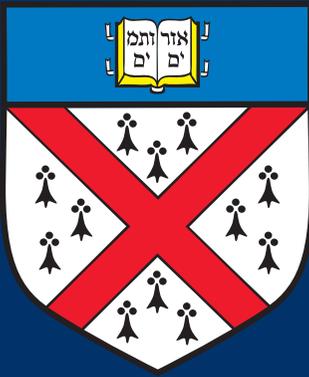


Yale College
Programs of Study
Fall and Spring Terms

2012–2013



BULLETIN OF YALE UNIVERSITY

Series 108 Number 9 August 1, 2012

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MISSION STATEMENT OF YALE COLLEGE The mission of Yale College is to seek exceptionally promising students of all backgrounds from across the nation and around the world and to educate them, through mental discipline and social experience, to develop their intellectual, moral, civic, and creative capacities to the fullest. The aim of this education is the cultivation of citizens with a rich awareness of our heritage to lead and serve in every sphere of human activity.

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Contents

Key to Course Listings	6
Building Abbreviations	8
Yale College Calendar with Pertinent Deadlines	9
Yale College Administrative Officers	12
Final Examination Schedules	14
Subject Abbreviations	15
A Message from the Dean of Yale College	16
I. Yale College	17
The Undergraduate Curriculum	17
Distributional Requirements	18
Major Programs	20
The Residential Colleges	22
International Experience	22
Yale Summer Session	25
Special Programs	25
Honors	29
Miscellaneous	30
II. Academic Regulations	31
A. Requirements for the B.A. or B.S. Degree	31
B. Grades	37
C. Course Credits and Course Loads	42
D. Promotion and Good Standing	43
E. Registration and Enrollment in Courses	44
F. Withdrawal from Courses	48
G. Reading Period and Final Examination Period	49
H. Completion of Course Work	51
I. Academic Penalties and Restrictions	55
J. Leave of Absence, Withdrawal, and Readmission	57
K. Special Arrangements	61
L. Transfer Students	72
M. Eli Whitney Students Program	73
N. Nondegree Students Program	76
O. Credit from Other Universities	78
P. Acceleration Policies	81
Q. Amendments	86
III. Subjects of Instruction	87
Majors in Yale College	87
Accounting	88
Aerospace Studies	88
African American Studies	89
African Studies	95
American Studies	102
Anthropology	111
Applied Mathematics	122

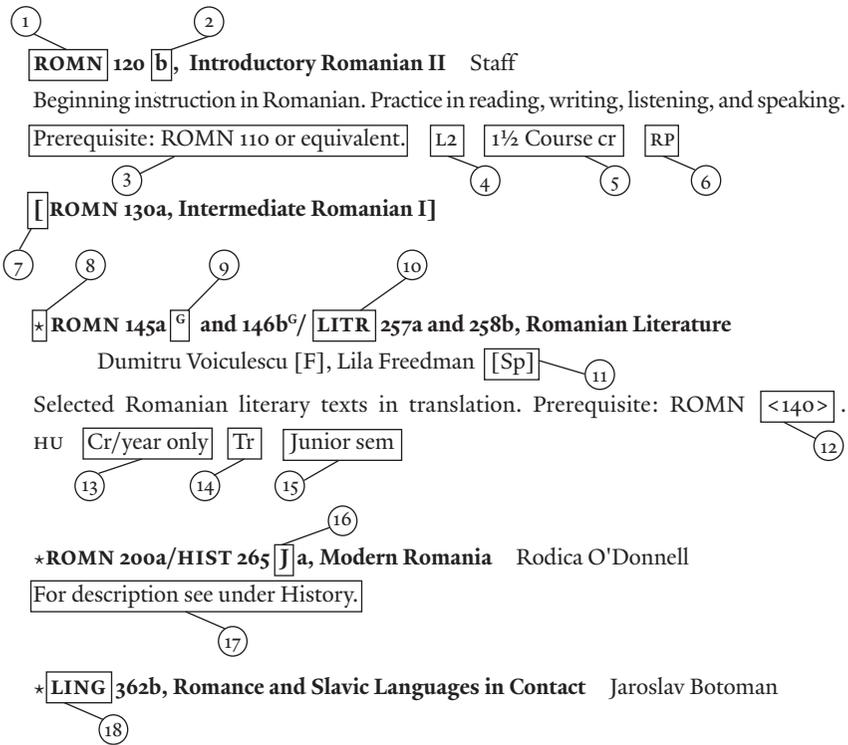
Subjects of Instruction (*cont.*)

Applied Physics	126
Archaeological Studies	130
Architecture	134
Art	140
Astronomy	149
Biology	154
Biomedical Engineering	155
British Studies	161
Chemical Engineering	162
Chemistry	166
Child Study Center	177
Classics	178
Cognitive Science	188
College Seminars in the Residential Colleges	192
Computer Science	193
Computer Science and Mathematics	200
Computer Science and Psychology	201
Computing and the Arts	202
DeVane Lecture Courses	204
Directed Studies	205
East Asian Languages and Literatures	206
East Asian Studies	216
Ecology and Evolutionary Biology	221
Economics	230
Economics and Mathematics	243
Education Studies	244
Electrical Engineering	245
Electrical Engineering and Computer Science	252
Engineering	254
Engineering and Applied Science	255
English Language and Literature	258
Environment	276
Environmental Engineering	276
Environmental Studies	279
Ethics, Politics, and Economics	287
Ethnicity, Race, and Migration	295
Film Studies	301
Forestry & Environmental Studies	309
French	310
Freshman Seminar Program	320
Geology and Geophysics	322
Germanic Languages and Literatures	332
German Studies	339
Global Affairs	344
Global Health Studies	350
Hellenic Studies	353
History	355

Subjects of Instruction (*cont.*)

History of Art	375
History of Science, Medicine, and Public Health	382
Humanities	387
Italian	396
Judaic Studies	401
Latin American Studies	406
Linguistics	411
Literature Major, The	418
Mathematics	430
Mathematics and Philosophy	439
Mathematics and Physics	440
Mechanical Engineering	440
Media Theory and History	446
Modern Middle East Studies	448
Molecular Biophysics and Biochemistry	453
Molecular, Cellular, and Developmental Biology	459
Music	473
Naval Science	483
Near Eastern Languages and Civilizations	485
Operations Research	495
Peking University–Yale University Joint Undergraduate Program	496
Philosophy	497
Physics	505
Physics and Philosophy	514
Political Science	515
Portuguese	532
Psychology	535
Public Health	545
Religious Studies	545
Russian and East European Studies	552
Science	556
Slavic Languages and Literatures	557
Sociology	564
South Asian Studies	572
Southeast Asia Studies	578
Spanish	580
Special Divisional Majors	587
Statistics	590
Study of the City	595
Theater Studies	595
Urban Studies	605
Women's, Gender, and Sexuality Studies	606
The Work of Yale University	614
Index	616
Map of Yale University	630

Key to Course Listings



1. Subjects are listed by three- or four-letter abbreviations in capitals. A list of subject abbreviations precedes chapter III.
2. Fall-term courses are indicated by the letter “a,” spring-term courses by the letter “b.” A course designated “a or b” (e.g., MATH 112a or b) is the same course given in both fall and spring terms.
3. Prerequisites and recommendations are listed at the end of the course description.
4. Foreign language courses are designated L1 (first term of language study), L2 (second term), L3 (third term), L4 (fourth term), or L5 (beyond the fourth term). Other distributional designations are QR, WR, HU, SC, and SO, representing quantitative reasoning, writing, humanities and arts, science, and social science, respectively. (See chapter I and section A of chapter II.)
5. The course earns the specified amount of course credit. Most courses earn one course credit per term; variations are noted.
6. Classes or other meetings are held during reading period. (See chapter II, section G.) If RP does not appear at the end of the course description, classes or other meetings are not held during reading period.

7. Courses in brackets are not offered during the current year but are expected to be given in the succeeding academic year.
8. A student must obtain the instructor's permission before taking a course marked by a star. All seminars are starred.
9. Open to both undergraduate and graduate students. Undergraduates electing these courses, unless already accepted into the Program for the Simultaneous Award of the Bachelor's and Master's Degrees, must enroll under the undergraduate number. (See chapter II, section K.)
10. A course with multiple titles, i.e., with two or more departments in the title line (such as ITAL 310/LITR 183), counts toward the major in each department where it appears. The course description appears under only one department. Students indicate on the course schedule which department should appear on their transcripts.
11. Instructors for fall and spring terms are indicated by the abbreviations "F" and "Sp."
12. A course number in angle brackets indicates a course that is not currently listed or bracketed but that has been offered within the past three years.
13. A student must complete the full year satisfactorily to receive credit. (See chapter II, section C.)
14. Literature course with readings in translation.
15. The abbreviations Junior sem, Senior sem, Fr sem, Amer, Core, Pre-1800, Pre-1900, and PreInd indicate Junior seminar, Senior seminar, Freshman seminar, American, Core course, Pre-1800 course, Pre-1900 course, and Preindustrial, respectively. Courses with these designations are applied toward the requirements of certain majors; descriptions of such requirements are included in program descriptions in chapter III.
16. A capital J or L following the course number denotes a History departmental seminar or a science laboratory, respectively.
17. "For description see under" refers the reader to the department in which full course information appears. The line is used when the location of the full listing is not apparent from the course abbreviation, as, for example, with a multiple-titled course.
18. Related courses appear in departments other than their own (e.g., ECON 159 is listed in Cognitive Science). Such courses may count toward the major of the relating department.

Changes in course information after May 2, 2012, as well as information regarding the required and recommended textbooks for courses in Yale College, appear on line at www.yale.edu/oci. The *Yale College Programs of Study* is also published on line at yalecollege.yale.edu/content/yale-college-programs-study. The YCPS Web site offers continually updated course listings, links to departmental Web sites, and links to other Yale online resources.

Building Abbreviations

AKW	Arthur K. Watson Hall	LFOP	Leitner Observatory and Planetarium
BASS	Bass Center for Molecular and Structural Biology	LGH	Abby and Mitch Leigh Hall
BASSLB	Bass Library	LOM	Leet Oliver Memorial Hall
BCMM	Boyer Center for Molecular Medicine	LORIA	Jeffrey Loria Center
BCT	Becton Engineering and Applied Science Center	LUCE	Henry R. Luce Hall
BK	Berkeley College	LWR	Lanman-Wright Memorial Hall
BM	Charles W. Bingham Hall	MC	Morse College
BML	Brady Memorial Laboratory	MEC	Malone Engineering Center
BR	Branford College	ML	Mason Laboratory
BRBL	Beinecke Rare Book and Manuscript Library	OML	Osborn Memorial Laboratories
C	Connecticut Hall	PC	Pierson College
CC	Calhoun College	PH	Phelps Hall
CRB	Class of 1954 Chemistry Research Building	PM	Peabody Museum of Natural History
CSC	Child Study Center	PWG	Payne Whitney Gymnasium
D	Durfee Hall	RDH	Rudolph Hall
DAVIES	Davies Auditorium, Becton Center	RKZ	Rosenkranz Hall
DC	Davenport College	SB	Sage Hall
DL	Dunham Laboratory	SCL	Sterling Chemistry Laboratory
EAL	Electron Accelerator Laboratory	SDQ	Sterling Divinity Quadrangle
EM	Edwin McClellan Hall	SHM	Sterling Hall of Medicine
ES	Ezra Stiles College	SLB	Sterling Law Building
ESC	Class of 1954 Environmental Science Center	SM	Silliman College
F	Farnam Hall	SMH	Sprague Memorial Hall
GML	Greeley Memorial Laboratory	SML	Sterling Memorial Library
GRN	Holcombe T. Green, Jr., Hall	SPL	Sloane Physics Laboratory
HEN	Hendrie Hall	SSS	Sheffield-Sterling-Strathcona Hall
HGS	Hall of Graduate Studies	ST	Street Hall
JE	Jonathan Edwards College	STOECK	Stoekel Hall
JWG	Josiah Willard Gibbs Research Laboratories	SY	Saybrook College
K	Kirtland Hall	TAC	The Anlyan Center
KBT	Kline Biology Tower	TC	Trumbull College
KCL	Kline Chemistry Laboratory	TD	Timothy Dwight College
KGL	Kline Geology Laboratory	UT	University Theatre
KRN	Kroon Hall	V	Vanderbilt Hall
L	Lawrance Hall	W	Welch Hall
LC	Linsly-Chittenden Hall	WLH	William L. Harkness Hall
LEPH	Laboratory of Epidemiology and Public Health	WNSL	Wright Laboratory
		WNSL-W	Wright Laboratory West
		YCBA	Yale Center for British Art
		YUAG	Yale University Art Gallery

Yale College Calendar with Pertinent Deadlines

This calendar includes a partial summary of deadlines given in chapters I and II, along with those in the Yale College online publication *Undergraduate Regulations*. Unless otherwise specified, references are to sections in chapter II of this bulletin, and deadlines fall at 5 p.m.

FALL TERM 2012

Aug. 22	W	Residences open to upperclassmen, 9 a.m.
Aug. 24	F	Residences open to freshmen, 9 a.m. Required registration meetings for freshmen, 8 p.m.
Aug. 28	T	Required registration meetings for upperclassmen.
Aug. 29	W	Fall-term classes begin, 8:20 a.m.
Aug. 31	F	Friday classes do not meet; Monday classes meet instead.
Sept. 3	M	Labor Day; classes do not meet.
Sept. 7	F	Final deadline to apply for a fall-term Leave of Absence (section J). Withdrawal from Yale College on or before this date entitles a student to a full rebate of fall-term tuition (<i>Undergraduate Regulations</i>).
Sept. 10	M	Course schedules due for the Class of 2016.*
Sept. 11	T	Course schedules due for the Classes of 2015 and 2014.*
Sept. 12	W	Course schedules due for the Class of 2013.* All students planning to complete degree requirements at the end of the fall term must file a petition by this date. (See section K for penalties resulting from failure to meet this deadline.)
Sept. 22	SA	Withdrawal from Yale College on or before this date entitles a student to a rebate of one-half of fall-term tuition (<i>Undergraduate Regulations</i>).
Oct. 15	M	Deadline to complete applications for financial aid for the 2013 spring term, for students not enrolled in the 2012 fall term (<i>Undergraduate Regulations</i>). Deadline to apply for a spring-term 2013 Term Abroad (section K).

*Late schedules from all classes are fined and may not include the Credit/D/Fail option. See chapter II, sections B and E.

Oct. 19	F	Midterm. Last day to withdraw from a fall-term course without the course appearing on the transcript (sections F and B). Deadline to apply for double credit in a single-credit course (section K). Withdrawal from Yale College on or before this date entitles a student to a rebate of one-quarter of the term's tuition (<i>Undergraduate Regulations</i>).
Oct. 23	T	October recess begins, 11 p.m.
Oct. 29	M	Classes resume, 8:20 a.m.
Nov. 9	F	Last day to convert from the Credit/D/Fail option in a fall-term course to a letter grade (section B).
Nov. 16	F	November recess begins, 5:30 p.m.
Nov. 26	M	Classes resume, 8:20 a.m.
Nov. 30	F	Last day to relinquish on-campus housing for the spring term without charge (<i>Undergraduate Regulations</i>).
Dec. 7	F	Classes end, 5:30 p.m.; reading period begins. Last day to withdraw from a fall-term course (sections F and B).
Dec. 12	W	Reading period ends. Deadline for all course assignments, including term papers. This deadline can be extended only by a Temporary Incomplete authorized by the student's residential college dean.
Dec. 13	TH	Final examinations begin, 9 a.m.†
Dec. 18	T	Examinations end, 5:30 p.m.; winter recess begins.
Dec. 19	W	Residences close, 12 noon.

SPRING TERM 2013

Jan. 9	W	Residences open, 9 a.m.
Jan. 13	SU	Required freshman registration meetings, 9 p.m.
Jan. 14	M	Spring-term classes begin, 8:20 a.m. Upperclassmen pick up registration materials by 5 p.m. in their residential college dean's office.
Jan. 18	F	Friday classes do not meet; Monday classes meet instead.
Jan. 21	M	Martin Luther King Jr. Day; classes do not meet.
Jan. 23	W	Course schedules due for the Class of 2016.* Final deadline to apply for a spring-term Leave of Absence (section J). Withdrawal from Yale College on or before this date entitles a student to a full rebate of spring-term tuition (<i>Undergraduate Regulations</i>).

Jan. 24	TH	Course schedules due for the Classes of 2015 and 2014.*
Jan. 25	F	Course schedules due for the Class of 2013.* Last day for students in the Class of 2013 to petition for permission to complete the requirements of two majors.
Feb. 7	TH	Withdrawal from Yale College on or before this date entitles a student to a rebate of one-half of spring-term tuition (<i>Undergraduate Regulations</i>).
Mar. 5	T	Deadline to apply for a fall-term 2013 Term Abroad or a 2013–2014 Year Abroad (section K).
Mar. 8	F	Midterm. Spring recess begins, 5:30 p.m. Last day to withdraw from a spring-term course without the course appearing on the transcript (sections F and B). Deadline to apply for double credit in a single-credit course (section K). Withdrawal from Yale College on or before this date entitles a student to a rebate of one-quarter of the term's tuition (<i>Undergraduate Regulations</i>).
Mar. 25	M	Classes resume, 8:20 a.m.
Apr. 5	F	Last day to convert from the Credit/D/Fail option in a spring-term course to a letter grade (section B).
Apr. 26	F	Classes end, 5:30 p.m.; reading period begins. Last day to withdraw from a spring-term course (sections F and B).
May 1	W	Reading period ends. Deadline for all course assignments, including term papers. This deadline can be extended only by a Temporary Incomplete authorized by the student's residential college dean. Applications for fall-term Leaves of Absence due (section J).
May 2	TH	Final examinations begin, 9 a.m.‡
May 7	T	Examinations end, 5:30 p.m.
May 8	W	Residences close for underclassmen, 12 noon.
May 13	M	Deadline to complete applications for financial aid for the fall and spring terms, 2013–2014 (<i>Undergraduate Regulations</i>).
May 20	M	University Commencement.
May 21	T	Residences close for seniors, 12 noon.

†Please note that examinations will be held on Saturday and Sunday, December 15 and 16, 2012.

*Late schedules from all classes are fined and may not include the Credit/D/Fail option. See chapter II, sections B and E.

‡Please note that examinations will be held on Saturday and Sunday, May 4 and 5, 2013.

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Final Examination Schedules

Rules governing the conduct of final examinations are given in section G of chapter II. (See “Reading Period” and “Final Examinations.”)

An examination group number is assigned to every course. Examination group assignments are based on course meeting times, according to the following scheme. Hours shown are the times at which courses begin:

- | | | | |
|------|----------------------------|------|-------------------------|
| (31) | M, W, or F, 8:20 a.m. | | |
| (32) | M, W, or F, 9 or 9:25 a.m. | (22) | T or TH, 9 or 9:25 a.m. |
| (33) | M, W, or F, 10:30 a.m. | (23) | T or TH, 10:30 a.m. |
| (34) | M, W, or F, 11:35 a.m. | (24) | T or TH, 11:35 a.m. |
| (36) | M, W, or F, 1 or 1:30 p.m. | (26) | T or TH, 1 or 1:30 p.m. |
| (37) | M, W, or F, after 2 p.m. | (27) | T or TH, after 2 p.m. |

Note With the exception of courses assigned to common examination groups, a change in class meeting time will alter the examination time.

Courses with multiple sections but a common examination are assigned to an examination group from (61) to (69). Typical assignments include (but are not limited to): (61) foreign languages; (63) introductory-level English; (64) introductory economics; (69) introductory mathematics.

The examination group (50) is assigned to courses whose times are published HTBA, or whose times belong to more than one of the groups listed above.

Courses in group (0) usually have no regular final examination, concluding instead with a term essay or other final exercise. Instructors of such courses may schedule a regular final examination based on the course starting time.

Final examination dates and times for 2012–2013 are:

2012		9 a.m.	2 p.m.	7 p.m.	2013		9 a.m.	2 p.m.	7 p.m.
Dec. 13	TH	(69)	(33)	(27)	May 2	TH	(69)	(34)	(37)
Dec. 14	F	(26)	(34)		May 3	F	(36)	(61)	
Dec. 15	S	(22)	(61)	(31)	May 4	S	(22)	(24)	(31)
Dec. 16	SU		(24)	(37)	May 5	SU		(32)	(27)
Dec. 17	M	(64)	(32)	(63)	May 6	M	(63)	(23)	(64)
Dec. 18	T	(36)	(23)		May 7	T	(26)	(33)	

A student who in a given term elects two courses with the same examination group number will be charged \$35 for a makeup examination. (See “Postponement of Final Examinations” in section H of chapter II.)

Subject Abbreviations

ACCT	Accounting	HNDI	Hindi
AFAM	African American Studies	HSAR	History of Art
AFST	African Studies	HSHM	History of Science, Medicine, and Public Health
AKKD	Akkadian	HUMS	Humanities
AMST	American Studies	INDN	Indonesian
AMTH	Applied Mathematics	ITAL	Italian
ANTH	Anthropology	JAPN	Japanese
APHY	Applied Physics	JDST	Judaic Studies
ARBC	Arabic	KREN	Korean
ARCG	Archaeological Studies	LAST	Latin American Studies
ARCH	Architecture	LATN	Latin
ART	Art	LING	Linguistics
ASTR	Astronomy	LITR	Literature
BENG	Biomedical Engineering	MATH	Mathematics
BIOL	Biology	MB&B	Molecular Biophysics and Biochemistry
BNGL	Bengali	MCDB	Molecular, Cellular, and Developmental Biology
BRST	British Studies	MENG	Mechanical Engineering
CENG	Chemical Engineering	MGRK	Modern Greek
CGSC	Cognitive Science	MMES	Modern Middle East Studies
CHEM	Chemistry	MUSI	Music
CHLD	Child Study Center	NAVY	Naval Science
CHNS	Chinese	NELC	Near Eastern Languages and Civilizations
CLCV	Classical Civilization	OPRS	Operations Research
CLSS	Classics	PERS	Persian
CPAR	Computing and the Arts	PHIL	Philosophy
CPSC	Computer Science	PHYS	Physics
CZEC	Czech	PLSC	Political Science
DEVN	DeVane Lecture Course	PLSH	Polish
DRST	Directed Studies	PORT	Portuguese
DUTC	Dutch	PSYC	Psychology
EALL	East Asian Languages and Literatures	RLST	Religious Studies
EAST	East Asian Studies	RSEE	Russian and East European Studies
ECON	Economics	RUSS	Russian
EDST	Education Studies	SAST	South Asian Studies
E&EB	Ecology and Evolutionary Biology	SCIE	Science
EENG	Electrical Engineering	SKRT	Sanskrit
EGYP	Egyptian	SLAV	Slavic Languages and Literatures
ENAS	Engineering and Applied Science	SOCY	Sociology
ENGL	English Language and Literature	SPAN	Spanish
ENVE	Environmental Engineering	SPEC	Special Divisional Major
EP&E	Ethics, Politics, and Economics	STAT	Statistics
ER&M	Ethnicity, Race, and Migration	STCY	Study of the City
EVST	Environmental Studies	SWAH	Kiswahili
F&ES	Forestry & Environmental Studies	TAML	Tamil
FILM	Film Studies	THST	Theater Studies
FREN	French	TKSH	Turkish
G&G	Geology and Geophysics	USAF	Aerospace Studies
GLBL	Global Affairs	VIET	Vietnamese
GMAN	Germanic Languages and Literatures	WGSS	Women's, Gender, and Sexuality Studies
GMST	German Studies	YORU	Yorùbá
GREK	Greek	YPKU	Yale–Peking University
HEBR	Hebrew	ZULU	isiZulu
HIST	History		
HLTH	Global Health Studies		

A Message from the Dean of Yale College

We officially call this book *Yale College Programs of Study*, but generations of students and faculty have known this volume simply as the Blue Book. A compendium of roughly 2,000 courses to be offered in Yale College in 2012–2013, the Blue Book is a book to use. Turn down pages you wish to return to; bend the spine so it opens to subjects you find yourself called to. Let this book be your key to the renowned faculty at Yale, through whose courses you will develop the intellectual knowledge, skills, and sense of citizenship that will serve you all the days of your lives.

