality Studies Program.

Courses

WGSS 613b, Theory and Method in the Study of Sex. Megan Sinnott.

Th 2–4

In this course sexuality is understood as a social, cultural, and historical phenomenon. An interdisciplinary approach to its study is used by exploring literature within the social sciences and humanities. Topics include the deconstruction of Western cultural paradigms of sexuality, the relationship between researcher and research subjects, and sexual ethics in fieldwork. Each week focuses on a particular discipline or theoretical approach to the study of sexuality. *Also ANTH 613b.*

WGSS 745b, Race, Gender, and the African American Experience. Averil Clark.

Th 9.30–11.20

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^U.*

WGSS 746a, American Queer Studies: Theorizing Race, Gender, Sexuality.

Seth Silberman.

M 1.30–3.20

Study of interdisciplinary methodologies shaping the field of lesbian/gay studies and its attendant queer theory. Focus on key works in the field's discourse and sociological studies. Authors include Boyarin, Butler, de Lauretis, Foucault, Harper, Martin, Mercer, Rubin, Sedgwick. *Also AFAM 753a, AMST 681a.*

WGSS 760b, Gender, Religion, and Globalization: Practices, Texts, and Contexts.

Serene Jones, 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 770b, Women Poets of Traditional China. Kang-i Sun Chang.

TTh 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^U.*

WGSS 780b^U, American Documentary Film and Photography. Charles Musser,
Laura Wexler.

T 3.30–5.20, screenings M 7 P.M.

Examination of a series of historical moments in which documentary plays a significant cultural role. Topics include the relationship between photographic and cinematic practices and theories generated by makers and critics; filmic constructions of gender, race, class, and national identity in the twentieth century; and changing conceptions of photographic truth. *Also AMST 812b^U, FILM 722b^U.*

WGSS 848b, African American Studies Graduate Research Seminar in Diasporic Cultural Studies. Hazel Carby.

F 10.30–12.20

This seminar is intended for second-term second-year students in a Ph.D. program who wish to undertake a research project and write a research paper. Enrollment is limited to six to eight graduate students. In order to be considered for the seminar each student needs to submit a two-page description of the intended project by Wednesday, January 5, 2005. Please include names and e-mail addresses. I will notify students of their acceptance before the first class. Prospective students who wish to talk to me about the seminar should do so at the end of the 2004 fall term. Those admitted to the course prepare a packet of readings. These essays (maximum 100 pages) should act as an introduction to your field of research. During the first three or four weeks of the term, two members of the seminar make a one-hour presentation and lead a discussion of their selection of essays each week. This presentation schedule is organized during the first class. Those who cannot make the first organizational meeting cannot take the seminar. After these presentations are completed, the seminar does not meet for the six weeks while the research is undertaken, but each student continues to meet with me individually. Toward the end of the term we all read each of the research papers and schedule a series of morning and afternoon meetings for presentations and discussions of the final research project. *Also AFAM 848b.*

Related Courses

AMST 429b, American Communities. Carrie Lane Chet.

AMST 673b, Theorizing “Black” and “Asian” Intersectionalities in the United States.
Diana Paulin, Sanda Lwin.

Also AFAM 722b, ENGL 942b.

ANTH 803b, Reproductive Ecology of Humans and Nonhuman Primates.
Richard Bribiescas.

LAW 21450, Equality, Citizenship, and Sovereignty: Comparative Perspectives.
Judith Resnik, Reva Siegel.

LING 546b^U, Language, Sex, and Gender. Laurence Horn.

PSYC 569a, Psychology's Contribution to Gender and Vice Versa.
Marianne LaFrance.

REL 758a, Trauma and Grace. Serene Jones.

Research Institutes

THE COWLES FOUNDATION

30 Hillhouse, 432.3702

Director

John Geanakoplos

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 another social science 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

Director

Ian Shapiro

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. 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.

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.

Additionally, it administers six undergraduate majors (African Studies; East Asian Studies; Ethnicity, Race, and Migration; International Studies; Latin American Studies; and European and Russian Studies), four graduate degree programs (African Studies; East Asian Studies; International Relations; and European and Russian Studies), and several joint-degree programs with the schools of Law, Management, Forestry & Environmental Studies, and the Department of Epidemiology and Public Health.

New for 2004–2005, YCIAS sponsors graduate certificates of concentration through its Councils on African, European, Latin American and Iberian, and Middle East 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 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 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 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 456–57. 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 406–7 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. This 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 pages 410–11.