Of course, a listing of individual courses does not constitute an education. To help shape that education, we offer you the counsel of faculty and deans and the guiding principles of our distributional requirements, but in the end we are counting on you to explore your old passions and new interests in ways that will lead you to become cultivated citizens of the world. Our expectation is that when you leave Yale, you will not only have acquired a trained mind, broadened knowledge, and a greater sense of citizenship; you also will have come to a deeper understanding of the continuing joy of disciplined learning.

We hope that perusing the pages of this bulletin will stir you to consider courses of study that you had never before imagined and lead you deeper into intellectual worlds you already have explored. This book represents the heart and soul of what the Yale faculty holds in promise for you. It comes to you with our best wishes for a successful year.

Mary Miller
Dean of Yale College
Sterling Professor of History of Art

I. YALE COLLEGE

Yale College, founded in 1701, is a coeducational undergraduate institution offering instruction in the liberal arts and sciences to about 5,200 students. The College is the oldest and the largest school of the University, which also comprises the Graduate School of Arts and Sciences and ten professional schools.

The Undergraduate Curriculum

Yale College offers a liberal arts education, one that aims to cultivate a broadly informed, highly disciplined intellect without specifying in advance how that intellect will be used. Such an approach to learning regards college as a phase of exploration, a place for the exercise of curiosity and an opportunity for the discovery of new interests and abilities. The College does not seek primarily to train students in the particulars of a given career, although some students may elect to receive more of that preparation than others. Instead, its main goal is to instill knowledge and skills that students can bring to bear in whatever work they eventually choose. This philosophy of education corresponds with that expressed in the Yale Report of 1828, which draws a distinction between “expanding [the mind’s] powers, and storing it with knowledge.” Acquiring facts is important, but learning how to think critically and creatively in a variety of ways takes precedence.

To ensure that study is neither too narrowly focused nor too diffuse, the College stands behind the principle of distribution of studies as strongly as it supports the principle of concentration. It requires that study be characterized, particularly in the earlier years, by a reasonable diversity of subject matter and approach, and in the later years by concentration in one of the major programs or departments. In addition, the College requires that all students take courses in certain foundational skills – writing, quantitative reasoning, and foreign language – that hold the key to opportunities in later study and later life. People who fail to develop these skills at an early stage unknowingly limit their futures. In each skill, students are required to travel some further distance from where they were in high school for the reason that these competences mature and deepen. The best high school writer is still not the writer he or she could be; students who do not use their mathematics or foreign language skills in college commonly lose abilities they once had, and can graduate knowing less than when they arrived.

In a time of increasing globalization, both academic study of the international world and firsthand experience of foreign cultures are crucial. No Yale College student can afford to remain ignorant of the forces that shape our world. Yale College urges all of its students to consider a summer, a term, or a year abroad sometime during their college careers.

A student working toward a bachelor’s degree takes four or five courses each term, and normally receives the B.A. or B.S. degree after completing thirty-six term courses or their equivalent in eight terms of enrollment. To balance structure with latitude, and to achieve a balance of breadth and depth, a candidate for the bachelor’s degree is required, in completing the thirty-six term courses, to fulfill the distributional requirements described in this bulletin as well as the requirements of a major program.

ADVISING

What students ultimately derive from four years at Yale depends in large measure on careful planning of a program of study. It would be imprudent for beginning students to map out a fixed schedule of courses for the next eight terms. Yet it is important that they think ahead, and make their plans while keeping in mind the principles outlined in this bulletin.

Yale College does not prescribe a program of study, believing that students who select their courses are inevitably more engaged in them—a first precondition for serious learning. As students shape their educational goals, they should seek informed advice. The best advising comes when students and faculty members develop relationships out of shared intellectual interests. For incoming students, who have not yet formed such relationships, Yale College furnishes a special constellation of advising revolving around the residential college dean. Representatives from academic departments, the Health Professions Advisory Board, Undergraduate Career Services, and the Center for International and Professional Experience offer presentations to freshmen during their first days at college. Incoming students also confer with individual faculty advisers, who can listen to students' interests, aims, and concerns and offer general guidance. Advisers do not mandate a particular set of courses, as the responsibility for choosing a program is the student's, but each student should make use of all the advice available in order to plan the most effective program.

Distributional Requirements

The distributional requirements, described below, are intended to assure that all graduates of Yale College have an acquaintance with a broad variety of fields of inquiry and approaches to knowledge. These requirements are the only specific rules limiting the selection of courses outside a student's major program. By themselves, the distributional requirements constitute a minimal education, not a complete one, and represent the least that an educated person should seek to know. They are to be embraced as starting points, not goals.

DISTRIBUTIONAL REQUIREMENTS FOR THE BACHELOR'S DEGREE

Students must fulfill disciplinary area requirements by taking no fewer than two course credits in the humanities and arts, two in the sciences, and two in the social sciences. Students must also fulfill skills requirements by taking at least two course credits in quantitative reasoning, two course credits in writing, and courses to further their foreign language proficiency. Depending on their level of accomplishment in foreign languages at matriculation, students may fulfill this last requirement with one, two, or three courses or by certain combinations of course work and approved study abroad.

Area requirement in the humanities and arts (two course credits) Study of the humanities and arts—those subjects that explore the broad range of human thought, expression, and endeavor—cultivates an educated recognition of the greatest accomplishments of the past and enriches the capacity to participate fully in the life of our time. Exploration of other civilizations, ancient and modern, gives students insight into the experiences of others and informs critical examination of their own culture. Those who create or perform works of

art experience firsthand the joy and discipline of artistic expression. By rigorously and systematically examining the value and purpose of all that surrounds them, students of the humanities and arts can acquire essential preparation for many different kinds of careers. But independently of any particular application, study of these subjects fosters understanding of, and delight in, the reach and sweep of the human spirit.

Area requirement in the sciences (two course credits) Acquiring a broad view of what science is, what it has achieved, and what it might continue to achieve is an essential component of a college education. Close study of a science develops critical faculties that educated citizens need. These include an ability to evaluate the opinions of experts, to distinguish special pleading and demagoguery from responsible science, and to realize which things are known and which unknown — which are knowable and which unknowable — to science. The theoretical inquiry, experimental analysis, and firsthand problem solving inseparable from studying a science give rise to new modes of thought. To know science is to appreciate a thousand intricacies in nature and the universe, which are hidden from casual observation but which, once revealed, lend richness to everyday life.

Area requirement in the social sciences (two course credits) Insights attained through the social sciences take on a critical significance at a time when the world's population is increasing rapidly and diverse cultures are coming into closer contact and sometimes into conflict. One major field of inquiry in the social sciences is international and area studies. Those who have been educated in the United States ought especially to acquire knowledge of cultures outside North America and western Europe, as well as broaden their understanding of the societies they know. Questions of class, gender, and identity are also central to work in the social sciences, whose methods test for connections between the familiar and the exotic, the traditional and the contemporary, the individual and the group, the predicted result and the anomalous outcome. Social science theories propose explanations for the entire range of human phenomena, from governments and economies to social organizations, communicative systems, cultural practices, and individual psychology.

Skills requirement in foreign language (at least one course, depending on preparation) The study of languages has long been one of the distinctive and defining features of a liberal arts education, and in the world of the twenty-first century, knowledge of more than one language is increasingly important. The benefits of language study include enhanced understanding of how languages work, often resulting in heightened sophistication in the use of one's own language; unmediated access to texts otherwise available only in translation, or not at all; and the ability to recognize and cross cultural barriers.

All Yale College students are required to engage in study of a foreign language, regardless of the level of proficiency at the time of matriculation. Depending on their preparation, students take one, two, or three terms of foreign language study to fulfill the distributional requirement. Students may complete an approved study abroad program in lieu of intermediate or advanced language study at Yale. Details of the foreign language distributional requirement are listed under "Distributional Requirements" in chapter II, section A.

Skills requirement in quantitative reasoning (two course credits) The mental rigor resulting from quantitative study has been celebrated since ancient times, and applications of quantitative methods have proven critical to many different disciplines. Mathematics and statistics are basic tools for the natural and the social sciences, and they have become

useful in many of the humanities as well. Information technology and the rigorous dissection of logical arguments in any discipline depend on algorithms and formal logical constructs. An educated person must be able to use quantitative information to make, understand, and evaluate arguments.

Many quantitative reasoning courses are taught through the departments of Mathematics, Statistics, and Computer Science. Such courses may also be found in Architecture; Astronomy; Chemistry; Economics; Engineering; Environmental Studies; Geology and Geophysics; Global Affairs; Linguistics; Molecular, Cellular, and Developmental Biology; Operations Research; Philosophy; Physics; and Psychology.

Skills requirement in writing (two course credits) The ability to write well is one of the hallmarks of a liberal education and is indispensable to advanced research in most disciplines. As students strengthen their writing skills, they develop intellectual practices that distinguish active from passive learners.

The English department in particular offers many courses that focus on writing clearly and cogently, and courses in other departments stress writing skills within the context of their disciplines. Over 150 courses, spanning approximately 40 different academic programs, give special attention to writing. Such courses, designated WR in this bulletin, do not necessarily require more writing than other courses; rather, they provide more help with writing assignments. Some characteristics of WR courses include writing to discover ideas, learning from model essays, detailed feedback, and reviewing writing in small groups. Note that credit toward the writing requirement cannot be earned in courses in creative writing (specifically poetry, fiction, and playwriting) nor in courses conducted in a language other than English.

Major Programs

All candidates for a bachelor's degree in Yale College must elect one of the major programs listed at the beginning of chapter III. The requirements for a major are described in general terms in the sections below, and in more detail preceding the course listings of each department or program in chapter III. Students plan a schedule of courses in their major in consultation with a representative of the department or program concerned, and must secure the consultant's written approval. Students should acquaint themselves fully with all the requirements of the major they plan to enter, considering not only the choice of courses in the current term but also the plan of their entire work in the last two or three years in college.

Students seeking the B.S. or the B.A. degree with a major in science are expected to declare their majors at the beginning of sophomore year, although a student who has completed the prerequisites may elect a science major later. Sophomores interested in majoring in science should have their schedules approved by the director of undergraduate studies or the adviser designated by the department. Students seeking the B.A. degree with a major in a field other than a science typically declare their major at the beginning of the junior year. In the sophomore year these students' schedules are signed by a sophomore adviser, chosen by the student, with whom the program has been discussed.

SELECTION OF A MAJOR

In designing a program of study, the student ought to plan for depth of concentration as well as breadth of scope. To study a subject in depth can be one of the most rewarding and energizing of human experiences, and can form the basis of the interests and occupations of a lifetime. Knowledge advances by specialization, and one can gain some of the excitement of discovery by pressing toward the outer limits of what is known in a particular field. Intense study of a seemingly narrow area of investigation may disclose ramifications and connections that alter perspectives on other subjects. Such study also sharpens judgment and acquaints a person with processes by which new truths can be found.

In order to gain exposure to this kind of experience, students must elect and complete a major, that is, the subject in which they will work more intensively than in any other. A list of the more than seventy possible majors in Yale College is given at the beginning of chapter III. The department or program concerned sets the requirements for each major, which are explained in chapter III.

Some students will have made a tentative choice of a major before entering college. Others will have settled on a general area—for example, the natural sciences or the humanities—without being certain of the specific department or program of their major. Still others will be completely undecided. Many students who arrive with their minds made up change them after a year or two. Even students who feel certain of their choices should keep open the possibility of a change. In selecting courses during their first two years, students should bear in mind not only the distributional requirements described above, but also the need for some exploration of the subjects to which they feel drawn.

THE MAJOR (B.A. OR B.S.)

A major program usually includes twelve term courses in the same area, progressing from introductory to advanced work, which become the focus of a student's program in the junior and senior years. Majors are offered by departments, interdepartmental programs, or interdisciplinary programs. In many departments and programs, a limited number of courses in related fields may be offered in fulfillment of the requirements for the major. Many majors have prerequisites of two or more term courses taken in the freshman and sophomore years.

In all majors, the student must satisfy a senior requirement, usually a senior essay, senior project, or senior departmental examination. In an intensive major, the student must fulfill additional requirements, such as taking a prescribed seminar, tutorial, or graduate course, or completing some other project in the senior year.

SPECIAL DIVISIONAL MAJORS

A Special Divisional Major affords an alternative for the student whose academic interests cannot be met within one of the existing major programs. Such students may, with the approval of the Committee on Honors and Academic Standing, design special majors of their own in consultation with members of the faculty and in accordance with the procedures outlined in chapter III. A Special Divisional Major may not be offered as one of two majors.

The Residential Colleges

The most conspicuous advantage of a university is that it presents students with a great breadth of learning and gives them access to scholars who are engaged not only in communicating knowledge but also in discovering it. But the potential disadvantages of a large university are that its size and complexity may discourage communication, and that teachers and students may become less of a challenge to each other. In such an event, the discovery of new knowledge suffers as much as do teaching and learning.

In order to mitigate such disadvantages as it grew from a small college into a modern research university, Yale established residential colleges. Initially made possible through gifts from Edward Stephen Harkness, B.A. 1897, the colleges are more than living quarters; they are small communities of men and women whose members know one another well and learn from one another. Each college has its own dining hall, library, common rooms, extracurricular activity spaces, and intramural athletic teams, and each college celebrates the progress of the academic year with various festivities, concerts, and dramatic presentations.

There are twelve colleges: Berkeley, Branford, Calhoun, Davenport, Timothy Dwight, Jonathan Edwards, Morse, Pierson, Saybrook, Silliman, Ezra Stiles, and Trumbull. At the head of each college is a resident master; and in each college a dean advises students on both academic and nonacademic matters. Associated with the master and the dean as fellows are about fifty additional members of the University drawn from different departments and schools. A few fellows reside in the college; others have offices there.

In the summer before arrival, each freshman is assigned to one of the twelve residential colleges. Most freshmen reside in a quadrangle known as the Old Campus. Whether freshmen live there or elsewhere on campus, they participate fully in the life of their residential college. All freshmen and sophomores are required to live on campus, and most juniors and seniors choose to do so. Whether they live on campus or off, students normally remain members of the same college throughout their undergraduate careers.

International Experience

While students can be introduced to the dynamics of a globalizing world through the course offerings at Yale, experience abroad is an invaluable complement to academic training. Such experience may include course work at foreign universities, intensive language training, directed research, independent projects, internships, laboratory work, and volunteer service. Yale College provides a variety of international opportunities during term time, summers, and post-graduation, as well as a large and growing number of fellowships to support students abroad.

Students may seek advice about summer or term-time study abroad and fellowship funding from the Center for International and Professional Experience, *cipe.yalecollege.yale.edu*. Summer courses abroad are offered by Yale Summer Session, *summer.yale.edu*, and by eligible outside programs through Summer Abroad, *www.yale.edu/yalecollege/international/opportunities/type/study/summer_abroad*. Advice about internships abroad is available

from Undergraduate Career Services, ucs.yalecollege.yale.edu. Students may search for all grants and fellowships at Yale that support international activities at studentgrants.yale.edu. Students on financial aid may be eligible for summer funding through the International Summer Award program, www.yale.edu/yalecollege/international/funding/isa.

YEAR OR TERM ABROAD

In recognition of the special value of formal study abroad, Yale College allows juniors and second-term sophomores to earn a full year or term of credit toward the bachelor's degree through the Year or Term Abroad program. Participation in the program provides students the opportunity to approach academic study through a different cultural perspective and, most significantly, to speak, write, and learn in a foreign language. Students apply to the Yale College Committee on the Year or Term Abroad for approval of a program of study abroad. The pertinent application procedures and regulations are listed in chapter II, section K. Additional information is available from the Center for International and Professional Experience, www.yale.edu/yalecollege/international.

YALE-IN-LONDON

The Yale-in-London program offers spring-term courses in British culture and society at the Paul Mellon Centre for Studies in British Art, located in central London. The program is open to undergraduates, carries full Yale course credit, and counts as a term of enrollment. Instruction is designed to take advantage of the cultural resources of London and its environs, with regular field trips (including overnight stays) to museums, historic houses, and other sites of interest. Accommodations are provided for students in shared apartments. Further information is available at britishart.yale.edu/education/yale-college-students/yale-in-london, or from the Yale-in-London office at the Yale Center for British Art, or by e-mail to yaleinlondon@yale.edu.

YALE-IN-LONDON SUMMER PROGRAM

Yale-in-London offers two overlapping summer sessions at the Paul Mellon Centre for Studies in British Art, each lasting six weeks. There are two courses in each session, with topics in history, history of art, architecture, literature, and drama. The courses are open to undergraduates and carry full Yale course credit, although enrollment in Yale-in-London summer session does not count as a term of enrollment in Yale College. Overnight field trips may be included. Accommodations are provided in University of London dormitories. Course descriptions and further information are available at britishart.yale.edu/education/yale-college-students/yale-in-london, or from the Yale-in-London office at the Yale Center for British Art, or by e-mail to yaleinlondon@yale.edu.

PEKING UNIVERSITY–YALE UNIVERSITY JOINT UNDERGRADUATE PROGRAM

Established in 2006, the Peking University–Yale University Joint Undergraduate Program in Beijing provides Yale students the unique opportunity to study and live with Chinese students on the Peking University campus. The program is open to Yale College sophomores,

juniors, and, in some cases, first-term seniors, and to Peking University Yuanpei College students. The program accepts students from all majors for the fall or spring term or for the academic year. A term at Peking University carries full Yale course credit and counts as a term of enrollment. No prior Chinese language knowledge is necessary for Yale participants, although each student is required to take a Chinese language course at the appropriate level while in the program. All other courses, in a variety of disciplines, are taught in English by Yale and Peking University faculty members. Students with advanced proficiency in Chinese may take courses offered in Chinese for Peking University students. Students from both universities live as roommates in a residence hall on the Peking University campus. Further information is available on the program's Web site at www.yale.edu/yalecollege/international/opportunities/type/study/pku-yale.

THE MACMILLAN CENTER

The Whitney and Betty MacMillan Center for International and Area Studies at Yale is the University's focal point for encouraging and coordinating teaching and research on international affairs and on societies and cultures around the world. It brings together scholars from relevant schools and departments to provide comparative and problem-oriented teaching and research on regional, international, and global issues. The MacMillan Center provides seven undergraduate majors, including six focused on world regions: African Studies, East Asian Studies, Latin American Studies, Modern Middle East Studies, Russian and East European Studies, and South Asian Studies. The seventh major, Global Affairs, concerns regions around the world. Language training is integral to each of the majors.

The MacMillan Center brings visiting scholars to Yale each year from a range of disciplines and countries; awards financial support to Yale students studying languages or traveling abroad; and sponsors lectures, conferences, workshops, symposia, films, and art events. The Center also produces *The MacMillan Report*, an Internet show that showcases Yale faculty in international and area studies, on the Web at www.yale.edu/macmillanreport. Further information about the MacMillan Center is available at www.yale.edu/macmillan.

JACKSON INSTITUTE FOR GLOBAL AFFAIRS

The Jackson Institute's mission is to institutionalize the teaching of global affairs throughout the University and to inspire and prepare Yale students for global citizenship and leadership. The Institute administers the undergraduate major in Global Affairs, a stand-alone major with tracks in international development and international security. In addition, the Institute offers a number of courses that are open to students in Yale College, including GLOBL 101, Gateway to Global Affairs.

Each year the Jackson Institute hosts a group of Senior Fellows, outstanding practitioners and experts in global affairs who teach courses and are available to consult with students on their career plans. The Jackson Institute's career services office specializes in helping students locate internships and career placement in areas of international affairs. For further information, consult jackson.yale.edu.

Yale Summer Session

Yale Summer Session offers courses in the humanities, social sciences, and sciences. Several summer courses, including language courses, are taught abroad. Courses in the Summer Session are in most cases similar to courses offered during the regular academic year, but in a more concentrated and intensive form. Yale College students may, if they wish, receive credit in Yale College for work successfully completed in Yale Summer Session. There are no auditing privileges in Yale Summer Session. Further information is available from the Yale Summer Session office or at summer.yale.edu.

Special Programs

DIRECTED STUDIES

Directed Studies is a selective freshman interdisciplinary program in Western civilization. Students in Directed Studies take three yearlong courses – Literature, Philosophy, and Historical and Political Thought – in which they read central works of the Western tradition.

One hundred twenty-five freshmen are admitted to the program each year. The Freshman Web site (yalecollege.yale.edu/content/directed-studies-ds) describes the program and explains the application procedure. Additional information is available at www.yale.edu/directedstudies.

PERSPECTIVES ON SCIENCE AND ENGINEERING

Perspectives on Science and Engineering is a lecture and discussion course designed to supplement the standard academic program of a selected group of freshmen who have unusually strong backgrounds in science and mathematics. It explores a broad range of topics and exposes students to questions at the frontiers of science. It also highlights the interdependence of the various fields of science and raises issues about the relation between science and society. Participants attend biweekly lectures by distinguished members of the Yale science faculty. In the intervening weeks, groups of students and faculty participants discuss the previous lecture.

Enrollment is limited to about sixty freshmen who, having applied, are selected on the basis of outstanding records in mathematics and natural science. The Freshman Web site (yalecollege.yale.edu/content/perspectives-science-and-engineering-pse) provides further information and explains the application procedure.

FRESHMAN SEMINAR PROGRAM

The Freshman Seminar program offers first-year students the opportunity to enroll in small classes with some of Yale's most eminent faculty members. Roughly forty freshman seminars across a wide range of subjects are offered every year, in both fall and spring terms. Some seminars provide an introduction to a particular field of study; others take an interdisciplinary approach to a variety of topics. Whatever the subject and method of instruction, all seminars are designed with freshmen in mind and provide a context for developing relationships with faculty members and peers.

Current seminar offerings are listed in chapter III. A description of the program and application procedures can be viewed at yalecollege.yale.edu/content/freshman-seminar-program-2.

RESIDENTIAL COLLEGE SEMINARS

The Residential College Seminar program, instituted in 1968, is devoted to the development within the residential colleges of innovative courses that fall outside departmental structures. Courses arise through the joint initiative of students and members of the faculty who are fellows of the residential colleges. The instructors for the seminar program are drawn from the University community and from the region, including individuals outside academic life such as writers, artists, participants in government and the public sector, and experts from the arts and the media. The college seminar program encourages innovation and experimentation, but all courses in the program must satisfy standard requirements for academic credit in Yale College and must be approved by the relevant faculty committees that oversee the curriculum.

Each residential college sponsors at least one seminar each term. Additional seminars are occasionally sponsored directly by the program and are equally open to students from all residential colleges. Descriptions of the seminars are found at yalecollege.yale.edu/content/residential-college-seminar-program.

THE DEVANE LECTURES

The DeVane Lectures are special series of lectures that are open to the general public as well as to students and to other members of the Yale community. They were established in 1969 in honor of William Clyde DeVane, Dean of Yale College from 1939 to 1963. The next set of DeVane Lectures will be offered in spring 2013 by David Bromwich, Sterling Professor of English, and will be entitled “Style, Purpose, and Persuasion in Literature.” Details of the course are listed in chapter III. Supplementary meetings are held for students taking the lectures for credit.

RESERVE OFFICERS TRAINING CORPS (ROTC)

Yale hosts both Naval and Air Force ROTC units, which offer qualified Yale College students an opportunity to pursue their regular Yale degrees while also preparing for leadership positions in the United States Air Force, Navy, or Marine Corps. Regardless of financial need, participating students may receive significant help in meeting the costs of a Yale education. Further information about the Air Force ROTC program can be found on the Web at yalecollege.yale.edu/content/air-force-rotc-yale or under Aerospace Studies in chapter III of this bulletin. Further information about the Naval ROTC program (including the Marine Corps program) can be found on the Web at nrotc.yalecollege.yale.edu or under Naval Science in chapter III of this bulletin.

FRANCIS WRITER-IN-RESIDENCE

The Francis Writer-in-Residence in Yale College is a distinguished writer of nonfiction who teaches either one or two term courses each academic year. He or she is actively engaged with undergraduate life and serves as an academic mentor through seminars,

readings, meetings with students, and other activities. The Francis Writer-in-Residence for 2012–2013 is Anne Fadiman.

ROSENKRANZ WRITER-IN-RESIDENCE

The Rosenkranz Writer-in-Residence in Yale College is a distinguished professional writer, chosen from fiction writers, playwrights, critics, journalists, screenwriters, essayists, poets, and social commentators. Both as a fellow of a residential college and as an instructor of one or two courses in each academic year, the Rosenkranz Writer-in-Residence meets formally and informally with students through classes and through readings and extracurricular activities. The Rosenkranz Writer-in-Residence for 2012–2013 is Louise Glück.

YALE JOURNALISM INITIATIVE

The Yale Journalism Initiative brings a distinguished writer to campus each term to teach an advanced journalism seminar, ENGL 467. Students who complete the seminar may apply to become Yale Journalism Scholars, a distinction that provides access to summer support for internships, career counseling with a journalism specialist in the Writing Center, and invitations to meet professional journalists at events both on and off campus. The visiting journalists for 2012–2013 are Steven Brill (fall 2012) and Mark Schoofs (spring 2013). For more information on the initiative or on becoming a Journalism Scholar, see writing.yalecollege.yale.edu/yale-journalism-initiative.

CENTER FOR LANGUAGE STUDY

The Center for Language Study (CLS), located at 370 Temple St., provides resources for students of foreign languages, as well as courses and support for nonnative speakers of English through its Office of English Language Programs. For undergraduates enrolled in a foreign language course, the CLS offers peer tutoring in the target language. For students in Yale College and in the graduate and professional schools, the CLS offers specialized language programs such as Directed Independent Language Study (DILS) for the study of languages not taught at Yale, and the Fields program for discipline-specific and advanced language study. For professional school students, the CLS offers courses in language for special purposes, such as Spanish or Chinese for medical professionals. All language learners at Yale have access to CLS facilities, including its study rooms and multimedia labs. For more information, including hours, a list of resources, and information about Yale's foreign language requirement and placement testing, see cls.yale.edu.

EXPOSITORY WRITING

The Yale College Writing Center supports a range of courses and tutoring services to help undergraduates improve their writing. The English department offers several courses specifically designed to prepare students for writing throughout the University, and other departments in the humanities, social sciences, and sciences complement this offering with courses (designated WR in chapter III of this bulletin) that give special attention to the conventions and expectations of writing in particular disciplines.

Beyond the regular departmental offerings, the Writing Center provides several ways for students to get help with writing. The most important of these is the presence of a Writing Tutor in each residential college. Tutors meet with students on a one-to-one basis to discuss rough drafts of work in progress, research techniques, revision strategies, or other matters relevant to effective writing. Tutors can help with any writing project: senior essays, course papers, graduate school and fellowship applications, or anything intended for publication. The Writing Partners, another resource, are undergraduate and graduate students who offer drop-in help to students at any stage of writing. Finally, the Writing Center Web site offers information on using sources effectively and avoiding plagiarism.

The Yale College Writing Center is maintained through the continuing support of the Bass family, the Newhouse Foundation, and other foundations. Its mission is to encourage excellence in writing and the use of writing for learning throughout the College. More detailed information is available from the Writing Center Web site at writing.yalecollege.yale.edu.

SCIENCE AND QUANTITATIVE REASONING

The Yale College Science and Quantitative Reasoning Center oversees programs for the enrichment of education in the sciences and quantitative disciplines. In addition to supporting faculty in the enhancement of teaching, the Center provides tutoring services and programs that enable students to participate in faculty-mentored research and engineering projects.

The Residential College Math and Science Tutoring program offers tutoring in the residential colleges to all Yale College students. Tutoring is available at scheduled times and on a walk-in basis, and is provided in all areas of math and science as well as in economics. Information about tutoring can be found at each residential college dean's office and on the Residential College Math and Science Tutoring Web site at science.yalecollege.yale.edu/residential-college-math-science.

To assist students who require more personalized or longer-term support than can be provided by the Residential College Math and Science Tutoring program, the Science and Quantitative Reasoning Center also administers a Science and QR Tutoring program. This program provides individual tutoring to undergraduates in the full range of science and quantitative disciplines, including economics. Any student enrolled in Yale College who is experiencing academic difficulty in a course, as confirmed by the instructor, is eligible for up to ten hours of tutoring per course each term free of charge. Further information is available at each residential college dean's office, at the Science and Quantitative Reasoning Center, and at science.yalecollege.yale.edu/science-quantitative-reasoning-1.

RESOURCE OFFICE ON DISABILITIES

To ensure that all students have an equal opportunity to make the most of their Yale education, the Resource Office on Disabilities facilitates individual accommodations for students with disabilities, and works to remove physical and attitudinal barriers to their full participation in the University community. The Office provides technical assistance, information, and disability awareness training to any member of the Yale community.

Current and prospective students with disabilities are encouraged to contact the Resource Office on Disabilities in person at 35 Broadway (rear entrance), room 222, or by mail at Resource Office on Disabilities, Yale University, P.O. Box 208305, New Haven, CT

06520-8305. Voice callers may reach staff at 432-2324 or 432-2325. Further information is available on the Web at yalecollege.yale.edu/content/resource-office-disabilities.

SIMULTANEOUS AWARD OF THE BACHELOR'S AND MASTER'S DEGREES

Yale College students with appropriate qualifications may enroll in courses in the Graduate School of Arts and Sciences. Such enrollment requires permission of the course's instructor and of the director of graduate studies of the department in which the course is offered.

A limited number of students of demonstrated ability may undertake graduate work that will qualify them for the simultaneous award of the bachelor's and master's degrees at the end of their senior year. Students apply to this program through their director of undergraduate studies. Details of the requirements are listed in chapter II, section K.

COMBINED BACHELOR'S AND MASTER'S DEGREE PROGRAMS IN THE PROFESSIONAL SCHOOLS

Well-qualified students may be able to structure their undergraduate programs so as to become eligible for a master's degree in Public Health, Forestry & Environmental Studies, or Music after one additional year of graduate study at Yale. For more information see under the respective headings in chapter III.

ELI WHITNEY STUDENTS PROGRAM

The Eli Whitney Students program is designed for individuals with high academic potential who cannot regularly enroll for full-time study, but who seek to obtain a bachelor of arts or bachelor of science degree from Yale College. The program enrolls a small number of students who have demonstrated leadership and maturity and who enrich Yale College through their life experience, sense of purpose, and character.

A minimum of eighteen course credits from Yale as a matriculated student is required, and the degree must be completed within seven years. The program is described more fully in chapter II, section M. Additional information is available at admissions.yale.edu/eli-whitney.

Honors

GENERAL HONORS

The bachelor's degree *cum laude*, *magna cum laude*, or *summa cum laude* is awarded at graduation on the basis of a student's general performance in courses taken at Yale. At Commencement, General Honors are awarded to no more than 30 percent of the class. The bachelor's degree is awarded *summa cum laude* to no more than the top 5 percent of the graduating class, *magna cum laude* to no more than the next 10 percent of the graduating class, *cum laude* to no more than the next 15 percent of the graduating class. Eligibility for General Honors is based on the grade point average (GPA) earned in courses taken only at Yale, with letter grades carrying the following values:

A	4.00	B–	2.67	D+	1.33
A–	3.67	C+	2.33	D	1.00
B+	3.33	C	2.00	D–	0.67
B	3.00	C–	1.67	F	0.00

Marks of CR in courses taken on a Credit/D/Fail basis are not included in the calculation of grade point averages. Marks of W, for Withdrawal, carry no course credit, and do not figure in a grade point average.

DISTINCTION IN THE MAJOR

Distinction in the Major is conferred at graduation on any senior who, on nomination by the student's department or program, and with the concurrence of the Committee on Honors and Academic Standing, merits such an award for the quality of work completed in the major subject.

Distinction is awarded to students who have earned grades of A or A– in three-quarters of the credits in the major subject or program and who have earned a grade of A or A– on the senior departmental examination, senior essay, or senior project. All courses taken for the major are included in these calculations for Distinction in the Major. Grades of F and marks of CR in courses taken Credit/D/Fail are included as non-A grades. Marks of W, for Withdrawal, carry no course credit, and do not figure in the calculation for Distinction.

PHI BETA KAPPA

Election to Phi Beta Kappa is based on the percentage of grades of A earned at Yale. The grade point average (GPA) is not a factor. Marks of CR in courses taken Credit/D/Fail are counted as non-A grades. Marks of W, for Withdrawal, carry no course credit, and do not figure in the calculation for Phi Beta Kappa. Grades earned outside Yale, including those earned during study abroad other than at Yale-in-London or the Peking University–Yale University Joint Undergraduate Program, are also not included in the calculation. Further information about the criteria for election and about the Yale chapter can be found at www.yale.edu/pbk/home.

PRIZES

For a list of the numerous prizes open annually to students in Yale College, consult www.yale.edu/secretary/prizes.

Miscellaneous

Expenses and expected patterns of payment are described in the *Undergraduate Regulations*, published by the Yale College Dean's Office on the Web at yalecollege.yale.edu/content/undergraduate-regulations. The *Undergraduate Regulations* also provides details of student coverage in the Yale Health medical plan. Information about programs designed to assist families in financing a Yale education is included in the Yale College Viewbook, available from the Office of Undergraduate Admissions, Yale University, P.O. Box 208234, New Haven, CT 06520-8234, and on the Web at admissions.yale.edu/financial-aid.

II. ACADEMIC REGULATIONS

As a condition of enrollment in Yale College, every student is required to comply with the academic regulations. Students are expected to familiarize themselves with these regulations, and an assertion of ignorance of their provisions cannot be accepted as a basis for an exception to them. No student or group of students should expect to be warned individually to conform to any of the regulations contained in this publication. Students are advised to pay special attention to all deadlines given in the academic regulations. Students who have questions or concerns about these regulations should consult with their residential college dean.

A. Requirements for the B.A. or B.S. Degree

To qualify for the bachelor's degree, B.A. or B.S., a student must successfully complete thirty-six term courses in Yale College or their equivalent. In doing so, the student must fulfill the distributional requirements of Yale College and the requirements of a major program. A student may normally complete no more than eight terms of enrollment in order to fulfill these requirements. Students enrolled in the Eli Whitney Students program should consult section M, "Eli Whitney Students Program."

Students who have already earned a bachelor's degree, at Yale or at another institution, are not eligible for degree enrollment in Yale College.

DISTRIBUTIONAL REQUIREMENTS

All students in Yale College must fulfill distributional requirements in order to qualify for the bachelor's degree. For a general introduction to the distributional requirements and a definition of the disciplinary areas and skills categories, refer to chapter I.

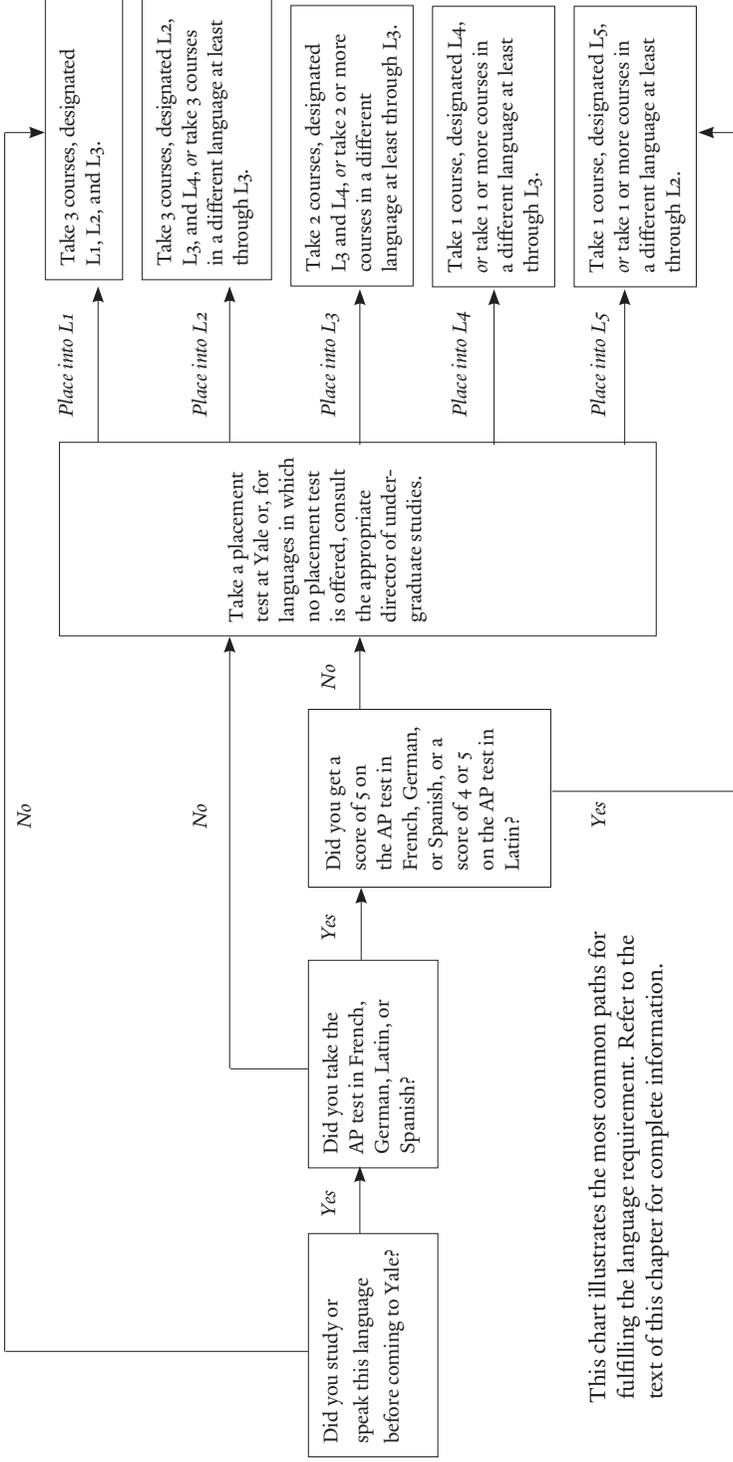
1. **Distributional requirements for the freshman, sophomore, and junior years** Students must partially fulfill the distributional requirements during the freshman, sophomore, and junior years in order to be eligible for promotion.

Distributional requirements for the freshman year: Students must have enrolled for at least one course credit in two skills categories by the end of the second term of enrollment in order to be eligible for promotion to sophomore standing. They may elect no more than four course credits in a single department, and no more than six course credits in a single disciplinary area, except that a student taking a laboratory course may elect as many as seven course credits in the sciences.

Distributional requirements for the sophomore year: Students must have enrolled for at least one course credit in each of the three disciplinary areas and for at least one course credit in each of the three skills categories by the end of the fourth term of enrollment in order to be eligible for promotion to junior standing.

Distributional requirements for the junior year: Students must have completed all of their skills requirements by the end of the sixth term of enrollment in order to be eligible for promotion to senior standing.

COMMON PATHS TOWARD FULFILLMENT OF THE LANGUAGE REQUIREMENT



This chart illustrates the most common paths for fulfilling the language requirement. Refer to the text of this chapter for complete information.

2. **Multiple distributional designations** Although some courses may carry more than one distributional designation, a single course may be applied to only one distributional requirement. For example, if a course is designated both HU and SO in chapter III of this bulletin, it may be applied toward either the humanities and arts requirement or the social science requirement, but not both. Similarly, if a course is designated QR and SC, it may be applied toward either the quantitative reasoning requirement or the science requirement, but not both.

A course with multiple distributional designations, once applied toward one distributional requirement, may subsequently be applied toward a different distributional requirement. During the summer after each academic year, the Registrar's Office optimizes the use of each student's completed courses toward fulfillment of the distributional requirements.

3. **Foreign language distributional requirement** All students are required to engage in the study of a foreign language while enrolled in Yale College. The most common paths to fulfillment of the foreign language distributional requirement are illustrated in the chart on the previous page.

Students who matriculate at Yale with no previous foreign language training must complete three terms of instruction in a single foreign language. This requirement is fulfilled by the completion of courses designated L1, L2, and L3 in chapter III of this bulletin. Students who have taken the Advanced Placement examination in French, German, or Spanish and who present scores of 5, or who have taken the Advanced Placement examination in Latin and who present scores of 4 or 5, are recognized as having completed the intermediate level of study. Scores of 6 or 7 on the International Baccalaureate Advanced-Level examination are also accepted as evidence of intermediate-level accomplishment. Students at this level fulfill the language distributional requirement by completing one course designated L5 in chapter III of this bulletin. Alternatively, they may successfully complete one or more courses in a different foreign language at least through the level designated L2.

Students who have studied a foreign language before matriculating at Yale but who have not achieved a score of 5 on the Advanced Placement test in French, German, or Spanish, or a score of 4 or 5 on the Advanced Placement test in Latin, must take a placement test offered by the appropriate language department or, for languages in which no departmental placement test is offered, consult the appropriate director of undergraduate studies. Dates and times of placement tests are given in the *Calendar for the Opening Days of College* and on the Web at cls.yale.edu. The departmental test determines whether students place into the first, second, third, or fourth term of language study (courses designated L1, L2, L3, or L4 in chapter III of this bulletin), or whether they qualify for language courses beyond the fourth term of study (L5).

Students who place into the first term of a foreign language must successfully complete three courses in that language, designated L1, L2, and L3 in chapter III of this bulletin.

Students who matriculate at Yale able to place into the second term of a foreign language must successfully complete three courses in that language, designated L2, L3, and L4 in chapter III of this bulletin. Alternatively, they may successfully complete three courses in a different foreign language at least through the level designated L3.

Students who matriculate at Yale able to place into the third term of a foreign language must successfully complete two courses in that language, designated L₃ and L₄ in chapter III of this bulletin. Alternatively, they may successfully complete two or more courses in a different foreign language at least through the level designated L₃.

Students who matriculate at Yale able to place into the fourth term of a foreign language must successfully complete one course in that language, designated L₄ in chapter III of this bulletin. Alternatively, they may successfully complete one or more courses in a different foreign language at least through the level designated L₃.

Students who matriculate at Yale able to place into the fifth term of a foreign language must successfully complete one course in that language, designated L₅ in chapter III of this bulletin. Alternatively, they may successfully complete one or more courses in a different foreign language at least through the level designated L₂.

Students whose secondary school transcript shows that the language of instruction was other than English may fulfill the foreign language requirement by successfully completing ENGL 114, 120, or 450. Alternatively, students in this category may fulfill the requirement by successfully completing one or more courses in a third language, neither English nor the language of their secondary school instruction, at least through the level designated L₂.

In order to promote firsthand experience in foreign cultures and the learning of language in real-world settings, students are permitted to apply toward the satisfaction of the foreign language requirement the completion of an approved study abroad program in a foreign-language-speaking setting if they have first completed or placed out of a language course designated L₂ in chapter III. Students seeking to undertake study at another institution or program for this purpose must consult the relevant director of undergraduate studies in advance of their proposed study for advice about appropriate programs and courses, and for information about the approval process. (See section O, “Credit from Other Universities.”) Study abroad may be used in place of L₁ and L₂ courses only if it is part of a Yale College program, such as Yale Summer Session or the Peking University–Yale University Joint Undergraduate Program. Study abroad opportunities are described in chapter I under the heading “International Experience.”

Intensive language courses provide the equivalent of a full year of instruction in a single term. A course designated L₁–L₂ in chapter III of this bulletin fulfills both the L₁ and the L₂ levels of the foreign language distributional requirement. Similarly, a course designated L₃–L₄ satisfies both the L₃ and the L₄ levels.

Not all of the languages offered in Yale College are offered at all levels, and it may not be possible to fulfill the language requirement in some of them. Languages currently offered in Yale College are Akkadian, Arabic, Bengali, Chinese, Czech, Dutch, hieroglyphic Egyptian, French, German, ancient Greek, modern Greek, biblical Hebrew, modern Hebrew, Hindi, Indonesian, isiZulu, Italian, Japanese, Kiswahili, Korean, Latin, Persian, Polish, Portuguese, Russian, Sanskrit, Spanish, Tamil, Turkish, Vietnamese, and Yorùbá. Students wishing to fulfill the foreign language requirement in a less commonly taught language should consult the director of undergraduate studies in the relevant department to verify that the appropriate level of study will be offered. Students who have intermediate- or higher-level proficiency in a language other than

those listed here (including American Sign Language) should consult the appropriate director of undergraduate studies or the director of the Center for Language Study to arrange for a placement examination.

Students who, for medical reasons, are not able to complete the language requirement may petition the Committee on Honors and Academic Standing for a waiver of the requirement. In granting such a waiver, the committee will normally require that a student complete four course credits in the study of a specific non-English-speaking culture.

4. **Courses taken on the Credit/D/Fail basis** A student may not apply any course credit earned on the Credit/D/Fail basis toward satisfaction of the distributional requirements for the junior year nor for the distributional requirements for the bachelor's degree.
5. **Independent study courses** A student may not apply any course credit earned through independent study courses toward satisfaction of any of the distributional requirements.
6. **Acceleration credits** Acceleration credits may not be employed to satisfy the distributional requirements for the bachelor's degree, nor may they be employed to meet the distributional requirements for the freshman, sophomore, or junior years.
7. **Course credit earned at Yale before matriculation** Course credit earned at Yale before a student's matriculation, either at Yale Summer Session or in the Nondegree Students program while the student was enrolled as a secondary school student in the New Haven area, may be applied to the distributional requirements for the bachelor's degree and to those for the sophomore and junior years, but it may not be applied to the distributional requirements for the freshman year.
8. **Courses in the graduate and professional schools** It is the expectation that Yale College students, including candidates for the simultaneous award of the bachelor's and master's degrees, will fulfill their distributional requirements in courses taken in Yale College. Credit earned in a course offered in the Graduate School of Arts and Sciences or in one of the professional schools of the University may be applied toward the distributional requirements only if the course instructor has secured, in advance of the term in which the course will be given, approval from Yale College. Instructors interested in making such an advance arrangement can contact the Dean of Academic Affairs to be directed to the appropriate authority for such approval.
9. **Course credit from outside Yale** Course credit earned at another university may be applied toward the distributional requirements for the bachelor's degree and to those for the sophomore and junior years whether or not it is counted toward the 36-course-credit requirement for graduation. Credit from outside Yale may not be applied toward the distributional requirements for the freshman year. See section O, "Credit from Other Universities." Note particularly that Yale does not award course credit or distributional credit for courses completed at another college or university before the student graduated from secondary school.
10. **Major programs** Courses taken in fulfillment of a student's major requirements may be applied toward satisfaction of the distributional requirements for the freshman, sophomore, and junior years and toward the distributional requirements for the bachelor's degree.

11. **Permission for a partial waiver of the distributional requirements for the freshman year** If, with the permission of the residential college dean, a freshman enrolls in a program of study for the first two terms of enrollment worth more than nine course credits, the dean may waive the year limit on the number of course credits that a student may elect in a single department or disciplinary area. Under no circumstances may a student be promoted to sophomore standing without having enrolled for at least one course credit in two skills categories (foreign language, quantitative reasoning, writing).
12. **Permission to postpone fulfillment of the distributional requirements for the sophomore year** A student may petition the Committee on Honors and Academic Standing for permission to fulfill the distributional requirements for the sophomore year in the fifth term of enrollment. Such a petition must be filed no later than the date of midterm of the fourth term of enrollment; it should explain the sound academic reasons why these requirements cannot be satisfied within four terms of enrollment and give an exact description of how they shall be fulfilled in the fifth term. Students who have not fulfilled the distributional requirements for the sophomore year by the end of the fourth term of enrollment and who have not been granted permission by the Committee on Honors and Academic Standing to postpone their fulfillment will normally not be promoted to junior standing.
13. **Permission to postpone fulfillment of the distributional requirements for the junior year** In exceptional circumstances, a student may petition the Committee on Honors and Academic Standing for permission to fulfill the distributional requirements for the junior year in the seventh term of enrollment. Such a petition, which must include the written support of the residential college dean and, where applicable, that of the director of undergraduate studies in the student's major, should be filed no later than the date on which the student's course schedule is due in the sixth term of enrollment; in no case will a petition be accepted later than the date of midterm in the sixth term of enrollment. It should explain the sound academic reasons why these requirements cannot be satisfied within six terms of enrollment and give an exact description of how they shall be fulfilled in the seventh term. Students who have not fulfilled the distributional requirements for the junior year by the end of the sixth term of enrollment and who have not been granted permission by the Committee on Honors and Academic Standing to postpone their fulfillment will normally not be promoted to senior standing.

MAJOR REQUIREMENTS

The requirements of the various major programs are given in chapter III. Every major program includes a senior requirement, which may take the form of a senior essay, a senior project, or a senior departmental examination.