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 the same as 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 434 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 \$1,675 of their tuition per term. Students enrolling for the summer only are charged \$838. 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 \$1,675 per term. Students enrolling for the summer only are charged \$838.

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

The Graduate School offers students interested in African American Studies, Classics, Film Studies, and Renaissance Studies an opportunity to 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 419).

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

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 Normale Supérieure, Paris, France; 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 425). 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 22–397 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 pages 411–12).

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 a one-page petition for extended registration, the standard dissertation progress report that is required annually of all students admitted to candidacy, and a continuous registration form (see page 411). 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 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 page 411). 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), \$268 per term in 2004–2005.

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 22–397. 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 22–397. 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 23. 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. PTAs 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 page 440).

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. Graduate 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 Eng-

lish. (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 the receipt of an external fellowship, 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 page 420. 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 22–397.

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 22–397.

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), Computer Science, East Asian Studies, Engineering and Applied Science, English, 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, Russian and East European Studies, Slavic Languages and Literatures, and Statistics.

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 22–397.

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). 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 above, pages 22–397.

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 and Russian Studies, International Relations, and International and Development Economics. These programs are described in the departmental statements on pages 245–53.

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 458–61). 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

Dissertations must be submitted to the Graduate School by October 3 for degrees to be considered at the fall meetings of the degree committees and by March 14 for consideration at May meetings of the degree committees. These deadlines have been established to allow sufficient time for readers to make careful evaluations and for departments to review those evaluations and make their recommendations to the Graduate School. No extensions of the deadlines will be granted. Dissertations submitted after the deadlines will be considered during the following term.

Students are advised to obtain the booklet entitled *Preparation and Submission of the Doctoral Dissertation* prior to preparing their dissertations. This booklet, available from the Graduate School Student Information Office (140 HGS), describes the formatting requirements for the dissertation and the processes for submission and approval. Candidates should obtain a Dissertation Submission Packet from the Graduate School Student Information Office prior to submitting their dissertations. This packet contains directions for submission and all required forms.

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 been awarded the Ph.D. or six years have elapsed since matriculation, whichever occurs 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.

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 425–27) 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 449).

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 page 412 (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 458–61. 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 458–61. 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

Marks of Credit/No Credit are assigned for History of Art students enrolled in History of Art courses.

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 458–61 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 458–61).

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 pages 442–43.

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 page 411 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), which in 2004–2005 is \$268 per term. 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 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. 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 granted 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 on pages 458–61). 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.

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 458–61. 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 448.

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 431–33.)
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, 2004 – 2005

*Tuition:**

Full-time study, per term	\$13,400
Full-time study in IDE, per term	13,900
Half-time study, per term	6,700
Master's programs, less than half time per term	
One-quarter time study, per term	3,350
Division of Special Registration (DSR, nondegree study)	
Course work, per course, per term (including audited courses)	3,350
Visiting Affiliated Research Graduate Students, per term	13,400
Visiting Assistants in Research, per term	1,675
Visiting Assistants in Research appointed for half-term or the summer only	838

Fees:†

Continuous Registration Fee (CRF), per term (see page 425)	\$268
Special in absentia registration, per term (see pages 424–25)	268
YHP Hospitalization/Specialty Coverage, twelve months‡	924
YHP Prescription Plus Coverage, twelve months	348

For fees relating to registration and course enrollment see page 422.

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 throughout the year based on individual family budget requirements. 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. The deadline for enrollment is June 18. 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 the first week of July, due and payable by August 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. The late charge will be imposed as follows:

<i>If fall-term payment in full is not received</i>		<i>Late charge</i>
by August 1		\$110
by September 1	an additional	110
by October 1	an additional	110
<i>If spring-term payment in full is not received</i>		<i>Late charge</i>
by December 1		\$110
by January 2	an additional	110
by February 1	an additional	110

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.

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 page 427) 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 447.

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 pages 442–43, 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 415).

To assist students in the completion of their studies, the Graduate School offers Summer Study Fellowships to eligible students in any two of the first five summers of study, and University Dissertation Fellowships 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. In 2004–2005, University Dissertation Fellowships will carry a stipend of \$17,000. 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). The levels of the 2004–2005 teaching fellowships were not available at the time of printing, but the 2003–2004 levels are listed as guidelines.

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 2003–2004 teaching fellowship was \$1,790 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 2003–2004 teaching fellowship was \$3,580 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 2003–2004 teaching fellowship was \$5,370 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 2003–2004 teaching fellowship was \$6,265 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 2003–2004 teaching fellowship was \$7,160 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 2003–2004 teaching fellowship was \$7,260 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.

During 2004–2005, 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 the 2004–2005 *Financial Information for Entering Graduate Students*. These documents are available from the financial aid office. 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 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.

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 for 2004–2005 and access the online application at the Web site listed above. The assignment process generally starts in mid- to late April after current returning residents are offered renewals. As the supply of housing is limited and not guaranteed, early application is recommended.

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, with an office at 155 Whitney Avenue, third floor, open from 8.30 A.M. to 3.30 P.M., Monday through Friday. Its listings may also 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. We are 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.

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, gynecology, mental health, pediatrics, pharmacy, laboratory, radiology, a twenty-three-bed inpatient care facility (ICF), a round-the-clock urgent care clinic, and such specialty services as allergy, dermatology, orthopedics, and a travel clinic. 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, 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 Hospitalization/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, 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

The University provides a large, central system for e-mail, Web page hosting, and other services for Yale College, the Graduate School, and selected professional schools. Yale's network offers a wide variety of local services through a campus-wide fiber-optic network, which is linked to both the worldwide Internet and the higher-performance Internet 2, specifically serving research universities. Services include Orbis, the University library's online catalogue; YaleInfo, a campus-wide Web-based information system that includes campus events, and Nexis, a database of newspapers and journal articles, as well as access to online training courses, Web courses, and various other services (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 residences, offices, and laboratories are equipped with Ethernet data outlets. Remote Access Services (www.yale.edu/ras), with offices at 221 Whitney Avenue, is the off-campus and roaming support center for the University.

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 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. Registered users can access network resources through wired or wireless connections. www.yale.edu/dno/wireless_pilot.htm.

Telecommunications

www.yale.edu/telecom/

The ITS Telecommunications Office at 221 Whitney Avenue provides voicemail, paging, facsimile, and answering services, in addition to a full range of telephone services. Toll calls require a toll authorization number (TAN), which can be arranged through the tele-

communications office as well as through departmental offices. Long-distance service for telephones on campus is through the University's private network, YALENET. 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. 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 programs, and orientation receptions for newly arrived graduate students and postdocs, 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 graduate students, postdocs, and visiting scholars can get connected with OISS by subscribing to one or both of the OISS e-mail lists. OISS-L is the electronic newsletter with important information for Yale's international community. YaleInternational E-Group is an interactive list through which over 1,000 international students and scholars keep each other informed about events in the area. Check the Web site for more information. To subscribe to either list, send a message to oiss@yale.edu.

Spouses and partners of international students and scholars will want to know about ISPY — International Spouses and Partners at Yale. Information about ISPY and other OISS programs can be found on the OISS Web site.

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., and may be reached at 203.432.2305 or oiss@yale.edu

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 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's staff and graduate fellows also provide special programs for international students throughout the year, including foreign language films, social events, outings, workshops on issues like domestic violence, safety, and tax preparation, and professional development seminars on writing, communicating with advisers, and dissertation preparation. The Center co-sponsors and partially funds the activities of several graduate student nationality groups and an international choral group. Incoming international students also are offered an informal buddy system called the "international host student program" which pairs them with current students for friendship and informal advising prior to and upon arrival. The Center provides an extensive weeklong orientation program for all new students, including several sessions for international students in cooperation with the Office of International Students and Scholars.

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

THE INTERNATIONAL CENTER OF NEW HAVEN

www.icnh.org

Established in 1949, the International Center of New Haven is a nonprofit community-based organization. The Center's programs are based on the idea that both the international community in Greater New Haven and the local community can benefit from each other. The Center is located at 442 Temple Street, and the office is open from 9 A.M. to 4.30 P.M., Monday through Friday. The work of the International Center is carried out by a small professional staff and by many volunteers in the community. The Center offers English as a Second Language (ESL) classes, in addition to a number of programs including the International Community Friendship Program, 'Round The World Women, and the International Classroom Project. The International House, a large Tudor mansion located at 406 Prospect Street in New Haven, is the venue of most of the International Center's activities and the home of fifteen students and scholars. Rooms are available for the academic year and summer. For more information on any of these programs, or on International House, telephone 203.432.6460, fax 203.432.6462, e-mail info@icnh.org, or visit www.icnh.org.