EIGHT TERMS OF ENROLLMENT

A student must complete the requirements for the bachelor's degree in no more than eight terms of enrollment. Terms spent on a Year or Term Abroad, or in the Yale College program at the Paul Mellon Centre in London during a spring term, or in the Peking University–Yale University Joint Undergraduate Program in Beijing, are considered the equivalent of terms of enrollment in Yale College. Note, however, that course credits earned in terms spent

on a Year or Term Abroad may not be applied to acceleration by the early accumulation of thirty-six course credits all earned at Yale: see section P, “Acceleration Policies.” (Attendance at the summer program at the Paul Mellon Centre in London or Yale Summer Session does not constitute a term of enrollment in Yale College.)

In exceptional circumstances, a student may petition the Yale College Committee on Honors and Academic Standing for permission to enroll for an additional term. Such a petition should be made no later than the beginning of a student’s seventh term of enrollment; it should describe precisely, giving detailed information on specific courses, why it is impossible for the student to complete the requirements for a bachelor’s degree within eight terms; and it should be accompanied by detailed, informative letters of endorsement from the student’s director of undergraduate studies and residential college dean. For a student to exceed eight terms of enrollment usually means that another student cannot be admitted to Yale; a petition for a ninth term will therefore be approved only in extraordinary circumstances. The Committee on Honors and Academic Standing cannot grant permission for a ninth term in order for a student to undertake an optional arrangement not necessary for the acquisition of a bachelor’s degree, such as, for example, the completion of two majors, or enrollment in the Program for the Simultaneous Award of the Bachelor’s and Master’s Degrees, or completion of the entrance requirements for graduate or professional school. A student given permission to enroll for a ninth term is not eligible for scholarship assistance from Yale, although other forms of financial aid may be available (see “Financial Aid Regulations” in the Yale College online publication *Undergraduate Regulations*).

Graduation in fewer than eight terms of enrollment is possible: see section P, “Acceleration Policies.” Under no circumstances may a student graduate in fewer than six terms of enrollment, unless the student was admitted by transfer from another college or university. Transfer students should consult section L, “Transfer Students.”

B. Grades

LETTER GRADES

The letter grades in Yale College are as follows:

A Excellent	B+	C+	D+	F Fail
A–	B Good	C Satisfactory	D Passing	
	B–	C–	D–	

CREDIT/D/FAIL OPTION

In order to encourage academic exploration and to promote diversity in students’ programs, the Yale College Faculty has provided that students may elect a certain number of courses on a Credit/D/Fail basis.

1. **Reporting of grades** In all courses (except for a few professional school courses), instructors report letter grades for all students. If the student has chosen the Credit/D/Fail option in a course, the registrar converts grades of A, A–, B+, B, B–, C+, C, and C– into the notation CR, which is entered on the student’s transcript. Grades of D+, D, D–, and F

are entered on the transcript as reported. A student may not be required to disclose to the instructor of a course whether the student has enrolled in the course for a letter grade or under the Credit/D/Fail option.

2. **Eligibility** All courses offered in Yale College during the fall and spring terms are available for election under the Credit/D/Fail option. Courses in Yale Summer Session may not be taken under the Credit/D/Fail option.
3. **Total number of courses** A student may offer as many as four course credits earned on the Credit/D/Fail basis toward the bachelor's degree.
4. **Number of courses in a term** As many as two credits may be elected under the Credit/D/Fail option in a term; thus in an academic year a student may earn as many as four credits on the Credit/D/Fail option. In each term, a student must elect at least two courses, representing at least two course credits, for letter grades.
5. **Distributional requirements** A student may not apply any course credit earned on the Credit/D/Fail basis toward satisfaction of the distributional requirements for the junior year nor toward satisfaction of the distributional requirements for the bachelor's degree.
6. **Requirements of the major** Program descriptions in chapter III of this bulletin specify whether or not courses taken on the Credit/D/Fail basis count toward the requirements of particular majors.
7. **Credit/year only course sequences** A Cr/year only course sequence may be taken under the Credit/D/Fail option for one term while the other term of the yearlong sequence is taken for a letter grade. For Cr/year only course sequences in which a student receives a separate letter grade for each of the two terms, each term will be governed by the enrollment option the student elected for that term. For Cr/year only course sequences in which a student receives the mark of SAT or NSAT for the first term and a letter grade for the second, the enrollment option that the student elects for the second term governs both terms of the course sequence; that is, students will receive either the mark of CR for both terms or a letter grade for both terms, depending on the option elected for the second term.
8. **Course schedules** Students must indicate on their course schedules at the beginning of a term the use they wish to make during that term of the Credit/D/Fail option. As indicated above, in a given term a student may elect as many as (but no more than) two course credits on the Credit/D/Fail basis; and a student must elect at least two courses, representing at least two course credits, for letter grades. If a student indicates on the course schedule more than two course credits being taken on the Credit/D/Fail option, the registrar will record only the first two of them, in the order in which they are listed, as being taken on that basis, and the student will not be permitted to take the others on the Credit/D/Fail option.
9. **Late course schedules** Because a decision to employ the Credit/D/Fail option in a course must be declared at the beginning of the term on the student's course schedule, and because conversion from a letter grade to the Credit/D/Fail option is not possible for students who submit their schedules on time, a student who submits the schedule after the date on which it is due may not employ the Credit/D/Fail option in any course

during that term. See “Enrollment in Courses” in section E. The only exception to this rule may be in the case of a student who for some valid and extraordinary reason cannot submit the course schedule on time and who has the permission of the residential college dean and the registrar to submit it late. If the college dean approves, such a student may employ the Credit/D/Fail option only by submitting to the college dean by the date on which the course schedule is due (as published in the calendar at the beginning of this bulletin) a written statement specifying the course (or courses) that the student wishes to take on the Credit/D/Fail basis.

10. **Registration withheld** In order to employ the Credit/D/Fail option, students whose registration is being withheld by the Office of Student Financial Services or any other administrative office of the University must submit their schedules on time, before the deadline indicated on the student’s course schedule and listed in the calendar at the beginning of this bulletin.
11. **Conversion to a letter grade** Until November 9, 2012, in the fall term (two weeks after midterm), and until April 5, 2013, in the spring term (a week after the date of the resumption of classes following spring recess), a student who has elected a course on the Credit/D/Fail basis may choose to receive a letter grade in that course by filing the appropriate form in the office of the residential college dean. After these dates such conversion is not possible. If a student converts from the Credit/D/Fail option to a letter grade before the deadline, the option may not again be resumed even if the student desires to do so before the deadline.
12. **Conversion from a letter grade to Credit/D/Fail** A course once elected for a letter grade may not subsequently be converted to a course taken on the Credit/D/Fail basis.
13. **Courses selected after the deadline** A student who for any reason has been granted extraordinary permission by the Committee on Honors and Academic Standing to elect a new course after the deadline for submitting a course schedule may not employ the Credit/D/Fail option in that course. A change of level in courses in which the subject is taught in an ordered progression is not considered the election of a new course.
14. **Acceleration credit** Work completed under the Credit/D/Fail option cannot yield acceleration credit (see yalecollege.yale.edu/content/acceleration or appendix A of the *Freshman Handbook*).
15. **Prizes and honors** Marks of CR are included in the calculations for some prizes, for Distinction in the Major, and for election to Phi Beta Kappa as non-A grades, but marks of CR are not included in the calculation for General Honors (see under “Honors” in chapter I).
16. **Courses in the graduate and professional schools** Courses in the Graduate School of Arts and Sciences and in the professional schools of the University are not available on the Yale College Credit/D/Fail option. Some courses in certain professional schools of the University are, however, graded on a Pass/Fail basis only, and grades for undergraduates in these courses are recorded as CR or F. Such credits are counted in the total earned on the Credit/D/Fail basis that a student is permitted to offer in a term as well as the total offered toward the requirements of a bachelor’s degree. Marks of CR in professional

school courses are included in the calculations for Distinction in the Major as non-A grades. Marks of CR in professional school courses are not included in the calculation for General Honors (see “General Honors” and “Distinction in the Major” in chapter I).

17. **Independent study** It is expected that course credit earned in independent study, directed reading or research, tutorial courses, or the like, will not be taken on the Credit/D/Fail basis. With the support of the course instructor and the director of undergraduate studies of the department in which the course is offered, a student may petition the Committee on Honors and Academic Standing to enroll in such a course on the Credit/D/Fail basis; such a petition should be filed no later than the date on which the student’s schedule is due in the term in which the student is enrolling in the course and should provide sound academic reasons for the exception.

GENERAL REGULATIONS CONCERNING GRADES AND TRANSCRIPTS

1. **Record of courses** A transcript is the record of courses in which a student has enrolled during the student’s progress in completing the requirements of the bachelor’s degree. All grades, passing and failing, thus appear on the transcript and are counted in the calculation of grade point average (GPA). These include passing grades earned in the first term of a Cr/year only course sequence in which the second term is not completed, even though such grades do not count toward the 36-course-credit requirement for graduation. If a student remains in a course after the date of midterm, the student is considered to have been enrolled in that course; therefore, if a student withdraws from the course after midterm and before the first day of the reading period, the mark W (for Withdrawn) appears on the transcript in association with the course. See paragraph 5 below.
2. **Equal value of courses** Passing grades contribute equally, to the extent to which they carry course credit, toward the 36-course-credit requirement for graduation. A grade of D in a course, for example, does not need to be balanced with a higher grade in some other course.
3. **Change of a grade** A grade, once submitted by the instructor of a course to the registrar, may not be changed except by vote of the Yale College Committee on Honors and Academic Standing on petition of the instructor, unless it is the result of a clerical error made in the instructor’s computation or in transcription of a grade.
4. **Withdrawal from courses before midterm** If a student has elected a course on the course schedule but formally withdraws from it before midterm (October 19, 2012, in the fall term; March 8, 2013, in the spring term), the student’s transcript will contain no indication of that course after the withdrawal has been recorded by the registrar. See “Withdrawal from Courses,” section F.
5. **Withdrawal from courses after midterm** If a student enrolled in a course formally withdraws from it after midterm but before the first day of the reading period, the student’s transcript will record the designation W (Withdrawn) for the course. The mark of W is a neutral designation indicating simply that the student has been enrolled in, but has withdrawn from, a course; while the course obviously carries no credit toward

the degree, the W implies no evaluation of a student's work and carries no implication whatsoever of failure. Withdrawal from a course after the deadline (December 7, 2012, in the fall term, and April 26, 2013, in the spring term) is not possible. See "Withdrawal from Courses," section F.

6. **Incomplete work and postponed final examinations** A student who has received permission for a mark of Temporary Incomplete in a course, or who has been authorized to take a makeup final examination in a course, is allowed the specified period of time to repair the deficiency in the course. If the deficiency is not repaired by a satisfactory performance within the stipulated time, then the designation TI (Authorized Temporary Incomplete) or ABX (Authorized Absence from Final Examination) is automatically converted by the registrar to the grade of F. See "Postponement of Final Examinations" and "Work Incomplete at the End of Term" in section H.
7. **Withdrawal from Yale College** Whether a student withdraws from Yale College for personal, medical, academic, or disciplinary reasons, the entry placed in each case on the student's transcript is the word "Withdrew" together with the date of the withdrawal.
8. **Tracks and programs within majors** A transcript may show as a student's major subject only a designation approved for that purpose by the Yale College Faculty; "tracks" or programs within majors may not appear on transcripts. The majors approved by the faculty are listed in this bulletin at the beginning of chapter III under "Majors in Yale College."
9. **Distribution of grade reports** The Registrar's Office sends grade reports to students each term from six to eight weeks after the close of the term. At registration each year, a student is given the opportunity to declare whether his or her grades may be released to certain other parties. If the student gives permission for grades to be released to a guardian or to parents, after the fall term of that year the Registrar's Office will send a grade report to them. After the spring term, the Registrar's Office sends a grade report to each student at the student's home address, and this report may be shared with parents if the student wishes. If a student gives permission for grades to be released to a secondary school or Alumni Schools Committee, grade reports will be furnished to them only upon specific request of the school or the committee. Upon written request of the student, the Registrar's Office will also send a copy of the grade report to any additional person or agency designated by the student.
10. **Early access to grade reports** Early access to recorded grades is available on line to students in any Yale College course for which they have completed or actively declined to complete the online course evaluation form through the Yale University Student Information Systems.
11. **Transcript orders** Transcripts may be ordered either at the Registrar's Office, 246 Church Street, or on the Web at www.yale.edu/sfas/registrar/index.html#transcripts. The charge is \$7 per transcript. Each fall the registrar provides in each student's registration packet, free of charge, an unofficial copy of the student's academic record to date. This record may serve as a convenient aid in discussions with the student's adviser of the student's academic plans during the coming year.

C. Course Credits and Course Loads

CREDIT VALUE OF COURSES

Most courses in Yale College are term courses that carry one course credit if completed with a passing grade. There are, however, some variations:

1. **Double-credit courses** A few courses in Yale College, including intensive language or research courses, award two course credits for a single term's work.
2. **Yearlong course sequences** There are a few yearlong course sequences in which two course credits are awarded upon the satisfactory completion of both terms of the sequence; other course sequences, including some research and laboratory courses, give one or four course credits for the successful completion of the full year's work. A student who fails the first term of a yearlong course sequence may be permitted to continue the sequence only with the instructor's written permission, and will receive course credit only for the successful completion of the second term's work. A student who satisfactorily completes the first term of a yearlong course sequence may receive course credit routinely for that term's work, except in those sequences marked Cr/year only. (See "Key to Course Listings" at the beginning of this bulletin.)

Note that completion of a modern foreign language course numbered 110 does not award credit unless and until the subsequent term, numbered 120, is also successfully completed. Except in intensive, double-credit courses in which the equivalent of one year of language study is covered in one term, credit may not be given in any circumstance for the first term only of an introductory modern foreign language; neither instructors nor departments have the authority to make an exception to this rule. With some exceptions, credit will be given for successful completion of the second term only of an introductory modern foreign language, or for the first term only or the second term only of an intermediate modern foreign language.

3. **Laboratory courses** Some laboratory courses carry no separate credit toward the degree; others carry a full course credit for a term's work; and still others carry one-half course credit.
4. **Half-credit courses** All courses that carry 0.5 or 1.5 course credits and that are not bound by the Cr/year only restriction count toward the 36-course-credit requirement for the bachelor's degree.

NORMAL PROGRAM OF STUDY

A student in Yale College normally takes four or five term courses, or their equivalent, for each of eight terms.

1. **Minimum course load** A student may not enroll in a program of study worth fewer than three course credits in one term. A student enrolled for three course credits may withdraw from one course credit between midterm and the first day of the reading period, receiving the neutral designation W (Withdraw) in that course. Similarly, a student enrolled for four or more course credits may withdraw from one or more courses as described above, but at

no time may any student carry a schedule of courses that will earn fewer than two course credits in a term.

2. **Course loads requiring permission** A three-course-credit program of study or a six-course-credit program of study requires the permission of the residential college dean. It is assumed that any student who requests permission to carry more than five course credits does not intend to drop any of them.
3. **Seven course credits in a term** A student must petition the Yale College Committee on Honors and Academic Standing for permission to take a program worth seven credits in a term. In the petition the student must explicitly state an intention to complete all the courses proposed.
4. **Independent study** Opportunities for independent study exist in many programs and departments under various designations: directed reading or research, individual reading or research, independent research or study, independent or special projects, individual instruction in music performance, independent, individual, or special tutorials, and the senior essay or project, among others. Note that course credit earned in such study may not be used toward fulfillment of the distributional requirements. Approval for any such particular course is given by the department or program; however, approval for an independent study course is also required from the Yale College Committee on Honors and Academic Standing if certain limits are exceeded. A student must petition the committee for permission to enroll in more than one such course credit in any one term before the senior year or in more than two such course credits in any one term during the senior year. Permission is also required for a student to enroll in more than three such course credits in the first six terms of enrollment; included in this total are any independent study courses completed in Yale Summer Session that are applied to the Yale College transcript. In the petition the student must give sound academic reasons for exceeding these limits and provide evidence that the additional work in independent study will not be done at the expense of the breadth and depth of study being pursued in regular Yale College courses.

D. Promotion and Good Standing

REQUIREMENTS FOR PROMOTION

1. To be promoted to sophomore standing after two terms of enrollment, a student must have earned at least eight course credits or the equivalent and have fulfilled the distributional requirements for the freshman year.
2. To be promoted to junior standing after four terms of enrollment, a student must have earned at least sixteen course credits or the equivalent and is expected to have fulfilled the distributional requirements for the sophomore year.
3. To be promoted to senior standing after six terms of enrollment, a student must have earned at least twenty-six course credits or the equivalent and is expected to have fulfilled the distributional requirements for the junior year.

REQUIREMENTS FOR ACADEMIC GOOD STANDING

At the conclusion of each term of enrollment, a student must have earned enough course credits to be in academic good standing.

1. At the end of the first term at Yale, a student must have earned at least four course credits.
2. At the end of the second term, a student must have earned at least eight course credits.
3. At the end of the third term, a student must have earned at least twelve course credits.
4. At the end of the fourth term, a student must have earned at least sixteen course credits.
5. At the end of the fifth term, a student must have earned at least twenty-one course credits.
6. At the end of the sixth term, a student must have earned at least twenty-six course credits.
7. At the end of the seventh term, a student must have earned at least thirty-one course credits.

Regardless of the number of credits accumulated, a student is not in academic good standing if the student's record shows three grades of F in a term or over two or three successive terms. "Successive terms" means successive terms in which the student enrolls, whether or not broken by a withdrawal or by a leave of absence. See "Dismissal for Academic Reasons" and "Makeup of Course Deficiencies for Promotion or Academic Good Standing" in section I.

E. Registration and Enrollment in Courses

REGISTRATION

Every student is required to register at the beginning of each term in which he or she is to be enrolled in courses at Yale College.

1. **Fall-term registration** To register for the fall term, all freshmen must attend a registration meeting with their residential college dean and freshman counselor on Friday, August 24, 2012. Upperclassmen must attend the registration meeting conducted by the office of the residential college dean on Tuesday, August 28, 2012. Students whose registration is being temporarily withheld by the Office of Student Financial Services or by any other administrative office of the University are nonetheless required to attend the appropriate registration meeting.
2. **Spring-term registration** To register for the spring term, freshmen are required to attend a registration meeting in their residential college at 9 p.m. on Sunday, January 13, 2013. Sophomores, juniors, and seniors are required to pick up registration materials from the office of the residential college dean no later than 5 p.m. on the first day of classes, Monday, January 14, 2013. Students whose registration is being temporarily withheld by an administrative office of the University are nonetheless required to report for spring-term registration as given immediately above.
3. **Late registration** A student who, for reasons other than incapacitating illness, the death of a family member, or a comparable emergency, fails to follow the registration procedures in paragraph 1 or 2 above may register for the term only by exceptional action of the Committee on Honors and Academic Standing and will be liable to a fine of \$50.

ENROLLMENT IN COURSES

Enrollment in courses can be accomplished only by the submission of an approved course schedule or, in amendment of the course schedule, by the submission of an approved course change notice. Attendance at a class does not constitute enrollment. The course schedule is an important document. A student is responsible for the timely submission of the course schedule and for the accuracy of all the information that the student enters upon it. The course elections that a student indicates on a course schedule or course change notice shall appear on the student's transcript unless a student formally withdraws from a course before midterm. See section F, "Withdrawal from Courses."

The following rules govern students' enrollment in courses during the fall and spring terms of the academic year:

1. **Deadline for submitting schedules** Every student must submit a course schedule for each term at the office of the residential college dean by 5 p.m. on the deadline indicated on the student's course schedule and listed in the calendar at the beginning of this bulletin. Students whose registration has been withheld by the Office of Student Financial Services or any other administrative office of the University must nonetheless submit their course schedules by these same deadlines.

It is the student's responsibility to obtain all necessary signatures, except that of the residential college dean, before the schedule is due. In the rare instance that the student's adviser is unavailable before the deadline, the student should nonetheless submit the schedule on time, and take a copy to be signed by the adviser and submitted to the dean as soon as possible. If the student does not submit a copy of the schedule signed by the adviser within one week of the deadline, the student will be subject to the fines and restrictions described under paragraphs 3 and 4 below.

2. **Addition of a new course after the deadline** The election of a new course after the deadline for submitting a course schedule will not be permitted save by exceptional action of the Committee on Honors and Academic Standing. Students who seek such an exception should consult immediately with the residential college dean. Permission to elect a new course must be requested by a petition that is accompanied by the written approval of the course instructor and the submission of a course change notice at the office of the residential college dean. The petition should explain in detail why the course is necessary to the student's schedule and why the student was unable to elect the course during the course selection period. Timeliness is an essential feature of any request to add a course to the course schedule; a delay in consulting with the dean or in submitting a complete petition will normally be grounds for denial. A fee of \$20 will be charged for the processing of an approved course change notice on which the election of a new course is requested. A student may not elect a new course after midterm (October 19, 2012, in the fall term; March 8, 2013, in the spring term), unless such election is made to correct a clerical error on the course schedule. A change of level in courses in which the subject is taught in an ordered progression, as for example in languages or in mathematics, is not considered the addition of a new course. Such a change may be made with the approval of the instructors involved (and, if necessary, with the added permission of the director of undergraduate studies in the subject). Similarly, a change of section in the same course is not considered the addition of a new course.

3. **Fines for late schedules** Students who submit their schedules after the deadlines will be fined at least \$50. Additional fines, increased \$5 daily according to lateness, will be imposed for schedules submitted more than one week after the deadlines. A schedule received more than two weeks after it is due will be accepted only by exceptional action of the Committee on Honors and Academic Standing and will be subject to an increased fine or other penalty.
4. **Credit/D/Fail option** A student who submits a course schedule after the date on which it is due may not employ the Credit/D/Fail option in any course during that term. (See “Credit/D/Fail Option” in section B, paragraph 9.)
5. **Fines for clerical errors** A student who submits a course schedule or course change notice with clerical errors or omissions of data is liable to a fine of \$50.
6. **Overlapping meeting times** A student may not elect courses with meeting times that overlap. If, for good cause, a student is obliged to elect two courses with a small and insignificant overlap in meeting times, the student must supply the residential college dean with the written permission of both instructors at the beginning of the term and must petition the Committee on Honors and Academic Standing, explaining why the student must enroll in both courses in the current term and how the student will meet all the requirements for both courses. Failure to file a complete and timely petition may result in the loss of credit for both courses.
7. **Starred courses** Election of a starred course requires that a student secure the permission of the instructor and, where appropriate, the director of undergraduate studies. If a student enters a starred course on the course schedule without the appropriate permission, the instructor may direct the registrar to drop the student from the class.
8. **Unstarred courses** While the election of unstarred courses does not require permission of the instructor, such courses may be limited in their enrollment (i.e., “capped”) at the beginning of the term, depending upon, for example, the number of teaching assistants available, the size of the appropriate meeting space, or other instructional needs.
9. **Prerequisites** Students are expected to have met the prerequisites published in course descriptions in this bulletin. If a student wishes to elect a course for which prerequisites are indicated but has not met those prerequisites, it is the student’s responsibility to secure the permission of the instructor and, where appropriate, the director of undergraduate studies before enrolling. The registrar may drop the student from the class if the student has not met the prerequisites for enrollment.
10. **Teaching evaluations** For the advancement of teaching in Yale College, anonymous teaching evaluations are made available through the Yale University Student Information Systems. Students are expected to participate in this evaluation process for any Yale College course in which they are enrolled. Students who withdraw from a course after midterm are invited but not required to participate.