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); the Church of Christ in Yale University, an open and affirming member congregation of the United Church of Christ; 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 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 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 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. Kipphuth 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 Brooks-Dwyer Varsity Strength and Conditioning Center; 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 during the academic year and for a nominal fee during the summer term. Academic and summer memberships at reasonable fees are available for faculty, employees, postdoctoral and visiting fellows, and student spouses.

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. 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. 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, 203.737.2257; Web site, www.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 2004

Monday, August 23	New student orientation week begins.
Wednesday, August 25	SPEAK test for new international students in Ph.D. programs.
Thursday, August 26	Matriculation ceremony.
Friday, August 27	Registration and orientation in departments for all new students begins.
Tuesday, August 31	Registration for returning students begins. Orientation for all new teaching fellows.
Wednesday, September 1	Fall-term classes begin, 8.30 A.M.
Friday, September 3	Final day to pick up registration materials from academic departments.
Monday, September 6	Labor Day; classes meet.
Friday, September 10	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>personal leave of absence</i> effective on or before this date.
Wednesday, September 15	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 24	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>)
Friday, October 1	Final date for the faculty to submit grades to replace Temporary Incompletes (TIs) awarded during the 2003–2004 academic year.
Monday, October 4	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 22	<p>Midterm.</p> <p>Final day to add a fall-term course.</p> <p>Final day to withdraw from a fall-term course without a fee and without the course appearing on the transcript. <i>A fee of \$25 per course is assessed and a "W" is recorded on the transcript for courses dropped after this date. Please note: Courses may be dropped with the \$25 per-course fee through Friday, December 3.</i></p> <p>Final day to change enrollment in a fall-term course from Credit to Audit or from Audit to Credit without a fee. <i>A fee of \$25 per course is assessed for enrollment changes submitted after this date. Please note: Courses may be changed from Credit to Audit or from Audit to Credit through Friday, November 5.</i></p> <p>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></p>
Friday, October 29	Readers' reports are due for dissertations to be considered by the degree committees for award of the Ph.D. in December.
Friday, November 5	<p>Departmental recommendations are due for candidates for December degrees.</p> <p>Final day to change enrollment in a fall-term course from Credit to Audit or from Audit to Credit.</p>
Friday, November 12	Final day to withdraw a degree petition for degrees to be awarded in December.
Thursday, November 18	SPEAK test for international students in Ph.D. programs.
Friday, November 19	Fall recess begins, 5.20 P.M.
Monday, November 29	Classes resume, 8.30 A.M.
Friday, December 3	<p>Classes end, 5.20 P.M.</p> <p>Final day to withdraw from a fall-term course.</p>
Saturday, December 18	Fall term ends; winter recess begins.

SPRING TERM 2005

Monday, January 10	Registration and spring ID validation begin. Spring-term classes begin, 8.30 A.M.
Wednesday, January 12	Final grades for fall-term courses due.
Friday, January 14	Friday classes do not meet. Monday classes meet instead.
Monday, January 17	Martin Luther King, Jr. Day. Administrative offices closed. Classes do not meet.
Thursday, January 20	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, January 21	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>
Friday, February 4	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 4	Midterm. Spring recess begins, 5.20 P.M. Final day to add a spring-term course. Final day to withdraw from a spring-term course without a fee and without the course appearing on the transcript. <i>A fee of \$25 per course is assessed and a "W" is recorded on the transcript for courses dropped after this date. Please note: Courses may be dropped with the \$25 per-course fee through Monday, April 25.</i> Final day to change enrollment in a spring-term course from Credit to Audit or from Audit to Credit without a fee. <i>A fee of \$25 per course is assessed for enrollment changes submitted after this date. Please note: Courses may be changed from Credit to Audit or from Audit to Credit through Monday, March 28.</i>

	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>
Monday, March 14	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 21	Classes resume, 8.30 A.M.
Friday, March 25	Good Friday; classes meet.
Monday, March 28	Final day to change enrollment in a spring-term course from Credit to Audit <i>or</i> from Audit to Credit.
Friday, April 15	Readers' reports are due for dissertations to be considered by the degree committees for award of the Ph.D. in May.
Thursday, April 21	SPEAK test for international students in Ph.D. programs.
Friday, April 22	Departmental recommendations are due for candidates for May degrees.
Monday, April 25	Final day to withdraw from a spring-term course. Monday classes do not meet. Friday classes meet instead. Classes end, 5.20 P.M.
Friday, April 29	Final day to withdraw a degree petition for degrees to be awarded in May.
Monday, May 2	Final day to submit Dissertation Progress Reports and Petitions for Extended Registration.
Tuesday, May 10	Spring term ends.
Friday, May 13	Final grades for spring-term courses are due for candidates for M.A. and M.S. degrees to be awarded at Commencement.
Sunday, May 22	Graduate School Convocation.
Monday, May 23	University Commencement.
Monday, May 30	Final grades for spring-term courses and full-year courses are due.

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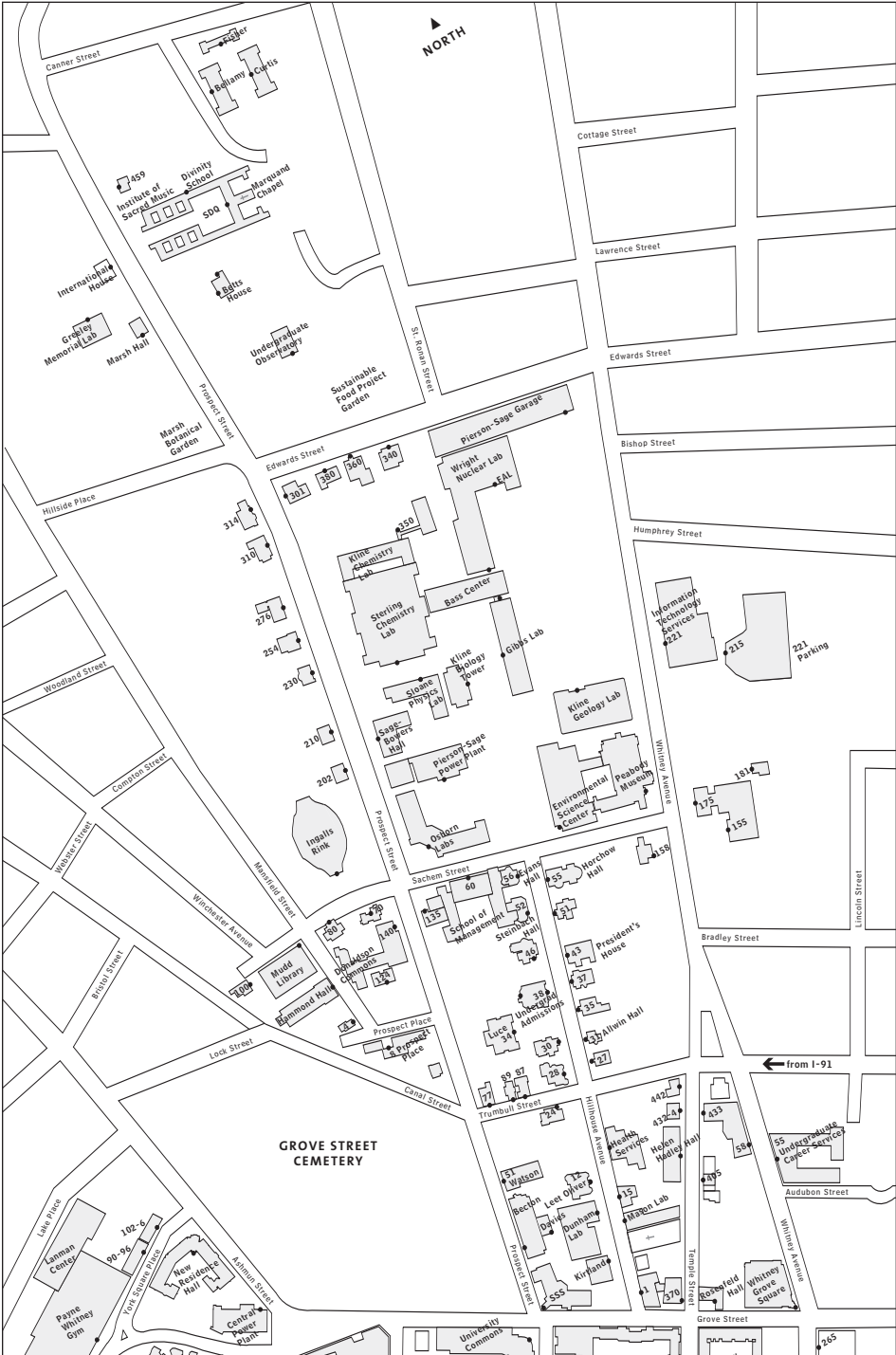
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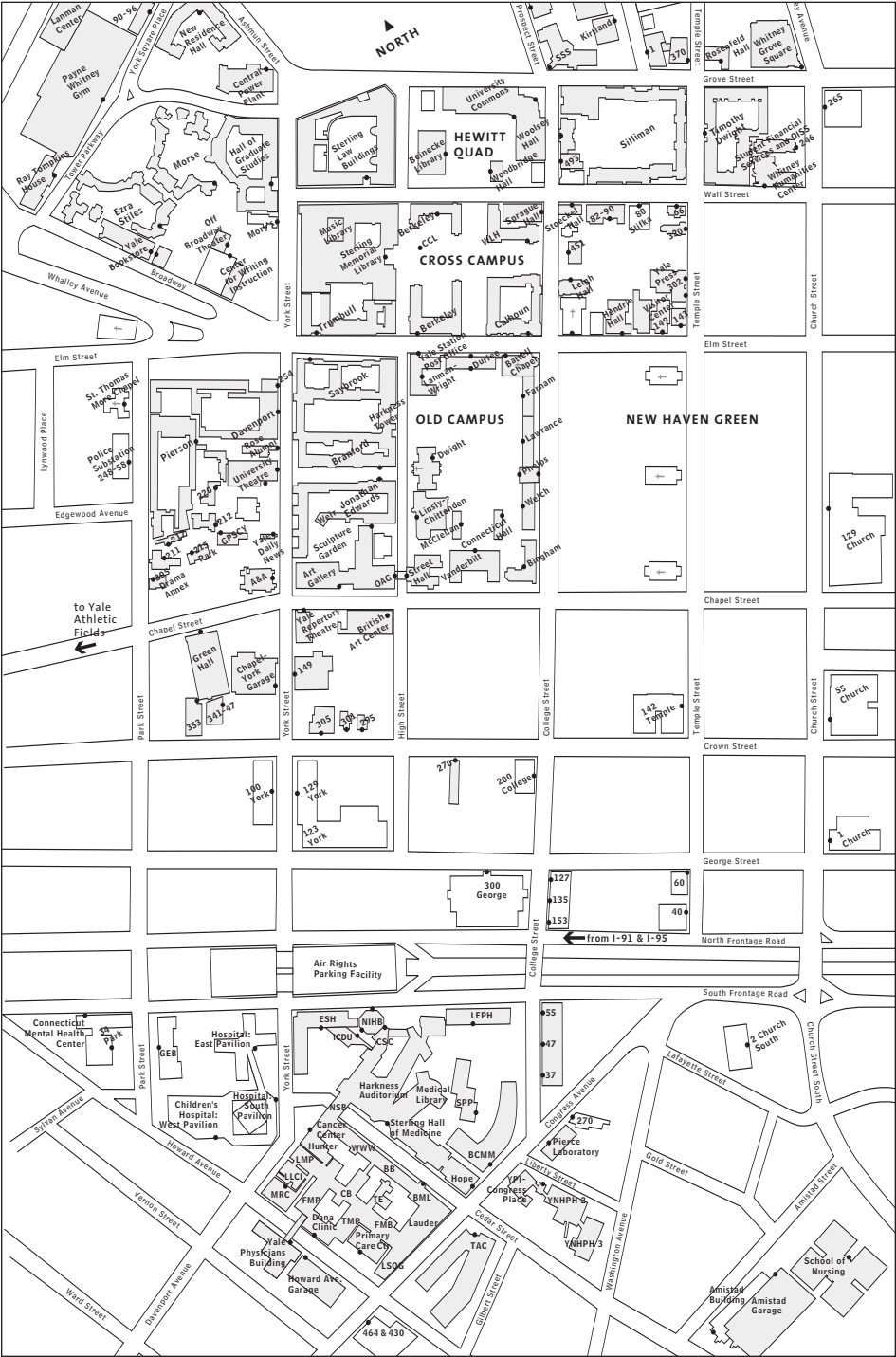
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YALE UNIVERSITY CAMPUS NORTH



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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 W. 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 111 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.)

INTERNATIONAL CENTER: 432.6460

442 Temple Street (An educational and social center serving all international students, faculty, and staff.)

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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