- 11. Selection of a less advanced course in the same subject** In certain subjects, such as mathematics, foreign languages, and the sciences, knowledge of the subject is acquired in an ordered progression. That is, the concepts and skills introduced in one course are necessary, or prerequisite, for mastery of the material in subsequent courses in that field. Occasionally a student, having completed an intermediate or advanced course in a subject, may take a less advanced one in that same subject. In such a case, although the student obviously cannot receive course credit for both courses, each course will appear on the student's transcript with the grades earned; however, the student will receive course credit only for the more advanced course. A student may sometimes be permitted to complete an intermediate or advanced course without having first completed a less advanced course in a subject; in such a case, the student does not receive course credit for the less advanced course by virtue of having completed the more advanced course.
- 12. Repeated enrollment in the same course** Courses may not be repeated for credit, except for courses marked "May be taken more than once" or "May be repeated for credit." In such cases, the repeated course earns no additional distributional credit. On some rare occasions, a student may take the same course over again, or may take a course with the same content as another course the student has already passed. In such cases, the student receives credit for the course only once. Should a student take the same or an equivalent course twice, each course with its grade appears on the transcript. The student receives course credit for the higher grade if one is earned; in such an event, course credit is not given for the lower grade. Note, however, that both grades are included in the calculation of a student's grade point average (GPA) and in the calculation for General Honors.
- 13. Placement in foreign language courses** Students placed by a language program or by their score on the Advanced Placement examination into a particular level of a foreign language may not earn course credit for the completion of a course in that language at a level lower than the placement. For example, a student placed into the third term (L3) of a foreign language earns no course credit for the completion of an L1 or L2 course in that language. Should a student complete a foreign language course at a level lower than the placement, the lower-level course with its grade appears on the transcript but earns no credit toward graduation.
- 14. Use of vertebrate animals** If the satisfactory completion of a course will require the use of vertebrate animals in experiments, the student must be notified of that requirement at the first meeting of the course. If a student objects on ethical grounds to participating in the animal usage in question, it is the student's responsibility to discuss the matter with the faculty member in charge and not to enroll in the course if no alternative acceptable to the faculty member can be arranged.
- 15. Field trips** If the satisfactory completion of a course will require participation in a field trip, students should understand that there are inherent risks, including the risks of travel, involved in such an activity. If a student objects to assuming these risks, it is the student's responsibility to discuss the matter with the faculty member in charge and not to enroll in the course if no alternative acceptable to the faculty member can be arranged. Yale College's policies regarding field trips can be found at yalecollege.yale.edu/content/academic-field-trip-policies.

F. Withdrawal from Courses

Students are permitted to withdraw from courses for which they have enrolled in a term until 5 p.m. on the last day of classes before the reading period in that term. Withdrawal from a course can be accomplished only by the submission of a course change notice at the office of the residential college dean. A fee of \$20 will be charged for the processing of an approved course change notice on which withdrawal from a course is requested. Formal withdrawal is important, because failure to receive credit for courses in which students are enrolled will be recorded as F on their transcripts and may open them to the penalties described under “Academic Warning” and “Dismissal for Academic Reasons” in section I.

1. **Transcripts** Each course listed on a student’s course schedule appears on the student’s transcript unless the student withdraws from the course by midterm. See paragraph 3 below.
2. **Permission** All course withdrawals require the permission of the residential college dean.
3. **Withdrawal before midterm** If a student formally withdraws from a course by midterm (October 19, 2012, in the fall term; March 8, 2013, in the spring term), then after the registrar has recorded the withdrawal, the transcript will contain no indication of that course.
4. **Withdrawal after midterm** If a student formally withdraws from a course after midterm but before 5 p.m. on the last day of classes before the reading period, the transcript will record the course and show the neutral designation W (Withdrawn) for the course. The deadlines for such withdrawals are December 7, 2012, in the fall term, and April 26, 2013, in the spring term. The deadlines apply to all courses, whether or not a particular course observes the reading period.

A change of level in courses in which the subject is taught in an ordered progression, as, for example, in foreign languages or in mathematics, is not considered a course withdrawal and does not result in the recording of a W.

5. **Withdrawal after the deadlines** After these deadlines, withdrawal from a course is not permitted. An exception will be made only for a student who withdraws from Yale College for medical reasons as certified by the Yale Health Center after the beginning of the reading period but by the last day of the final examination period; in such a case the student will be permitted to withdraw from a course with a mark of W.
6. **Lack of formal withdrawal** If, when grades are due, the instructor of a course notifies the registrar that a student has not successfully completed a course from which the student has not formally withdrawn, then a grade of F will be recorded for that course on the student’s transcript. See “General Regulations concerning Grades and Transcripts” in section B. See also “Work Incomplete at the End of Term” and “Postponement of Final Examinations” in section H.
7. **Withdrawal from Yale College** A student who has withdrawn from Yale College for any reason, including medical, is no longer enrolled. Consequently, as of the date of the withdrawal, such a student cannot continue to attend classes or complete work

that was assigned in the term in which the withdrawal occurred, even if the deadline for such assignments was previously extended by the instructor or by the residential college dean.

8. **Transcripts of students withdrawn from Yale College** It follows that if a student withdraws from Yale College by midterm, the transcript will not show that the student has been enrolled in any course during that term. If a student withdraws from Yale College after midterm, but before 5 p.m. on the last day of classes before the reading period, the transcript will record the student's courses with the designation W (Withdrawn). If a student withdraws from Yale College after the beginning of the reading period, the transcript will show the student's courses with grades of F unless an instructor reports a passing grade for the student in any of the courses. The only exception is for a student who withdraws from Yale College for medical reasons after the beginning of the reading period but before the end of the term; see paragraph 5 above.

G. Reading Period and Final Examination Period

1. **Due dates for course work** It is expected that instructors will require all course assignments, including term papers, to be submitted at the latest by the last day of reading period. (For the dates of the reading period and final examination period, consult the calendar at the beginning of this bulletin.) Instructors do not have the authority to give permission for this deadline to be extended beyond the end of the term; only the residential college dean has this authority (see "Work Incomplete at the End of Term" in section H). Even if an extended deadline should be announced by the instructor, a grade reflecting work submitted after the end of the term cannot be accepted unless a Temporary Incomplete was authorized by the student's residential college dean.

2. **Reading period** The Yale College Faculty established the reading period between the end of classes and the beginning of final examinations in order to provide a period of about a week during which students might conclude their course work and prepare for final examinations. The instructor of each course determines whether or not that course observes the reading period. A course that does not observe the reading period is identified in chapter III by the abbreviation "RP" at the end of the course description.

The assumption underlying the faculty's institution of the reading period was that no additional assignments would be required during the reading period in a course observing it, but that students would use the reading period in their own way to consolidate and augment the work of the course. Such being the case, no final examination may be administered during the reading period. A final examination in a course, whether or not the course observes the reading period, must be administered during the final examination period. No take-home final examination may be due during the reading period.

3. **Final examinations** Yale College expects every course to conclude with a regular final examination or with a substitute for such an examination. The substitute should be in the nature of a final examination in that it requires the student to demonstrate proficiency in the discipline and subject matter of the course. Substitutes may include, for

example, an oral presentation or examination, a term essay due at the latest before the beginning of the final examination period, or the last of a series of hour tests administered during the last week of classes. Final examinations normally last either two or three hours but, in either case, students are permitted to take an additional half-hour before being required to turn in their answers. This additional time is given for improving what has already been written, rather than for breaking new ground.

4. **Scheduling of final examinations** The Registrar's Office has assigned a specific time and date for the administration of final examinations in most courses in Yale College. The time of the final examination is determined by the meeting time of a course during the term. If the meeting time of a course is changed from that originally published, the time of the examination is defined by the new meeting time. If a course is published with no scheduled examination but the instructor subsequently decides to offer a final examination, it must be administered at the time defined by the meeting time of the course. A schedule of final examinations may be found on the page "Final Examination Schedules" at the front of this bulletin.
5. **Date of administering final examinations** Since the final examination schedule has been carefully designed to make efficient use of the entire final examination period and to minimize overcrowding of students' schedules, a final examination must be administered on the date and at the time specified. On occasion instructors have administered final examinations at times different from those assigned. Such an arrangement is allowed under the following conditions: (a) that two different and distinct final examinations be administered; (b) that one of these examinations be administered at the regularly specified time within the final examination period; (c) that the alternative examination be administered during the final examination period; and (d) that no student be required to obtain permission to take the alternative examination.
6. **Take-home final examinations** Take-home final examinations are sometimes substituted for regular final examinations. If a course has been assigned a final examination date, a take-home examination for that course is due on the scheduled examination day. If a course has not been assigned a final examination date, a take-home examination for the course is due on the day specified in the final examination schedule by the meeting time of the course. (See "Final Examination Schedules" at the front of this bulletin.) If a course does not meet at a time covered by the final examination schedule, a take-home examination may not be due during the first three days of the final examination period. No take-home examination may be due during the reading period.
7. **Due dates for term grades** An instructor is required to submit term grades promptly after the completion of a course. Fall-term grades are due by 5 p.m. on January 2, 2013; spring-term grades are due within one week of the end of the final examination period; grades for seniors in the spring term are due within forty-eight hours of the end of the final examination period.

In submitting term grades, the instructor is expected to apply appropriate penalties for missed or incomplete work unless the late submission of the work has been authorized by the student's residential college dean or by the Committee on Honors and Academic

Standing. If an instructor reports a mark of incomplete for which there has been no authorization by the college dean, the incomplete will be recorded by the Registrar's Office as a grade of F.

8. **An hour test at the end of term instead of a final examination** Some instructors do not give final examinations of the usual two-and-one-half-hour or three-and-one-half-hour length, but instead terminate their courses with an hour test that is the last in a succession of hour tests administered during the term.

For courses that do not observe the reading period, this hour test may be administered during the reading period, since, in such courses, regular class meetings are scheduled to extend through the reading period. A course that does not observe the reading period may also administer the hour test during the final examination period at the time specified in the final examination schedule.

For courses that do observe the reading period, the hour test may not be administered during the reading period, but may be administered only during the last week of classes or during the final examination period at the time specified in the final examination schedule.

9. **Senior departmental examinations** In those major programs requiring a senior departmental examination, that examination is scheduled on the two weekdays preceding the final examination period in the fall and spring terms. In a department or program in which a two-day written senior departmental examination is administered on those days, a senior may, with the written consent of the appropriate instructors, be excused from final examinations in as many as two courses in the major in the term in which he or she takes the departmental examination. In a department or program in which the senior departmental examination takes place on only one of the two scheduled days, a senior may, with the written consent of the instructor, be excused from the final examination in one course in the major in the term in which the departmental examination is taken. If the senior departmental examination takes place before the scheduled days, or if a senior essay or senior project takes the place of the examination, a student may not omit a final examination.

H. Completion of Course Work

SUBMISSION OF COURSE WORK TO INSTRUCTORS

Students in Yale College are expected to take personal responsibility for the timely delivery to their instructors of all course work, including examinations, in the manner and format prescribed by the instructors. It is generally expected that the student will submit course work in person, either to the instructor or to a person explicitly designated by the instructor, such as a teaching fellow or an administrative assistant. Students who submit course work in a manner other than in person, directly to an appropriate individual (e.g., place it under a door or in a box in a hallway), do so at their own risk. Students who must use postal services to submit a course assignment, because they will be unavoidably absent from campus at the time an assignment is due, should ascertain in advance from the instructor the correct mailing address and use receipted mail services to establish the date of mailing.

Instructors are not required to accept course work sent over a computer network to their computer, printer, or e-mail account unless they have explicitly authorized such electronic submission in the syllabus for the course or have made a special arrangement with the student. Instructors may establish a deadline for electronic submission of a particular assignment different from the deadline for submission of the same assignment on paper.

LATE OR POSTPONED WORK

There are three kinds of late or postponed work: (1) work late during term time; (2) work incomplete at the end of term; and (3) postponed final examinations. Instructors of courses may, during term time, give permission to make up late or missed work, provided that such work is submitted before the end of term. Only the residential college dean, however, may authorize the late submission of work still incomplete at the end of term, or the postponement of a final examination.

When students know in advance that they must miss or postpone work for a legitimate reason, as described below in “Work Missed during the Term” and in “Postponement of Final Examinations,” they should inform the instructor and the residential college dean as soon as possible.

WORK MISSED DURING THE TERM

The basic responsibility for permitting postponement of work during the term is the instructor’s. However, the residential college dean may give permission for a student to make up work missed or delayed during the term because of an incapacitating illness, the death of a family member, or a comparable emergency. The residential college dean also has authority to give permission to make up work missed because of the observance of religious holy days and because of participation required in intercollegiate varsity athletic events. Only in these cases does a residential college dean have authority to give permission to make up late work during term time. This permission is conveyed by means of a special form from the college dean that the student delivers to the instructor. Students participating in events of intramural or club sports, as differentiated from varsity events sponsored by the Department of Athletics, are not eligible for a postponement of work by the dean on account of those events.

In all other cases of work missed during the term, permission to make up course work must be secured directly from the instructor of the course, since the instructor is the only person who can decide, in the context of the nature and requirements of the course, whether such permission is appropriate. This permission may not, however, extend beyond the end of the term. Permission to submit work still incomplete at the end of term may be granted only by a student’s residential college dean. See “Work Incomplete at the End of Term” below.

WORK INCOMPLETE AT THE END OF TERM

Only the residential college dean has authority to give permission to a student to submit work in a course after the end of term. The college dean may give such permission because of an incapacitating illness, because of a serious family emergency, or because of another

matter of comparable moment. In such cases the college dean may authorize a mark of Temporary Incomplete for a period not to exceed one month from the beginning of the final examination period. Note that the mark of Temporary Incomplete refers to unfinished course work, not to a final examination missed for any reason; see “Postponement of Final Examinations” below.

The residential college dean, in authorizing a mark of Temporary Incomplete, will stipulate the date on which the student’s late work will be due and the date on which the instructor is expected to submit a course grade to the registrar. The college dean may not set this second date later than one month after the beginning of the final examination period. If the student’s work has not been completed in time for the instructor to report a grade to the registrar by the deadline stipulated, then the instructor will submit a grade for the student that reflects the absence of the missing work, or the registrar will convert the mark of Temporary Incomplete to a grade of F. See “General Regulations concerning Grades and Transcripts” in section B, and “Withdrawal from Courses,” section F.

Permission for a mark of Temporary Incomplete to last beyond one month from the beginning of the final examination period can be granted only by the Yale College Committee on Honors and Academic Standing. Such an extension may be given only for a brief period of time, usually one to two weeks, and only in response to extraordinary circumstances, usually of a medical nature. A petition for such permission must be submitted at the earliest possible date. In considering such requests, the Committee on Honors and Academic Standing takes into account the original deadline for submission of the work and the date on which a petition is delivered to the committee.

USE OF COMPUTERS AND POSTPONEMENT OF WORK

Problems that may arise from the use of computers, software, and printers normally are not considered legitimate reasons for the postponement of work. A student who uses computers is responsible for operating them properly and completing work on time. (It is expected that a student will exercise reasonable prudence to safeguard materials, including saving data on removable disks at frequent intervals and making duplicate copies of work files.) Any computer work should be completed well in advance of the deadline in order to avoid last-minute technical problems as well as delays caused by heavy demand on shared computer resources in Yale College.

POSTPONEMENT OF FINAL EXAMINATIONS

Only the residential college dean may authorize postponement of a final examination. The residential college dean may give such permission because of an incapacitating illness, because of a family emergency requiring the student’s absence from New Haven, or because of another matter of comparable moment. The residential college dean may also authorize such a postponement because of the observance of religious holy days, or because of participation required in an intercollegiate varsity athletic event. Students participating in events of intramural or club sports, as differentiated from varsity events sponsored by the Department of Athletics, are not eligible for a postponement of final examinations on account of those events. Finally, the college dean may authorize postponement of a final examination if a student has three examinations scheduled during the first two days of

the final examination period, or three examinations scheduled consecutively in the final examination schedules.* The postponement of a final examination for any other reason requires the permission of the Committee on Honors and Academic Standing. A student's end-of-term travel plans are not a basis for the postponement of a final examination. See "Final Examination Schedules" at the beginning of this bulletin and paragraph 4 in section G, "Reading Period and Final Examination Period."

It is normally the expectation that when a student begins a final examination but does not complete it, the student will receive credit only for the work completed on the examination. If, however, a student becomes unable to complete an examination because of a sudden and serious illness or other emergency during the examination, the student may request authorization from the residential college dean to take a makeup final examination. In such a case, the student must explain his or her departure to the instructor, or to some other person proctoring the examination, before leaving the room, and must contact the Yale Health Center or the residential college dean as soon as possible thereafter.

Makeup examinations for the fall term are scheduled to take place at the end of the second week of classes in the spring term. Makeup examinations for underclassmen who miss final examinations in the spring term are scheduled at the end of the second week of classes in the following fall term. Makeup final examinations are administered by the Registrar's Office only at these times. Students who will not be enrolled at these times—whether because they are on leave of absence or on a Year or Term Abroad, or because they have withdrawn from Yale—must make alternative arrangements with the Registrar's Office in advance of the dates on which makeup final examinations are administered by that office. The registrar automatically records a grade of F in a course for a student who fails to take an officially scheduled makeup examination in that course at the appointed time. If an examination is not administered by the registrar, it is the student's responsibility to make arrangements with the instructor to take the makeup examination. In such cases, if a grade is not received by the midterm following the original examination date, the registrar automatically records a grade of F in the course.

No fee will be charged for a makeup examination necessitated by illness, family emergency, the observance of a religious holy day, or participation required in an intercollegiate varsity athletic event. A charge of \$35 will be made for the administration of a makeup examination occasioned by a conflict between two final examinations scheduled at the same time, or three examinations scheduled in the first two days of the examination period, or

*The final examination schedules indicate three examination sessions, or time slots, per day: one in the morning, one in the afternoon, and one in the evening. Some of these time slots contain examinations; others do not. A college dean may postpone an examination if a student has three examinations scheduled within any four consecutive time slots, whether or not each of those time slots has an examination assigned to it. See "Final Examination Schedules" at the beginning of this bulletin. Occasionally an instructor may arrange an option for an alternative final examination in addition to the regularly scheduled examination. (See paragraph 5 in section G, "Reading Period and Final Examination Period.") Such an optional arrangement cannot be the basis for a postponement of an examination if three of a student's final examinations would thereby acquire "consecutive" status.

three final examinations scheduled in consecutive examination periods. Ordinarily there will be a charge of \$35 for makeup examinations authorized for special reasons approved by the Committee on Honors and Academic Standing.

Permission to postpone a final examination does not also carry authorization for a student to submit other work late in that course. See “Work Incomplete at the End of Term” above.

I. Academic Penalties and Restrictions

CUT RESTRICTION

Regular classroom attendance is expected of all students. While Yale College enforces no general regulation concerning attendance, instructors of individual courses may require it of all students. This is particularly the case in discussion groups, seminars, laboratories, and courses in foreign languages.

A student who, in the opinion of the instructor and of the residential college dean, has been absent from a course to an excessive degree and without excuse may at any time be placed on Cut Restriction in that course or in all courses. A student on Cut Restriction who continues to be absent from a course may, with the concurrence of the college dean and the Committee on Honors and Academic Standing, be excluded from it without credit. See “Exclusion from Courses” below.

EXCLUSION FROM COURSES

Any student may, because of excessive absences or unsatisfactory work, be excluded from a course without credit at any time upon recommendation, made by the instructor or department concerned, to the residential college dean and the Committee on Honors and Academic Standing. If the exclusion occurs after midterm and before the first day of the reading period, the student’s record will show a mark of W for the course.

ACADEMIC WARNING

Academic Warning is an indication that a student’s scholastic record is unsatisfactory. Students on Academic Warning who do not pass all of their courses in the term in which they are on Academic Warning will be dismissed for academic reasons. No matter how many course credits a student has earned, Academic Warning is automatic in the following cases: (a) failure in one term to earn more than two course credits; (b) a record that shows two grades of F in one term; (c) in two successive terms, a record that shows a grade of F for any course. The college deans attempt to give written notification of Academic Warning to students whose records show these deficiencies, but such students should regard themselves as being on warning even in the absence of written notification. A student permitted to continue in Yale College with fewer than the number of course credits ordinarily required for academic good standing (see “Requirements for Academic Good Standing” in section D) may be placed on Academic Warning, and in such a case the student will be notified that he or she has been placed on warning. The Committee on Honors and

Academic Standing may at its discretion disqualify a student on Academic Warning from participation in recognized University organizations.

DISMISSAL FOR ACADEMIC REASONS

1. **Failure in three classes** A record that shows three grades of F in a term or over two or three successive terms will normally result in the student's dismissal from Yale College. "Successive terms" means successive terms in which the student enrolls, whether or not broken by a withdrawal or by a leave of absence.
2. **Failure to meet requirements for good standing or promotion** A student who has not, at the end of a term, met the minimum requirements for academic good standing (see section D), or a student who has failed to meet the minimum standards for promotion (see section D), may be dismissed unless permitted by the Committee on Honors and Academic Standing to repair the deficiency. See "Makeup of Course Deficiencies for Promotion or Academic Good Standing" below. A student who is short by more than two credits of the minimum requirements for academic good standing or promotion, even if the student has no grades of F, will be dismissed.
3. **Students on Academic Warning** A record that shows a grade of F for a student who is on Academic Warning in that term will result in that student's dismissal for academic reasons. See "Academic Warning" above.
4. **Readmitted students** A student readmitted to Yale College who does not, in the first or second term following readmission, pass all the courses completed in that term will be dismissed for academic reasons. See "Readmission" in section J.

In addition, at any point during the year a student may be dismissed from Yale College if in the judgment of the Yale College Committee on Honors and Academic Standing the student's academic record is unsatisfactory.

MAKEUP OF COURSE DEFICIENCIES FOR PROMOTION OR ACADEMIC GOOD STANDING

A student who has failed to satisfy the requirements for promotion or for academic good standing, if permitted to continue by the Committee on Honors and Academic Standing, must repair the deficiency promptly. Such deficiencies are to be repaired before the opening of the next fall term by work in summer school. The institution to be attended and the courses to be taken require the approval of the residential college dean. See section O, "Credit from Other Universities." Only in extraordinary circumstances will a student be allowed to repair a deficiency by carrying an additional course during the following academic year. Course deficiencies may not be repaired under any circumstances by the application of acceleration credits.

J. Leave of Absence, Withdrawal, and Readmission

LEAVE OF ABSENCE

Any student in Yale College who is in academic good standing will normally receive permission, upon petition to the Committee on Honors and Academic Standing through the residential college dean, to take one or two terms of leave of absence, provided that the student departs in academic good standing at the end of a term and returns at the beginning of a term. (See “Requirements for Academic Good Standing” in section D.) In order that the University may make plans to maintain enrollment at the established level, students desiring leaves of absence are requested to make their intentions known to their residential college deans as soon as possible. Yale College assumes that students who take leaves of absence will inform their parents or guardians in good time that they intend to do so. Ordinarily, residential college deans do not notify parents or guardians that a student has taken a leave of absence, though they may do so if they believe that such notification is appropriate.

1. **Petition for a fall-term leave** For a fall-term leave of absence, a student is requested to submit a petition by May 1. Since a student’s plans often change during the summer, however, the Committee on Honors and Academic Standing will ordinarily grant a petition for a leave that is received on or before the tenth day of the term in the fall. See paragraph 3 below.
2. **Petition for a spring-term leave** For a spring-term leave of absence, a student’s petition must be received on or before the tenth day of the term in the spring. See paragraph 3 below.
3. **Relinquishing housing** Students considering a leave of absence should be aware that there is a substantial financial penalty for relinquishing on-campus housing after the relevant deadlines for relinquishing such housing. See “Rebates of Undergraduate Charges” in the section “Financial Regulations” in the Yale College online publication *Undergraduate Regulations*.
4. **Canceling a leave** A student may cancel a leave of absence for either term as late as the first day of classes in the term for which the leave has been requested. However, the deadlines for payment of the term bill and the penalties for late payment apply in such cases. See “Payment of Bills” in the section “Financial Regulations” in the *Undergraduate Regulations*.
5. **Total terms of leave** A student is eligible for a total of two terms of leave of absence. These two terms need not be taken consecutively.
6. **Accelerated students** A student taking an accelerated degree by use of acceleration credits who has had two terms of leave of absence may receive a third term of leave if the third term of leave is needed to bring the student’s pattern of attendance into conformity with the pattern of attendance stipulated for an accelerated degree. See section P, “Acceleration Policies.”

7. **Returning from a leave** Permission to take a leave of absence normally includes the right to return, with prior notification to the residential college dean but without further application, at the beginning of the term specified in the student’s petition to the Committee on Honors and Academic Standing. In the case, however, in which a student achieved eligibility for a leave of absence because of a postponement of a deadline for course work as a result of an identified medical problem, the Yale College Dean’s Office may require medical clearance from Yale Health before the student’s return from the leave of absence.
8. **Financial aid** Students taking leaves of absence who have received long-term loans will be sent information about their loan repayment obligations, which in most cases begin six months after the last day of formal enrollment at Yale. A student taking a leave of absence who is receiving financial aid through Yale must consult with a counselor in the Student Financial Services Center before leaving Yale; see “Rebates of Undergraduate Charges” in the section “Financial Regulations” in the *Undergraduate Regulations*.
9. **Health coverage** A student on a leave of absence is eligible to retain coverage by Yale Health during the time of the leave, but the student must take the initiative to apply for continued membership in Yale Health by completing an application form and paying the fee for membership. See “Leave of Absence” in the section “Health Services” in the *Undergraduate Regulations*. Application forms and details about medical coverage while on leave of absence may be obtained from the Member Services Department of Yale Health.

MEDICAL WITHDRAWAL

A withdrawal for medical reasons must be authorized by the director of Yale Health or the chief of the Mental Health and Counseling department, or by their official designees within the Health Center. If a student under the care of a non–Yale Health physician wishes to withdraw for medical reasons, that physician should submit sufficient medical history to the director of Yale Health for a final decision on the recommendation. A student planning to return to Yale should discuss the requirements for readmission with the residential college dean or the chair of the Committee on Readmission.

Yale College reserves the right to require a student to withdraw for medical reasons when, on recommendation of the director of Yale Health or the chief of the Mental Health and Counseling department, the dean of Yale College determines that the student is a danger to self or others because of a serious medical problem, or that the student has refused to cooperate with efforts deemed necessary by Yale Health to determine if the student is such a danger. An appeal of such a withdrawal must be made in writing to the dean of Yale College no later than seven days from the date of withdrawal.

WITHDRAWAL FOR PERSONAL REASONS

At any time during the year, a student may withdraw from Yale College for personal reasons. After consulting with the residential college dean, a student wishing to withdraw should write a letter of resignation to the college dean. In consulting with the college dean, a student

planning to return to Yale should discuss the requirements for readmission. Also, students in academic good standing who fail to register in a term will be withdrawn for personal reasons.

REBATES OF UNDERGRADUATE CHARGES

For information on financial rebates on account of withdrawal from Yale College, consult the section “Financial Regulations” in the *Undergraduate Regulations*.

READMISSION

During the time that a student who has withdrawn is away from Yale College, the Committee on Readmission expects him or her to have been constructively occupied and to have maintained a satisfactory standard of conduct.

Students whose withdrawal was for either academic reasons or personal reasons must remain away for at least one fall term and one spring term, in either order, not including the term in which the withdrawal occurred. Students whose withdrawal had been authorized as medical by the director of Yale Health must normally remain away at least one full term before a return to Yale College, not including the term in which the withdrawal occurred. The period of withdrawal for disciplinary reasons is set by the Yale College Executive Committee at the time the student’s enrollment is suspended.

Further requirements depend to some extent on the circumstances of the withdrawal and its duration. Students who are not in academic good standing, i.e., students who withdrew while a term was in progress or who were dismissed for academic reasons (see section I), must ordinarily complete the equivalent of at least two term courses, either in Yale Summer Session or at another college or university, earning grades of A or B. Courses conducted on line, whether taken at Yale Summer Session or elsewhere, do not fulfill this readmission requirement. In general, such a record of course work is also required of students who withdrew for medical reasons and of any students who have been away from full-time academic work for two years or more, whether or not they were in academic good standing at the time of their departure, in order to demonstrate that upon return they can satisfactorily complete their academic program. Courses themselves, as well as the institution at which they are taken, should be cleared in advance with the chair of the Committee on Readmission or the applicant’s residential college dean. In some cases, the Committee on Readmission may require more than two courses or courses in a specific subject area. All such course work must be completed no later than the opening of the term to which the student has applied to be readmitted, but no earlier than two years before the date that term begins. Courses completed in fulfillment of readmission that are eligible for graduation credit must be applied to the student’s Yale College transcript.

Interviews with members of the committee are required of all applicants. The committee cannot approve a student’s return to Yale College until after the necessary interviews have taken place. These may include meetings for any applicant with the chair of the committee, the applicant’s residential college dean, and any other member of the committee, including a member of the Yale Health staff. Interviews are normally conducted just prior to the beginning of the term to which the student is seeking readmission.

As an integral part of the application for readmission, students who withdrew for medical reasons must obtain a recommendation from Yale Health. Such a recommendation

must come from either the director of Yale Health or the chief of the Mental Health and Counseling department, or from their official designees within the Health Center; no such recommendation can be made in the absence of documentation provided to Yale Health that the student has had successful treatment from an appropriate health clinician.

Inquiries about readmission should be directed to the chair of the Committee on Readmission, Yale College Dean's Office, 110 SSS, Yale University, P.O. Box 208241, New Haven, CT 06520-8241. The first inquiry about readmission to a fall term should come no later than the previous April 30, and applications must be submitted in person or by receipted mail by June 1. The first inquiry concerning readmission to a spring term should come no later than the previous September 30, and applications must be submitted in person or by receipted mail by November 1. These deadlines are strictly enforced.

While the majority of students who apply for readmission do return to Yale College, readmission is not guaranteed to any applicant. Since the committee seeks to readmit only those students who have demonstrated the ability henceforth to remain in academic good standing and thus complete degree requirements within the specific number of terms of enrollment remaining to them, the committee may sometimes advise an applicant to defer his or her return until a time later than the one originally proposed.

Students who are readmitted to Yale College are expected to be complete and passing in all their courses at the conclusion of each of the two terms following their readmission. A student who fails to meet this condition is ordinarily required to withdraw after his or her record has been reviewed by the Committee on Honors and Academic Standing. A student is eligible to be readmitted only once; a second readmission may be considered only under unusual circumstances, ordinarily of a medical nature.

For complete information about readmission to Yale College, consult the brochure "General Information concerning Readmission to Yale College," available from the Committee on Readmission.

U.S. MILITARY SERVICE READMISSION POLICY

Students who wish or need to interrupt their studies to perform U.S. military service are subject to a separate U.S. military leave readmission policy.

In the event a student withdraws or takes a leave of absence from Yale College on or after August 14, 2008, in order to serve in the U.S. military, the student will be entitled to guaranteed readmission under the following conditions:

1. The student must have served in the U.S. Armed Forces for a period of more than thirty consecutive days.
2. The student must give advance written or verbal notice of such service to his or her residential college dean. In providing the advance notice the student does not need to indicate whether he or she intends to return. This advance notice need not come directly from the student, but rather, can be made by an appropriate officer of the U.S. Armed Forces or official of the U.S. Department of Defense. Notice is not required if precluded by military necessity. In all cases, this requirement of giving notice can be fulfilled at the time the student seeks readmission, by submitting an attestation that the student performed the service.

3. The student must not be away from the University to perform U.S. military service for a period exceeding five years (this includes all previous absences to perform U.S. military service but does not include any initial period of obligated service). If a student's time away from the University to perform U.S. military service exceeds five years because the student is unable to obtain release orders through no fault of the student or the student was ordered to or retained on active duty, the student should contact his or her residential college dean to determine if the student remains eligible for guaranteed readmission.
4. The student must notify Yale within three years of the end of the U.S. military service of his or her intention to return. However, a student who is hospitalized or recovering from an illness or injury incurred in or aggravated during the U.S. military service has up until two years after recovering from the illness or injury to notify Yale of his or her intent to return.
5. The student cannot have received a dishonorable or bad conduct discharge or have been sentenced in a court-martial.

A student who meets all of these conditions will be readmitted for the following term unless the student requests, in writing, a later date of readmission. Any student who fails to meet one of these requirements may still be eligible for readmission under Yale's general readmission policy but is not guaranteed readmission. Upon returning to Yale, the student will resume his or her education without repeating completed course work for courses interrupted by U.S. military service. The student will have the same enrolled status last held and will be in the same academic standing. For the first academic year in which the student returns, the student will be charged the tuition and fees that would have been assessed for the academic year in which the student left the institution. Yale may charge up to the amount of tuition and fees other students are assessed, however, if veterans' education benefits will cover the difference between the amounts currently charged other students and the amount charged for the academic year in which the student left. In the case of a student who is not prepared to resume his or her studies with the same enrollment status and academic standing as when he or she left or who will not be able to complete the program of study, Yale will undertake reasonable efforts to help the student become prepared. If, after reasonable efforts, Yale determines that the student remains unprepared or will be unable to complete the program, or Yale determines that there are no reasonable efforts it can take, Yale may deny the student readmission.

K. Special Arrangements

YEAR OR TERM ABROAD

In recognition of the value of international study, Yale College encourages students to spend a term or an academic year studying in an approved program abroad. In order to participate in a Year or Term Abroad, students must have the approval of the Yale College Committee on the Year or Term Abroad and have been accepted into an approved and accredited study-abroad program. Students in any major may apply. Please note that a

term abroad may be taken only during the second term of the sophomore year or either the first or second term of the junior year, and that a year abroad may be taken only during the junior year. Within the limits of the eligibility requirements given below, other combinations of terms of study abroad may be permitted with the approval of the Committee on the Year or Term Abroad. Students are limited to a total of two terms abroad for full Yale credit and financial aid transfer. To be eligible, students must be in academic good standing as a junior or second-term sophomore, as appropriate, to begin an approved term or year abroad and be able to return to enrollment at Yale in academic good standing (see “Requirements for Academic Good Standing” in section D). Students must also have at least a B average at the time of their application and demonstrate sufficient competence in the language of the host country to do university-level course work. In general, by the time that they go abroad students should have completed the relevant intermediate-level foreign language course (typically a course numbered 140 with an L4 designation) or have demonstrated the equivalent proficiency by examination. Study in an English-speaking country or participation in any other program abroad in which instruction is in English is permitted when the student articulates clear academic objectives for such a program. Applicants may petition the committee for an exception to eligibility requirements if they believe they have compelling reasons for the exception.

Application forms for a Year or Term Abroad are available on the Web site of the Center for International and Professional Experience, cipe.yalecollege.yale.edu. A complete application includes all of the following: the application form; an approval form from the student’s director(s) of undergraduate studies; an evaluation form from the student’s residential college dean; a foreign language evaluation form (if applicable); and a statement concerning the proposed course of study. Students on Yale financial aid must also submit a Year Abroad Budget for Financial Aid Applicants to the appropriate office. Approval from the Yale College Committee on the Year or Term Abroad is contingent upon the student’s acceptance into a program or university abroad. Students must provide a copy of their acceptance letter to the committee before departure.

Applications for permission to study abroad in the spring term of the academic year 2012–2013 are due on October 15, 2012. Applications for study in the fall term of the academic year 2013–2014 or for the full academic year 2013–2014 are due on March 5, 2013. Early applications that meet all requirements as listed in this bulletin are reviewed on a rolling basis until the final deadline.

Applications for programs or universities abroad are available directly from the sponsoring institutions. Information about specific programs, including course descriptions, addresses and telephone numbers of the programs, and evaluations from past Yale participants, can be found at the Center for International and Professional Experience. Note that application deadlines differ from program to program and usually also differ from the Yale College committee’s deadline. Students are responsible for meeting the deadlines set by the programs they seek to attend, whether those deadlines fall before or after the Yale College committee’s deadline.

In selecting programs abroad in which to enroll, students should be aware that such programs vary in quality, and some may not be approved for a Year or Term Abroad. At a minimum, approved programs must involve full-time work at the university level and must be undertaken during the regular academic year at an institution outside the United States. Students should note that programs in the Southern Hemisphere are

subject to a different academic calendar, one which extends into the months of June, July, and August. With this exception, summer terms do not qualify as part of a Year or Term Abroad.

A list of programs which have had the approval of the committee in the past and in which Yale students have participated with success is available on the Web site of the Center for International and Professional Experience. Students applying to enroll in programs not previously reviewed or approved by the committee may be required to furnish informational literature about the program, course syllabi, or a letter of support from a Yale faculty member familiar with the program. The committee evaluates programs primarily on the quality and structure of their academic offerings. Study abroad advisers are available in the Center for International and Professional Experience to assist students in selecting an appropriate program.

1. **Course credits** Students on a Year Abroad who complete a full program of study for the equivalent of two terms of enrollment at Yale may earn up to nine course credits. Students on a Term Abroad who complete a full program of study for the equivalent of one term of enrollment at Yale may earn up to four course credits. What the committee considers a full program of study varies from program to program. Students should consult with the Center for International and Professional Experience to ensure that they are enrolled in a full program abroad.

Usually, if the student has consulted with the director of undergraduate studies and an adviser in the Center for International and Professional Experience before going abroad, the award of credit upon return from a Year or Term Abroad is routine.

2. **Course credit from outside Yale** Enrollment in the Year or Term Abroad program is the only arrangement by which students may offer more than two outside credits toward the thirty-six course credits required for the bachelor's degree.* Students receiving credit for a Year Abroad may not apply any other credits from outside Yale toward the 36-course-credit requirement. Students receiving credit for a Term Abroad may apply up to two other course credits from outside Yale toward the 36-course-credit requirement.
3. **Evidence of course work** To be awarded credit toward degree requirements, students must submit to the committee such evidence of their achievement as transcripts or other official academic records, wherever possible. Students should also be prepared to provide on their return to Yale copies of all course work, syllabi, and letters from instructors describing the nature and quality of their work.

*Study during the academic year at the Paul Mellon Centre in London (Yale-in-London) is equivalent to enrollment in Yale College and is not considered a Term Abroad. Application to the Yale-in-London program should be made directly to that office at the Yale Center for British Art. For details, see under "Yale-in-London" in chapter I and under British Studies in chapter III. Likewise, study during the academic year in the Peking University–Yale University Joint Undergraduate Program in Beijing is equivalent to enrollment in Yale College and is not considered a Year or Term Abroad. For details, see under Peking University–Yale University Joint Undergraduate Program in chapter III.

4. **Grades** No credit will be awarded for a course in which the grade earned was lower than a C or its equivalent in other grading scales. Nor will credit be awarded for a course taken on a Pass/Fail option, if the student had the choice of taking the course for a letter grade.
5. **Distributional requirements and major requirements** In addition to applying credits earned on a Year or Term Abroad toward the 36-course-credit requirement, students may, with appropriate permissions, apply these course credits toward fulfillment of distributional requirements and some of the requirements of their major programs. Petitions for credit toward the distributional requirements should be directed to the director of study abroad; petitions for credit toward major requirements should be directed to the relevant director of undergraduate studies.
6. **Academic regulations** Because a Year or Term Abroad counts as the equivalent of one or two terms of enrollment in Yale College, the academic regulations of Yale College pertain to enrollment abroad. Students must earn a sufficient number of credits abroad to remain in academic good standing. Failure to do so will result in academic warning or dismissal for academic reasons. (See section I, “Academic Penalties and Restrictions.”) Withdrawal from an approved program abroad has the same consequences as withdrawal from Yale College.
7. **Canceling a Year or Term Abroad** Students who have received permission to study abroad but later decide not to do so must notify their residential college dean in writing of their change of plans and then either enroll as usual in Yale College or apply for a leave of absence before the deadline (see section J, “Leave of Absence, Withdrawal, and Readmission”). In some cases, such students will have to withdraw from Yale College if the deadline for requesting a leave has passed, or they have already taken two terms of leave, or the deadline for enrolling in courses in Yale College has passed. Under no circumstances can a Year or Term Abroad be converted retroactively to a leave of absence. Similarly, a leave of absence cannot be converted retroactively to a Year or Term Abroad.
8. **Enrollment in Yale College after a Year or Term Abroad** After returning from a Year or Term Abroad, students must enroll in Yale College for at least two terms. Students who have accelerated should speak with their residential college dean about the possible need to decelerate (see section P, “Acceleration Policies”).
9. **Financial aid** Students who have been approved by the committee to study abroad and who receive financial aid from Yale are eligible for aid while abroad. For information about financial aid support, consult a counselor in the Student Financial Services Center, 246 Church Street, 432-2700.

COMPLETION OF DEGREE REQUIREMENTS AT THE END OF A FALL TERM

Students who at the end of a fall term complete the requirements for graduation may be of three kinds: (1) those who complete such requirements in eight terms of regular enrollment; (2) those who have accumulated thirty-six course credits or more, all earned at Yale,

in fewer than eight terms of regular enrollment; and (3) students admitted by transfer to Yale College and students whose admission to Yale College was deferred until a spring term. (Note that acceleration credits may not yield a completion of degree requirements at the end of a fall term; see section P, “Acceleration Policies.”) The following rules apply to students of these three kinds.

1. **Notification by the student** By the day on which the student’s course schedule is due in the final term of enrollment, the student must notify the Committee on Honors and Academic Standing through the residential college dean that the fall term will be the student’s last term of enrollment. Forms on which to make such notification are available in the offices of the college deans. Notification must include written certification from the student’s director of undergraduate studies that the student will have completed all the requirements of the major program by the end of the fall term, and from the student’s residential college dean that the student will have fulfilled the distributional requirements by that time. Failure to observe the deadline will result in the student’s being charged a fine of \$100.
2. **Award of degrees and diplomas** Students who complete degree requirements at the end of a fall term are awarded their degrees and their diplomas at Commencement at the conclusion of the spring term of that academic year and are considered to be members of the class that graduates at that Commencement. General Honors and Distinction in the Major are also awarded at that time. If a student who completes degree requirements at the end of a fall term wishes to participate in the Commencement exercises held in the previous academic year, however, the student may do so with the permission of the residential college master and dean. Such might be the case, for example, of a student who because of a leave of absence did not qualify for graduation with the class in Yale College with which he or she entered as a freshman. Such a student would not receive the degree or diploma until the May of the academic year in which degree requirements were completed.
3. **Health coverage** A student whose last term of enrollment is a fall term is eligible, upon application and payment of a fee, for continued coverage by Yale Health during the subsequent spring term, just as if the student were on leave of absence for that term. Such coverage extends to August 31. See “Leave of Absence” in section J.

TWO MAJORS

A student must petition the Committee on Honors and Academic Standing for permission to complete the requirements of two major programs. Application forms are available from the residential college deans. A student contemplating the completion of two majors should bear in mind that doing so will almost invariably limit the opportunities for a wider distribution of studies over different subjects.

Each major must be completed independently of the other, with no more than two term courses overlapping. Prerequisites in either major are not considered to be overlapping courses. Other than such prerequisites, all courses taken in a major – including those taken in excess of the minimum requirements of the major – are counted in the consideration of overlapping courses unless such courses are in excess of the minimum requirements

for both majors. Overlapping courses may not include the senior essay or senior project, unless the essay or project is unusually substantial and represents at least the equivalent of the minimum essay or project requirement of the one major in addition to the minimum essay or project requirement of the other major. If a single senior essay or project is approved for the two majors, no additional overlap in course credits is permitted.

It is not possible to offer as two majors a combined major with one of its component majors. For example, a major in Economics and Mathematics cannot be joined with a second major in either Economics or Mathematics. Similarly, a student completing a major that permits the inclusion of a concentration of courses from another major or program cannot also major in that second major or program. For example, a major in Sociology with Psychology cannot have a second major in Psychology. A Special Divisional Major may not be offered as one of two majors.

A petition for two majors should show clearly how the requirements for each of the two programs will be met, and should include the approval of the appropriate directors of undergraduate studies. The completion of two majors does not result in the award of two degrees; a student who completes a major that leads to the award of the B.A. degree and another major that leads to the award of the B.S. degree may choose the degree to be conferred. A petition to complete the requirements of two majors should be made only after the student's plans are definite, but no later than the due date for course schedules in the student's final term of enrollment. Petitions submitted after this deadline will be accepted only by exceptional action of the Committee on Honors and Academic Standing and will be fined \$50.

A student may not petition for permission to complete the requirements of more than two major programs.

SPECIAL DEPARTMENTAL MAJOR

In special cases, a department or program may recommend to the Committee on Honors and Academic Standing that a student be awarded from four to six course credits for a two-term senior essay or project. The request for such an arrangement, with supporting information, must come from the director of undergraduate studies as early as possible before the beginning of the student's next-to-last term of enrollment. A student in the Special Departmental Major must, in addition to the senior project, complete at least three regular term courses during the last two terms of enrollment. Students who are interested in pursuing a Special Departmental Major should consult the appropriate director of undergraduate studies.

DOUBLE CREDIT FOR A SINGLE-CREDIT COURSE

Two course credits for a course normally carrying one course credit may be awarded to a student under the following conditions:

1. **Deadline** Permission must be requested by midterm, i.e., October 19, 2012, in the fall term, and March 8, 2013, in the spring term.

2. **Petition and approvals** The student's petition must be approved by the instructor of the course, the director of undergraduate studies in the instructor's department, and the Committee on Honors and Academic Standing. The petition should include a detailed syllabus and an explanation of how the student's proposed work represents at least twice the normal expectations of the course.
3. **Distributional requirements** When a petition for double credit is approved for a course that fulfills a distributional requirement, the additional credit may not be applied toward the distributional requirement, although it may be applied toward the 36-course-credit requirement for graduation.
4. **Multiple courses** A student may make use of this arrangement rarely, no more than once or twice.

SPECIAL TERM COURSES

With the approval of the Yale College Committee on Honors and Academic Standing, a student may arrange with a member of the faculty to take a Special Term Course, or individual tutorial, for credit toward the bachelor's degree, provided that certain requirements are met. First, the material of the proposed course must be appropriate to the qualifications of the student and it must be otherwise unavailable in the Yale curriculum. If the subject can be pursued through independent study in an existing tutorial course in a department (e.g., HIST 494, PLSC 471 and 472), the student must apply for enrollment in that course through the director of undergraduate studies. Second, the instructor of the proposed special course must hold a teaching appointment in the University. Third, the student must describe in detail the nature of the proposed course work and submit a syllabus.

Requests for Special Term Courses should be made to the Committee on Honors and Academic Standing, 110 SSS, on forms available from the residential college deans. The application form must be completed by the student and then approved and signed by the proposed instructor and the director of undergraduate studies of the instructor's department. A request for a Special Term Course should be made during the term immediately preceding the term during which the course is actually to be taken. An application will not be accepted by the committee after the second week of the term for which a course is proposed. It is expected that Special Term Courses will be taken for a letter grade. A student may not apply credit earned in a Special Term Course toward satisfaction of any of the distributional requirements.

LIMIT ON RESIDENTIAL COLLEGE SEMINARS

The number of residential college seminars is limited and the demand for them is great. A student may therefore take no more than four residential college seminars, and no more than two in a single term. Permission to exceed these limits must be secured in advance from the Yale College Committee on Honors and Academic Standing; such permission will be given only if the student can demonstrate that the integrity or coherence of the student's academic objectives would suffer without it.

COURSES IN THE YALE GRADUATE AND PROFESSIONAL SCHOOLS

When a course is open to undergraduate as well as either graduate or professional school students, a Yale College student must enroll under the undergraduate number, unless already accepted into the program for the simultaneous award of the bachelor's and master's degrees. A student may request to elect a graduate or professional school course, other than those designated independent study, by means of a form downloaded from www.yale.edu/sfas/registrar. Such requests should be made as early as possible in the term in which enrollment is sought and not later than one month after the first day of classes of the term. Forms that are submitted after this date will be accepted only by exceptional action of the Committee on Honors and Academic Standing and will be subject to a fine of at least \$50, with increases of \$5 daily according to lateness. The form must be completed by the student and signed by the course instructor. For enrollment in a course in the Graduate School of Arts and Sciences, the form must also be signed by the director of graduate studies in the department in which the course is offered. For enrollment in a course in any of the professional schools of the University, the form must also be signed by the appropriate agent of the dean or the registrar of the school in which the course is offered. Note that Yale College students are not permitted to enroll in independent study courses in the Graduate School of Arts and Sciences or in any of the professional schools of the University.

A student may offer toward the 36-course-credit requirement for the bachelor's degree as many as four course credits earned in professional schools of the University. More than four such credits may be taken, and they will appear for credit on the student's transcript, but they must be offered in excess of the 36-course-credit requirement. Courses taken in the Graduate School of Arts and Sciences are not included in this four-credit restriction.

Note that systems for the award of course credit in the professional schools differ and that not all courses in these schools yield a full course credit in Yale College.

Courses in performance in the School of Music may be taken only after completion of MUSI 360, 361, 460, and 461, in the Department of Music. Performance courses in the School of Music may not be counted toward the 36-course-credit requirement for the bachelor's degree. Such courses will be included on the student's transcript, but must be offered in excess of the thirty-six credits required for graduation. For further information, see the section entitled "Individual Instruction in Performance" under Music in chapter III. Nonperformance courses in the School of Music may be taken for credit without previous completion of MUSI 360, 361, 460, and 461; such courses are also included in the limit of four credits that may be earned in professional schools of the University.

The deadlines and regulations of Yale College are binding on all students, including candidates for the simultaneous award of the bachelor's and master's degrees, in regard to courses in which they are enrolled in the Graduate School of Arts and Sciences and the professional schools of the University. These include the deadlines and regulations pertaining to withdrawal from courses, late or postponed work, work incomplete at the end of term, and double credit in a single-credit course. An exception in deadline may be made in a course offered in a professional school of the University in which the academic calendar

differs from that of Yale College. A request for such an exception must be grounded in compelling academic reasons, and must be made in writing by the instructor of the course to the student's residential college dean in advance of the deadline in question. Instructors of courses in the Graduate School and in the professional schools of the University are expected to use the Yale College grading system when they report grades for undergraduates who have completed their courses.

SIMULTANEOUS AWARD OF THE BACHELOR'S AND MASTER'S DEGREES

A limited number of students of distinguished ability may undertake graduate work that will qualify them for the simultaneous award of the bachelor's and master's degrees at the end of their senior year. Students must apply to their department for admission to the program through their director of undergraduate studies no later than the first day of classes of their third-to-last term in Yale College. If the department acts favorably on the student's application, it is forwarded with the formal approval of the director of undergraduate studies and of the director of graduate studies to the Yale College Dean's Office, where a joint committee of Yale College and the Graduate School acts upon the department's nomination and notifies the student of acceptance into the program. The director of the Program for the Simultaneous Award of the Bachelor's and Master's Degrees is Dean George Levesque.

1. **Eligibility** Applicants cannot be considered for admission unless by the end of their fifth term of enrollment they have achieved at least two-thirds A or A– grades in all of their course credits as well as in all of the course credits directly relating to their major. (Particular deadlines and specific grade requirements are listed in chapter III for the programs for the two degrees in Chemistry; Ecology and Evolutionary Biology; Economics; Mathematics; and Molecular, Cellular, and Developmental Biology. Nominations from these departments also require confirmation by the joint committee.)

Prior to admission to the program, students enrolling in a course that carries both an undergraduate and a graduate number must do so under the undergraduate number. Students planning to apply to the program who enroll in such a course may petition at the time of their enrollment in the course to have it converted to the graduate number on the academic record if they are subsequently admitted to the program. The petition, which is made to the director of the program, must be accompanied by certification that the course instructor has accepted the student's proposal to complete the course at its graduate level.

2. **Program requirements** Yale will award the master's degree and the bachelor's degree simultaneously only in a single department or program that confers both degrees. A student in the Special Divisional Major or any other major that does not have an exact counterpart in the Graduate School is not eligible for the combined degree program. A student cannot qualify for the simultaneous award of a bachelor's degree in one department or program and a master's in another.

Specific requirements for the award of degrees will be determined by each department. Normally a student is expected to complete the requirements of the

undergraduate major in addition to eight or more courses in the Graduate School. For all students in the program, graduate work must not be entirely concentrated in the final two terms, and students in the program must take at least six term courses outside the major during their last four terms at Yale and at least two undergraduate courses during their last two terms.

Students may not enroll in Yale College for more than eight terms in order to qualify for the simultaneous award of both degrees. It is possible to earn both degrees in fewer than eight terms, but not by the use of acceleration credits. Upon acceptance into the program, a student who has accelerated by the use of acceleration credits will automatically be decelerated, and may not, so long as the student remains in the simultaneous degree program, subsequently employ the credits to accelerate.

3. **Requirements for the master's degree** To qualify for the master's degree, students must complete eight term course credits in the Graduate School with grades of A in at least two term courses (or in one year course) and with a B average in the remaining ones. Students in those departments with a language requirement for the Ph.D. degree will be required to demonstrate proficiency in one of the specified languages.
4. **Approval of course schedules** Following notification that they have been accepted into the Program for the Simultaneous Award of the Bachelor's and Master's Degrees, students must have their course schedules approved each term both by the director of undergraduate studies and by the director of graduate studies.

COURSES IN YALE SUMMER SESSION

There is no limit on the number of courses in Yale Summer Session that a student may offer toward the requirements for the bachelor's degree.

Attendance at Yale Summer Session does not constitute a term of enrollment in Yale College. Thus a student accelerating by one term by use of acceleration credits may not offer attendance at Yale Summer Session as one of the required seven terms of enrollment in Yale College.

A student accelerating by the early accumulation of thirty-six course credits all earned at Yale may count credits earned in Yale Summer Session toward such acceleration. See "Acceleration by the Early Accumulation of Thirty-Six Course Credits All Earned at Yale" in section P.

Courses successfully completed in Yale Summer Session may, with the permission of the student's director of undergraduate studies, be counted toward the requirements of the student's major program. They may also be counted toward any of the distributional requirements. The Credit/D/Fail option may not be used in Summer Session courses. There are no auditing privileges in Yale Summer Session.

Unless the Registrar's Office is instructed in writing to the contrary, courses completed in Yale Summer Session will be entered on the Yale College record. Once a course in Yale Summer Session has been entered on or removed from the Yale College transcript in response to a student's request, that action cannot subsequently be reversed by the student. When a Summer Session course is entered on a student's Yale College transcript, both the

course and the grade are recorded; the course may not be recorded without the grade. If a Summer Session course is entered on the Yale College transcript, it will be included in the calculation of the student's eligibility for General Honors and Distinction in the Major. For further information about Summer Session courses and transcripts, refer to the Summer Session Web site at *summer.yale.edu*.

YALE-IN-LONDON SUMMER PROGRAM

Courses in the summer program at the Paul Mellon Centre in London carry full Yale course credit, but enrollment in the Yale-in-London summer program does not constitute a term of enrollment in Yale College. (Attendance at the Yale College program at the Paul Mellon Centre in London during a spring term does count as a regular term of enrollment.) Thus a student accelerating by one term by use of acceleration credits may not offer attendance at the summer program at the Mellon Centre in London as one of the required seven terms of enrollment in Yale College.

A student accelerating by the early accumulation of thirty-six course credits all earned at Yale may count credits earned in the summer program at the Paul Mellon Centre in London toward such acceleration. See "Acceleration by the Early Accumulation of Thirty-Six Course Credits All Earned at Yale" in section P.

DIRECTED INDEPENDENT LANGUAGE STUDY

With the approval of the director of the Center for Language Study, a student may study a language not taught at Yale through the program in Directed Independent Language Study. Students may not apply to study a language being offered at the same time by Yale at the requested level. Students accepted into the program work on their own time, but on a schedule and with materials approved by the director of the Center for Language Study; they must meet regularly with a conversation partner; and they are tested at the end of the term in speaking, listening, reading, and writing. The director will approve only those proposals for which adequate materials, conversation partners, and testing can be arranged. Directed Independent Language Study does not earn Yale College course credit, nor does it appear on the transcript. Interested students should apply to the Center for Language Study.

AUDITING

Auditors are not permitted in courses taught in Yale College except for persons in one of the categories described below.

1. Students enrolled full time in Yale College or in one of the graduate or professional schools of the University may audit courses without charge. The permission of the instructor is required.
2. Members of the Yale faculty and emeritus faculty may audit courses without charge. The permission of the instructor is required.
3. Spouses or partners of full-time Yale faculty members, or of emeritus faculty, or of students enrolled full time in the University may audit courses without charge. Permission is required of the instructor and of Dean William Whobrey.

4. Employees of the University and their spouses or partners may audit courses without charge in accordance with applicable personnel policies. Permission is required of the instructor, of the employee's supervisor, and of Dean William Whobrey.

No other persons are permitted to audit courses in Yale College except for those accepted through the Association of Yale Alumni Auditing program. The Alumni Auditing program is administered separately from the general auditing program, and different rules may apply. Information is available at admissions.yale.edu/yale-alumni-auditing-program.

Persons auditing courses with limited laboratory or computer facilities must secure the explicit permission of the instructor to do so, and should understand that regularly enrolled students must at all times have priority in using such facilities. Computer or language laboratory facilities should be employed by auditors only during times when they are not in heavy demand, and in certain courses charges for computer use may be necessary. General access to the campus computing network may not be available to auditors.

It is the usual expectation that an auditor does not take tests or examinations or write papers for a course for evaluation by the instructor. Occasionally, however, an auditor may wish to do such work and may request the instructor to evaluate it. If the instructor wishes to cooperate with the auditor in this way, the instructor does so on a voluntary basis and not as an obligation.

The Registrar's Office does not keep a record of courses audited. It is not possible, therefore, for a student's transcript to show that a course has been audited, or for a transcript to be issued that records the auditing of a course.

Persons interested in auditing a course should visit the Yale College Special Programs Office, 55 Whitney Avenue, Suite 420.

L. Transfer Students

The following regulations apply to students admitted to Yale College by transfer from other colleges and universities:

1. **Degree requirements** In order to graduate from Yale College, transfer students must fulfill all the requirements for the bachelor's degree. They must thus earn a total of the equivalent of at least thirty-six course credits, that total consisting of the number of credits awarded for their work at their previous institutions combined with the number of course credits subsequently earned at Yale. They must also complete the requirements of a major program in Yale College and fulfill the distributional requirements for the bachelor's degree, which include the foreign language requirement. Upon their arrival at Yale, transfer students should consult carefully with the director of the transfer program in order to ascertain their status with regard to the distributional requirements, especially the foreign language requirement.
2. **Terms of enrollment at Yale** Transfer students are expected to enroll in Yale College for the number of terms designated at the time of the final credit evaluation made of their work at previous institutions. Under no circumstances may a transfer student complete fewer than four terms of enrollment in Yale College. Under no circumstances may a transfer student earn fewer than eighteen course credits at Yale or accelerate by the use of acceleration credits.

3. **Transfer of credits** A preliminary evaluation of transferable credits is made at the time of the student's admission. Final evaluation of transfer credits is completed when all official transcripts from a student's previous institutions have been received.
4. **Additional terms at Yale** Students who must remain at Yale beyond the terms designated in the final evaluation of transfer credits must petition the Yale College Committee on Honors and Academic Standing for permission to do so. Such a petition will be considered only if it is impossible for the student to complete the requirements for the bachelor's degree in the designated number of terms. See section A under "Eight Terms of Enrollment." A student thus granted permission to remain at Yale for an additional term, if the term represents more than the equivalent of eight terms of enrollment at the college level, is not eligible for scholarship assistance from Yale for the additional term, although other forms of financial aid may be available.
5. **Transcripts** A transfer student's Yale transcript indicates the institutions from which the student transferred to Yale, and the number of course credits earned there. It does not list the titles of courses taken or grades earned at the transfer student's previous colleges or universities. A transfer student who needs a record of studies completed before admission to Yale must secure a transcript from the previous institutions.
6. **Course credit from outside Yale** Transfer students may receive course credit for work completed outside Yale only for studies completed before matriculation at Yale; transfer students may not receive course credit for any outside courses taken after they have enrolled in Yale College. An exception is made for transfer students who earn credit on a Year or Term Abroad. Transfer students may attend a Year or Term Abroad provided that they enroll in Yale College proper for at least four terms, earning by attendance at Yale a minimum of eighteen course credits.
7. **Distributional requirements** Transfer students are not bound by the distributional requirements for the freshman, sophomore, or junior years, but they must fulfill the distributional requirements for the bachelor's degree. See paragraph 1 above. Transfer students are not eligible for the award of acceleration credit or for acceleration by use of acceleration credits.
8. **Attendance at Yale before enrollment** Once a student has been accepted for admission as a transfer student, the student may not attend Yale as an Eli Whitney student or a nondegree student before his or her first term of enrollment at Yale.

M. Eli Whitney Students Program

The Eli Whitney Students program is designed to meet the needs of students who may not be able to attend college full time by allowing nonresident students to enroll in Yale College courses for credit. The Eli Whitney Students program is for enrollment for the degree of Bachelor of Arts (B.A.) or Bachelor of Science (B.S.) only; students in the program are therefore ineligible for the simultaneous award of the bachelor's and master's degrees. Like all others enrolled in Yale College, students in this program are required to comply with the academic regulations.

To qualify for the bachelor's degree through the Eli Whitney Students program, a student must successfully complete at least thirty-six course credits or the equivalent, earning at least eighteen of the thirty-six credits at Yale while enrolled in the Eli Whitney Students program. As many as eighteen course credits earned at another college or university or in the Nondegree Students program at Yale may be transferred toward the requirements for the bachelor's degree. Such credit will be awarded for academic courses that were taken at an accredited institution and that were similar in content to Yale College courses. Grades of A or B are expected, and no more than one-quarter of courses accepted for transfer toward the requirements for the degree may have grades of C. Once a student has matriculated at Yale as a candidate for the bachelor's degree, as many as two course credits earned at another institution may be transferred to the student's Yale record, provided that the student earns no fewer than eighteen course credits at Yale. The regulations governing the transfer of such credits are given in section O, "Credit from Other Universities." The thirty-six course credits completed at Yale or elsewhere must meet the distributional requirements as described in chapters I and II. Students admitted prior to 2009 fulfill distributional requirements according to regulations for the Class of 2008, as listed in previous editions of this bulletin.

Candidates for a bachelor's degree must fulfill the requirements of one of the major programs listed at the beginning of chapter III. See "Major Programs" in chapter I.

1. **Academic requirements** The Eli Whitney Students program normally is to be completed in a period not exceeding seven years from initial enrollment. In any calendar year, an Eli Whitney student must have completed three courses to remain in academic good standing. Eli Whitney students are required to meet all of the academic obligations of any course in which they enroll and all requirements of their degree program. At the end of each term, the records of all Eli Whitney students will be reviewed; a student who does not have at least a C average for that term will be placed on Academic Warning and may not be permitted to enroll in a subsequent term.
2. **Registration and enrollment** Eli Whitney students submit their course schedules for approval to their residential college dean according to the submission deadline for seniors. Students admitted since the fall term 2007 are permitted to enroll for a full course load, up to 5.5 course credits each term, with the possibility of a greater term load if appropriate permissions are secured. See "Normal Program of Study" in section C. Students admitted prior to the fall term 2007 may normally enroll for no more than a total of six course credits during an academic year (exclusive of enrollment in Yale Summer Session). As an exception, a student may petition the director to enroll for a total of eight course credits in an academic year; such permission, if granted, will be granted one time only.
3. **Tuition and financial aid** Tuition for the 2012–2013 academic year for Eli Whitney students admitted before the fall term 2007 is \$3,240 per course credit; these students are not eligible for financial aid. Tuition for the 2012–2013 academic year for Eli Whitney students admitted since the fall term 2007 is \$4,700 per course credit; these students are eligible to apply for financial aid. Yale employees are entitled to a tuition reduction

as determined by the Office of Human Resources. Tuition must be paid in full to the Office of Student Financial Services before registration.

4. **Facilities and services** Eli Whitney students are entitled to use the library system together with the other facilities that are required for the courses in which they are enrolled, such as laboratories, computers, and the like. They are also eligible for services such as career counseling through Undergraduate Career Services and fellowships through the Center for International and Professional Experience. Eli Whitney students are entitled to purchase gymnasium membership and Yale Health coverage. Students in the Eli Whitney program are not eligible for undergraduate housing and they may not serve as freshman counselors.
5. **Regulations** Eli Whitney students are governed by the academic regulations of Yale College, wherever appropriate, and by the rules contained in the *Undergraduate Regulations*. In disciplinary matters, Eli Whitney students are subject to the jurisdiction of the Yale College Executive Committee.
6. **Leave of absence and withdrawal** See section J, “Leave of Absence, Withdrawal, and Readmission.” All regular deadlines and policies apply.
7. **Year or Term Abroad** With the approval of the director of the Eli Whitney Students program, the department of their major, and the Committee on the Year or Term Abroad, students enrolled in the Eli Whitney Students program may undertake study outside the United States for a full academic year or for either a fall or a spring term. An Eli Whitney student must comply with all deadlines and requirements of the Committee on the Year or Term Abroad. See “Year or Term Abroad” in section K. To be eligible to apply, an Eli Whitney student must have accumulated, before enrolling abroad, at least sixteen course credits but no more than twenty-two course credits toward the 36-course-credit requirement and have a B average in course work at Yale. Study abroad must involve full-time work at the university level. Eli Whitney students must enroll for at least two terms in Yale College after their return from study abroad and may not receive degree credit for any other work done at another university after their matriculation at Yale.
8. **Yale students** No person who was ever a regular student in Yale College may enter the Eli Whitney Students program before the lapse of five years after withdrawing from Yale College. A person who in the past has withdrawn from Yale College without graduating and who wishes to return to Yale as a candidate for the bachelor’s degree as an Eli Whitney student must make application to the Eli Whitney Students program and fulfill all of its requirements for the bachelor’s degree, including the requirement that at least eighteen course credits must be earned while the student is enrolled in the Eli Whitney Students program. Once a former Yale College student has entered the Eli Whitney Students program, that student can pursue the bachelor’s degree only through the Eli Whitney Students program.

Further information and application forms for the Eli Whitney Students program are available at admissions.yale.edu/eli-whitney.

N. Nondegree Students Program

The Nondegree Students program is designed to meet the needs of students with specific and defined educational goals, which may include personal or professional enrichment, exploration of new fields, or preparation for career changes. This program offers non-resident students who are unable to attend college full time the opportunity to enroll in Yale College courses for credit. The Nondegree Students program is open to graduates of Yale College, and is also open to academically qualified persons who have attended other colleges and universities, or who have not continued their education beyond high school. Like all others enrolled in Yale College, students in this program are required to comply with the academic regulations.

Nondegree students may enroll in from one to five courses in any academic term. Non-degree students may not take more than a total of eighteen course credits in the Nondegree Students program.

1. **Academic requirements** Nondegree students are required to meet all of the academic obligations of any course in which they enroll. At the end of a term, the record of any nondegree student who does not have at least a C average for that term will be reviewed, and that student may not be permitted to enroll in a subsequent term. To remain in academic good standing, a student is furthermore expected to complete at least one course per term. Withdrawal from all courses in any given term may jeopardize good standing and enrollment in a subsequent term. Students who plan not to enroll in courses in any given term must apply for a leave of absence on or before the tenth day of the term in question. A leave of absence can be granted for no more than two terms. Any student who does not enroll in courses in a term and does not apply for a leave of absence may be removed from the program.
2. **Registration and enrollment** All nondegree students register for courses with Dean William Whobrey, 55 Whitney Avenue, Suite 420, 432-2430. In general, admission to limited-enrollment courses is not available to nondegree students. Auditing is not permitted in the Nondegree Students program. Nondegree students are not eligible for enrollment in individual tutorial courses; nor are they eligible, while in the Non-degree Students program, for enrollment in courses in the graduate or the professional schools. Those interested in enrolling in such courses should apply directly to the Graduate School or to the particular professional school in whose courses they wish to enroll.
3. **Credit/D/Fail option** Nondegree students who wish to elect a course under the Credit/D/Fail option must make a compelling case for that election in a petition to Dean William Whobrey no later than September 12 for the fall term and January 25 for the spring term. Nondegree students may take no more than one course in a term using the Credit/D/Fail option, and must be enrolled in at least one other course worth a minimum of one course credit during the same term. A maximum of two courses may be taken Credit/D/Fail during a student's time in the Nondegree Students program.
4. **Tuition** The tuition for nondegree students during 2012–2013 is \$4,700 per course credit; Yale employees and their spouses are entitled to a tuition reduction as determined

by the Office of Human Resources. Tuition must be paid in full to the Office of Student Financial Services before registration. Yale provides no financial assistance for nondegree students. Students withdrawing from a course may be eligible for a refund of all or a portion of the tuition fees, in accordance with the tuition refund policy: (a) a student who drops a course for any reason on or before the last day of the course selection period will be refunded the tuition fees paid for that course; (b) a student who drops a course for any reason after the course selection period but on or before the day of midterm (Friday, October 19, for fall 2012, and Friday, March 8, for spring 2013) will be refunded one-half the tuition paid for that course; (c) a student who drops a course after midterm will not be refunded any portion of the tuition.

Fees for late submission of course schedules apply as outlined in section E of this chapter. Please note that payments completed after the registration deadline may be subject to late payment fees. Late payments will be accepted (with the addition of a late payment fee) no later than September 22, 2012, for fall 2012, and February 7, 2013, for spring 2013. Any student who has not completed payment in full for courses by these dates will not be permitted to enroll for that term.

5. **Facilities and services** Nondegree students are entitled to use the library system and other facilities that are required for the courses in which they are enrolled, such as laboratories, computers, and the like. For a fee, they are entitled to purchase gymnasium membership and Yale Health coverage. Nondegree students are not eligible for undergraduate housing and they may not serve as freshman counselors.
6. **Regulations** Nondegree students are governed by the academic regulations of Yale College and by the rules contained in the *Undergraduate Regulations*. In disciplinary matters, nondegree students are subject to the jurisdiction of the Yale College Executive Committee.
7. **Yale students** Students who have withdrawn from Yale College or who did not complete degree requirements within the number of terms of enrollment for which they were admitted may not return to Yale College to complete degree requirements as nondegree students. This rule includes former Yale College students who are currently employees of the University. Students on leave of absence may not be admitted to the Nondegree Students program.
8. **Yale graduates** Graduates of Yale College who have received the bachelor's degree after eight terms of regular enrollment are eligible to apply as nondegree students either on a full-time or on a part-time basis. But Yale College graduates who have taken degrees after fewer than eight terms of regular enrollment are eligible to apply as nondegree students only on a full-time basis until they have completed the equivalent of eight terms of enrollment in Yale College. Thus a student who took a seven-term degree must be a full-time student for the first term in which he or she is a nondegree student, but may be a part-time nondegree student in a subsequent term. For example, a student who has completed degree requirements at the end of a fall term after eight terms of regular enrollment is eligible to apply as a nondegree student either on a full-time basis or on a part-time basis during the subsequent spring term, but a student who has completed degree requirements at the end of a fall term after seven terms of regular enrollment is

eligible to apply as a nondegree student during the subsequent spring term only on a full-time basis. Please note that any courses taken by a former Yale College student in the Nondegree Students program will appear on the undergraduate transcript.

9. **Transfer students** Students who have been accepted for admission as transfer students may not attend Yale as nondegree students before their first term of enrollment at Yale.
10. **Application deadlines** Applications are due on October 1, 2012, for spring term 2013, and on June 1, 2013, for fall term 2013. Yale employees require permission of their supervisors to apply. Nondegree enrollment may begin in either the fall or the spring term.

Further information and application forms are available at admissions.yale.edu/non-degree-students-program.

O. Credit from Other Universities

A student may not employ course credits earned at another college or university to reduce the expected number of terms of enrollment in Yale College. Under the conditions described below, a student may apply as many as two course credits earned at another college or university toward the 36-course-credit requirement for graduation from Yale College. Forms on which to request the award of credit for study that has been completed elsewhere are available at the offices of the residential college deans. Before undertaking such outside study, the student should consult the residential college dean about both the institution to be attended and the course to be taken there. Courses in Yale Summer Session are not considered outside courses, and there is no limit on the number of such courses that a student may offer toward the requirements of the bachelor's degree; see "Courses in Yale Summer Session" in section K. Similarly, courses taken in the Yale College program at the Paul Mellon Centre in London, or in the Peking University–Yale University Joint Undergraduate Program in Beijing, are Yale courses and do not count as outside credit.

1. **Approval of credit** In order for credit to be given for courses taken elsewhere, all of the following conditions must be met:
 - (a) The director of undergraduate studies in the subject of a course taken elsewhere must approve the award of credit at Yale for the course.
 - (b) A student who has studied at an American university, or abroad on a program sponsored by an American university, must provide the office of the residential college dean with an official transcript of the work completed. A student who has enrolled in a program that is not sponsored by an American university should supply an official transcript if the sponsoring institution issues transcripts; if it does not, then the student must furnish an official certificate of enrollment, showing if possible the course or courses completed.
 - (c) Students seeking outside credit should be prepared to furnish a copy of the course syllabus, as well as essays and examinations written in the course. In some cases, a letter from the instructor of the course may be required, or the student may be asked to pass an examination on the material of the course. Such information may be particularly necessary in the case of study at a foreign university.

(d) Study undertaken in the United States must be at a four-year accredited institution that grants a bachelor's degree in the arts and sciences. Foreign study must be completed at a university or other approved institution. Credit may be awarded only for work done while a student was officially enrolled at such an institution, and cannot be given for any work completed independently of such formal enrollment.

(e) A grade of A or B is expected; a grade of C is acceptable. Credit cannot be given for a mark of Credit on a Credit/D/Fail option, nor for a grade of Pass on a Pass/Fail option, if the student had the choice of taking the course for a letter grade.

(f) In order for credit to be given for a course completed at another college or university, the course must carry a value of at least three semester credit hours; if the course is taken at an institution on the quarter system, it must carry a value of at least four-and-one-half quarter units.

(g) In order for credit to be given for a course completed at another college or university, the number of contact hours for the course must equal or exceed the number of contact hours for an equivalent course offered in Yale College during the fall or spring term, and the length of term (from the first to the last day of classes) must be at least four consecutive weeks.

2. **Residential college seminars** Residential college seminars are, by definition, courses that extend beyond the Yale College curriculum. They are not used as comparables for credit for outside courses, whether in Year or Term Abroad or for other considerations for outside credit.
3. **Work done while in secondary school** Course credit or distributional credit cannot be given for any college or university course taken while the student was still enrolled in secondary school. Work done after graduation from secondary school but before matriculation at Yale may be accepted on recommendation from the appropriate director of undergraduate studies.

As a regular exception to this rule, students who earned credits while still enrolled in secondary school as members of the Nondegree Students program in Yale College or as students in Yale Summer Session may apply such credits toward the requirements of the bachelor's degree.

4. **Limit of two course credits** Credit cannot be given for more than two course credits earned at another institution. An exception of one additional course credit may be made only by action of the Committee on Honors and Academic Standing upon the student's petition, normally after the final term of enrollment.
5. **Distributional requirements** With permission, course credit earned at another college or university may be applied toward the distributional requirements for the bachelor's degree and to those for the sophomore and junior years whether or not it is counted toward the 36-course-credit requirement for graduation; students should consult with the residential college dean to be directed to the appropriate authority for such approval. Credit from outside Yale may not be applied toward the distributional requirements for the freshman year. Note particularly that Yale does not award course credit or distributional credit for courses completed at another college or university before the student graduated from secondary school.

6. **The foreign language requirement and courses taken elsewhere** Students who have taken a course in a foreign language at another institution, either in the United States or through a program abroad, and who wish to offer that course toward fulfillment of the foreign language distributional requirement must secure the approval of the relevant director of undergraduate studies. While the approval process varies across departments, in no case can it be completed until an official transcript of the work has been received and reviewed by the department. Typically, an additional assessment of the student's work will be necessary, especially with respect to the level (e.g., L₃ through L₅) that has been achieved by the outside study. Such assessment might include a written or oral examination or both, a review of the course syllabus and written assignments, or other methods of evaluation. Some departments maintain a list of programs that have been previously evaluated, in which case the approval process is often simplified. Students are therefore strongly encouraged to consult the relevant department before undertaking language study elsewhere.
7. **Major requirements** At the discretion of the director of undergraduate studies in a student's major, work done at another institution may be counted as fulfilling a requirement of the student's major program. This may be done whether or not a course is credited toward the 36-course-credit requirement.
8. **Year or Term Abroad** Students receiving credit for foreign study on a Year Abroad are not eligible to apply additional credit from outside Yale toward the 36-course-credit requirement. Students receiving such credit on a Term Abroad may apply up to two course credits from outside Yale toward the 36-course-credit requirement.
 Students receiving credit for foreign study on a Year or Term Abroad may apply such credit toward the distributional requirements for the bachelor's degree or toward a requirement of the student's major program (see points 5 and 7 above).
9. **Summer Abroad** Students who wish to receive credit for summer study abroad with outside programs must apply for approval through the Summer Abroad program. The deadline to apply for 2012 Summer Abroad credit is March 1, 2013. Information about the application process, including a list of eligible programs, is available at the Center for International and Professional Experience, 55 Whitney Avenue, 3rd floor, and on the Web at www.yale.edu/yalecollege/studyabroad. Students receiving credit for foreign study on a Summer Abroad may apply such credit toward the distributional requirements for the bachelor's degree or toward a requirement of the student's major program (see points 5 and 7 above).
10. **Transfer students** Students admitted by transfer from another college or university may receive course credit from outside Yale only for work done before matriculation at Yale; transfer students may not receive course credit for any outside courses taken after they have enrolled in Yale College. An exception may under certain circumstances be made in the case of course credits earned by transfer students on a Year or Term Abroad. See section L, "Transfer Students." Transfer students must enroll in Yale College proper for at least four terms, and earn therein at least eighteen course credits.

11. **Correspondence courses, internships, and the like** Course credit cannot be given for a course taken by correspondence even if it is sponsored by another university, including accredited four-year institutions granting a bachelor's degree. It also cannot be given for such programs as internships, field studies, workshops, or "distance learning" arrangements, unless such programs include as a component a full, regular, academic course of instruction, and are certified by a transcript from an accredited four-year institution granting a bachelor's degree.
12. **Yale transcript** Outside courses may be entered on a student's Yale transcript only if they are applied to the 36-course-credit requirement, the distributional requirements, or the requirements of a major program. Such courses must be entered on the Yale transcript if they are to be applied toward any of these requirements. Except for transcripts of transfer students (on which see section L, "Transfer Students"), courses that are applied toward the 36-course-credit requirement are listed by title with indication of the credit units earned, but without grades. Courses that are applied toward the distributional requirements only are listed without grades and with the designation "for distributional credit only." Courses that are applied toward the requirements of a major program only are listed without grades and with the designation "for credit toward the major only." Once a course has been entered on a student's Yale transcript at the student's request, or as a consequence of readmission, the entry may not subsequently be removed at the student's request.
13. **Acceleration** See section P, "Acceleration Policies."

P. Acceleration Policies

ACCELERATION BY THE EARLY ACCUMULATION OF THIRTY-SIX COURSE CREDITS ALL EARNED AT YALE

A student may accelerate progress toward graduation by accumulating thirty-six course credits in fewer than eight terms of enrollment. Such a student must earn all thirty-six course credits at Yale and may not offer course credits earned at another institution in order to reduce the number of terms of enrollment at Yale.

1. **Study abroad** Terms spent on a Year or Term Abroad count as if they were terms of enrollment in Yale College, but course credits earned therein may not be applied to acceleration by the early accumulation of thirty-six course credits because all such credits must be earned at Yale. A spring term at the Yale College program at the Paul Mellon Centre in London or a fall or spring term at the Peking University–Yale University Joint Undergraduate Program in Beijing is, in fact, a term of enrollment in Yale College, and credits earned in either program may be applied to such acceleration. Attendance at Yale Summer Session or the summer program at the Paul Mellon Centre in London does not count as a term of enrollment, but course credits earned in these summer programs may be applied toward acceleration by the early accumulation of thirty-six credits all earned at Yale. See "Courses in Yale Summer Session" and "Yale-in-London Summer Program" in section K.

2. **Patterns of attendance** While students employing acceleration credits in order to acquire an accelerated degree are required to attend Yale in certain patterns of attendance (see below), no particular pattern of attendance is required from a student accelerating by the early accumulation of thirty-six course credits all earned at Yale.
3. **Six or seven terms of enrollment** Either a six-term degree or a seven-term degree may be acquired by the accumulation of thirty-six course credits earned at Yale; graduation after fewer than six terms of enrollment in Yale College by such an early accumulation of course credits is not permitted.
4. **Notification by the student** A student intending to accelerate through the early accumulation of thirty-six course credits all earned at Yale must notify the Committee on Honors and Academic Standing through the residential college dean of that intention by the day on which the student's course schedule is due in the final term of enrollment. Such notification must include written certification from the student's director of undergraduate studies that the student will have completed all of the requirements of the major program, and from the residential college dean that the student will have fulfilled the distributional requirements at the conclusion of that term. Failure to do so will result in the student's being charged a fine of \$100.
5. **Deceleration** A student may subsequently decelerate and take an eight-term degree. A reversion to an eight-term degree will not affect a student's academic good standing or eligibility for eight terms of financial aid.

ACCELERATION BY USE OF ACCELERATION CREDITS

For the definition of acceleration credits and the criteria for their award, see yalecollege.yale.edu/content/acceleration or appendix A of the *Freshman Handbook*. For the sake of equity and fairness, no exceptions can be made to the regulations governing the use of acceleration credits. Inquiries about acceleration may be addressed to the residential college dean or to Chair of the Committee on Advanced Placement and Acceleration, Registrar's Office, 246 Church Street, 432-2331.

1. **Eligibility** The following charts list the number of total credits needed to accelerate by one or two terms during a given term of enrollment:

<i>Acceleration by One Term</i>	<i>Minimum Total Credits</i>	<i>Minimum Yale Course Credits</i>	<i>Activated Acceleration Credits</i>
In the third term	12	8	4
In the fourth term	16	12	4
In the fifth term	21	17	4
In the sixth term	26	22	4

<i>Acceleration by Two Terms</i>	<i>Minimum Total Credits</i>	<i>Minimum Yale Course Credits</i>	<i>Activated Acceleration Credits</i>
In the third term	17	8	9
In the fourth term	21	12	9
In the fifth term	26	17	9

2. **Application deadline** Application to accelerate is made by submission of the required form to the office of the residential college dean. The deadline for applying for acceleration is the last day of classes in the respective term of enrollment given in the eligibility charts above. As a special exception, a student accelerating by one or two terms who wishes to complete a term of study abroad as early as during the third term of enrollment would have to petition to accelerate before the third term of enrollment. Such a student should consult with the residential college dean. The absolute and final deadline for applying for acceleration by one term is the last day of classes in the sixth term of enrollment. The absolute and final deadline for applying for acceleration by two terms is the last day of classes in the fifth term of enrollment.
3. **Course credit requirement for graduation** A student accelerating by two terms must earn at least twenty-seven course credits at Yale, and a student accelerating by one term must earn at least thirty-two course credits at Yale. Therefore, with the exception of credit earned through enrollment in the Year or Term Abroad program, a student accelerating by use of acceleration credits may not apply any credit earned at another college or university toward the 36-course-credit requirement for the bachelor's degree.
4. **Enrollment requirements, including required patterns of attendance** A student intending to accelerate by two terms must complete six terms of full-time enrollment in Yale College. Those six terms may be in any pattern of enrollment as long as the student's sixth and final term of enrollment is a spring term.

A student intending to accelerate by one term must complete seven terms of full-time enrollment in Yale College. Those seven terms may be in any pattern of enrollment as long as the student's seventh and final term of enrollment is a spring term.

A student accelerating by two terms may not combine acceleration credits and course credits to graduate in fewer than six terms; six terms of enrollment is the minimum as well as the maximum requirement for acceleration by two terms. Likewise, a student accelerating by one term may not combine acceleration credits and course credits to graduate in fewer than seven terms; seven terms of enrollment is the minimum as well as the maximum requirement for acceleration by one term.

5. **Deceleration** A student accelerating by two terms or one term may subsequently apply to decelerate by submitting the required form to the office of the residential college dean. A student who is considering whether to decelerate should consult with the residential college dean as soon as possible. A student accelerating by two terms who subsequently decides to accelerate by only one term must meet the requirements for acceleration by one term. A student accelerating by two terms or one term may subsequently decide to decelerate completely and take an eight-term degree. Since by definition an eight-term degree is not an accelerated degree, such a student will lose the use of acceleration credits. A reversion to an eight-term degree will not adversely affect a student's academic good standing or eligibility for eight terms of financial aid.
6. **Reacceleration** A student who has declared an intention to decelerate and to relinquish the use of acceleration credits is permitted to accelerate again through the use

of acceleration credits as long as the student meets the eligibility requirements and application deadline for one or two terms of acceleration given in points 1 and 2 above.

GENERAL RULES RELATING TO THE USE OF ACCELERATION CREDITS

1. **Notification** The chief responsibility for ascertaining eligibility and for meeting the deadline to apply for acceleration rests with the students themselves. However, the Registrar's Office will make reasonable efforts to inform students, at the beginning of the third term of enrollment, of their eligibility to accelerate by one or two terms.

It is not the responsibility of the Registrar's Office or Yale College to remind students who have declared an intention to accelerate of the rules on the pattern of attendance stipulated for the use of acceleration credits. Students who are accelerating are themselves responsible for planning to meet these rules, and if a student's pattern of attendance does not conform to them, it will be concluded that the student has decided to relinquish the use of acceleration credits and not to accelerate. Such a student will be automatically decelerated.

2. **Interruption of studies by leave or withdrawal** Terms of enrollment need not be consecutive. A student accelerating by one or two terms has the same privileges of leave of absence or withdrawal that a nonaccelerating student has.
3. **A third term of leave of absence** A student taking an accelerated degree by use of acceleration credits who has had two terms of leave of absence may receive a third term of leave if it is needed to bring the student's pattern of attendance into conformity with the pattern of attendance stipulated for an accelerated degree. See "Leave of Absence" in section J; a student who has received long-term loans through Yale or who is receiving financial aid from Yale should particularly note paragraph 8 under "Leave of Absence."
4. **Withdrawal** If a student withdraws from a term after the date on which course schedules for that term are due, the uncompleted term counts as a term of enrollment, both in the determination of the student's eligibility to accelerate and in the calculation of the number of terms in which the student has been in attendance at Yale. As an exception to this rule, if an accelerating student withdraws from Yale College on the recommendation of Yale Health without having successfully completed a term, the student has the option of not counting the uncompleted term as one of the six or seven terms of enrollment.
5. **Enrollment in Yale Summer Session or the Yale-in-London summer program** Attendance at Yale Summer Session or the summer program at the Paul Mellon Centre in London does not constitute a term of enrollment. Thus a student accelerating by one term may not offer attendance at Yale Summer Session or the summer program at the Paul Mellon Centre in London as one of the required seven terms of enrollment in Yale College. Course credits earned by attendance at these summer programs, however, may be applied toward the requirements for the bachelor's degree by accelerating students, provided that such students meet the conditions specified for acceleration by one or two terms. See also "Courses in Yale Summer Session" and "Yale-in-London Summer Program" in section K.

6. **Course credit from outside Yale** A student accelerating by two terms must earn at least twenty-seven course credits at Yale, and a student accelerating by one term must earn at least thirty-two course credits at Yale. Therefore, an accelerating student may not apply any credit earned at another college or university toward the 36-course-credit requirement for the bachelor's degree. A student, whether accelerating or not, may be permitted to apply course credits earned at another college or university toward the requirements of the student's major program or toward any of the distributional requirements other than those for the freshman year. See section O, "Credit from Other Universities."

(Please note that attendance at the Yale College program at the Paul Mellon Centre in London during the spring term counts just as if it were a term of enrollment at Yale College in New Haven, as does attendance at the Peking University–Yale University Joint Undergraduate Program in Beijing. Attendance at the Paul Mellon Centre during the summer, however, does not count as a term of enrollment. See "Yale-in-London Summer Program" in section K.)

7. **Year or Term Abroad** A Year Abroad counts as two terms and a Term Abroad counts as one term of enrollment in Yale College. Credits earned on a Year or Term Abroad count as the equivalent of Yale course credits.

Note that after a Year or Term Abroad all students must attend two subsequent terms in Yale College; see "Year or Term Abroad" in section K. In many cases a student must relinquish the use of acceleration credits and decelerate in order to take a Year or Term Abroad. As a special exception, a student accelerating by one or two terms who wishes to complete a term of study abroad as early as during the third term of enrollment would have to petition to accelerate before the third term of enrollment. A student who wishes to accelerate and to take a Year or Term Abroad should consult with the residential college dean and the Center for International and Professional Experience at the earliest opportunity.

An accelerating student who wishes also to complete a Year or Term Abroad must conform to one of the following schemes:

<i>Terms of Acceleration</i>	<i>Total Terms at Yale</i>	<i>Terms on YA/TA</i>	<i>Acceleration Credits</i>	<i>Minimum Course Credits Earned at Yale</i>	<i>Maximum Course Credits Earned on YA/TA</i>
1	6	1	4	28	4
1	5	2	4	23	9
2	5	1	9	23	4
2	4	2	9	18	9

8. **Distributional requirements** Acceleration credits may not be employed to meet the distributional requirements for the freshman, sophomore, or junior years, or the distributional requirements for the bachelor's degree, including the foreign language requirement. With permission, an accelerating student may apply course credit earned at another college or university toward the distributional requirements for the bachelor's degree and to those for the sophomore and junior years; students should consult with the residential college dean to be directed to the appropriate authority for such approval.

9. **Major requirements** With the permission of the director of undergraduate studies, an accelerating student may apply credit earned at another university toward the requirements of the student's major program.
10. **Makeup of course credit deficiency** If an accelerating student's record at the end of a term of enrollment shows a deficiency for promotion, academic good standing, or graduation, the student will be allowed to repair the deficiency without forfeiting the use of acceleration credits only through enrollment in Yale Summer Session if the credit earned is to be applied toward the 36-course-credit requirement for the bachelor's degree. See section D, "Promotion and Good Standing."
11. **Enrollment after graduation as a nondegree student** Accelerating students who have qualified for the award of the bachelor's degree are eligible, as are all Yale College graduates, for full-time enrollment in Yale College as nondegree students. Because such students will have graduated, they will not be eligible for financial aid. See section N, "Nondegree Students Program."
12. **Transfer students** Students admitted by transfer from other colleges and universities are not eligible for acceleration by the use of acceleration credits.

Q. Amendments

The University reserves the right to amend or supplement these regulations at any time upon such notice to students as it deems appropriate.

III. SUBJECTS OF INSTRUCTION

Majors in Yale College

African American Studies (B.A.)
African Studies (B.A.)
American Studies (B.A.)
Anthropology (B.A.)
Applied Mathematics (B.A. or B.S.)
Applied Physics (B.S.)
Archaeological Studies (B.A.)
Architecture (B.A.)
Art (B.A.)
Astronomy (B.A.)
Astronomy and Physics (B.S.)
Chemistry (B.A. or B.S.)
Chinese (B.A.)
Classical Civilization (B.A.)
Classics (Greek) (B.A.)
Classics (Greek and Latin) (B.A.)
Classics (Latin) (B.A.)
Cognitive Science (B.A.)
Computer Science (B.A. or B.S.)
Computer Science and Mathematics (B.A. or B.S.)
Computer Science and Psychology (B.A.)
Computing and the Arts (B.A.)
East Asian Studies (B.A.)
Ecology and Evolutionary Biology (B.A. or B.S.)
Economics (B.A.)
Economics and Mathematics (B.A.)
Electrical Engineering and Computer Science (B.S.)
Engineering
 Biomedical Engineering (B.S.)
 Chemical Engineering (B.S.)
 Electrical Engineering (B.S.)
 Engineering Sciences (Chemical) (B.S.)
 Engineering Sciences (Electrical, Environmental, or Mechanical) (B.A. or B.S.)
 Environmental Engineering (B.S.)
 Mechanical Engineering (B.S.)
English (B.A.)
Environmental Studies (B.A.)
Ethics, Politics, and Economics (B.A.)
Ethnicity, Race, and Migration (B.A.)
Film Studies (B.A.)
French (B.A.)
Geology and Geophysics (B.A. or B.S.)
German (B.A.)
German Studies (B.A.)
Global Affairs (B.A.)
Greek, Ancient and Modern (B.A.)
History (B.A.)
History of Art (B.A.)
History of Science, History of Medicine (B.A.)
History of Science, Medicine, and Public Health (B.A.)
Humanities (B.A.)
Italian (B.A.)
Japanese (B.A.)
Judaic Studies (B.A.)
Latin American Studies (B.A.)
Linguistics (B.A.)
Literature (B.A.)
Mathematics (B.A. or B.S.)
Mathematics and Philosophy (B.A.)
Mathematics and Physics (B.S.)
Modern Middle East Studies (B.A.)
Molecular Biophysics and Biochemistry (B.A. or B.S.)
Molecular, Cellular, and Developmental Biology (B.A. or B.S.)
Music (B.A.)
Near Eastern Languages and Civilizations (B.A.)
Philosophy (B.A.)
Physics (B.S.)
Physics and Philosophy (B.A.)
Political Science (B.A.)
Portuguese (B.A.)
Psychology (B.A. or B.S.)
Religious Studies (B.A.)
Russian (B.A.)
Russian and East European Studies (B.A.)
Sociology (B.A.)
South Asian Studies (second major only)
Spanish (B.A.)
Special Divisional Major (B.A. or B.S.)
Statistics (B.A. or B.S.)
Theater Studies (B.A.)
Women's, Gender, and Sexuality Studies (B.A.)

Accounting

ACCT 170a or b, Financial Accounting Laurance Schiffres

Contemporary accounting and corporate financial reporting. Preparation, interpretation, and analysis of the earnings statement; the statement of financial position and the statement of cash flows. Open to seniors and juniors as space allows.

Aerospace Studies

Program chair: Colonel Scott Manning, USAF; program adviser: Lieutenant Colonel Theodore Weibel, USAF, theodore.weibel@yale.edu; program adviser: Captain Timothy Secor, USAF, timothy.secor@yale.edu; Rm. 450, 55 Whitney Ave., 432-9431; yalecollege.yale.edu/content/air-force-rotc-yale

The mission of Air Force Reserve Officers Training Corps (AFROTC) Detachment 009 at Yale is to develop quality leaders for the U.S. Air Force. Cadets have gone on to serve in a range of career fields, from medicine to aviation. The program offers students an ideal training environment that instills values such as integrity, service before self, and excellence. Cadets are also involved in a variety of activities and organizations that reach out to the local community while strengthening the skills necessary for a military career. After completing all Air Force ROTC and academic degree requirements, cadets on scholarship and those in the Professional Officer Course accept a commission as a second lieutenant in the Air Force, with a minimum active-duty service commitment of four years.

Academic requirements The Aerospace Studies curriculum is organized into four major areas, including profession of arms, communication skills, leadership studies, and military and international security studies. Courses emphasize development of professional knowledge and leadership skills in the context of military service. Classes are conducted as seminars and call for active student discussion. All uniforms, textbooks, and supplies for cadets are provided by the Air Force. Enrollment in Aerospace Studies courses is not limited to cadets; courses are open to any Yale student. Aerospace Studies courses count for enrollment credit only; they do not count toward the thirty-six course credits required for the bachelor's degree. In some cases, courses in other departments and programs may count toward both the bachelor's degree and AFROTC requirements. No course taken Credit/D/Fail may be counted toward the program in Aerospace Studies.

Cadets become involved in the management of their own cadet wing through a mandatory two-hour leadership laboratory each week. They are assigned corps positions, with increasing responsibility over their four years. In addition, students in the program participate in physical training, leadership projects, visits to Air Force bases, orientation flights, and normal college extracurricular activities. In all, cadets can expect to dedicate six to eight hours per week to the program.

Students in the Class of 2015 and subsequent classes are eligible for enrollment in the AFROTC program. Full and partial scholarships that may cover tuition, fees, books, and/or a subsistence allowance are available, with levels dependent on qualifications and other factors. Scholarships are open to both freshmen and sophomores who excel in academics and display leadership potential.

For additional information about Yale's Air Force Reserve Officers Training Corps program, visit yalecollege.yale.edu/content/air-force-rotc-yale or send questions to Captain Timothy Secor at timothy.secor@yale.edu.

***USAF 101a and 102b, Foundation of the U.S. Air Force** Bai Lan Zhu

Introduction to the U.S. Air Force and how it works as a military institution, including an overview of its basic characteristics, missions, and organizations. For enrollment credit only; not to be counted toward the thirty-six course credits required for the bachelor's degree.

***USAF 301a and 302b, Air Force Leadership Studies** Timothy Secor

Advanced study of leadership concepts and ethics, management and communication skills, and Air Force personnel and evaluation systems. Emphasis on the enhancement of leadership skills. Case studies and exercise of leadership and management techniques in a supervised environment. Prerequisite: USAF <202> or equivalent. For enrollment credit only; not to be counted toward the thirty-six course credits required for the bachelor's degree.

**COURSE IN ANOTHER DEPARTMENT THAT COUNTS
TOWARD AFROTC REQUIREMENTS**

HIST 221a/GLBL 281a, Military History of the West since 1500 Paul Kennedy

For description see under History.

African American Studies

Director of undergraduate studies: Crystal Feimster, Rm. 403, 81 Wall St., 436-3563, crystal.feimster@yale.edu; www.yale.edu/afamstudies

**FACULTY OF THE DEPARTMENT OF AFRICAN AMERICAN
STUDIES**

Professors Elizabeth Alexander, Elijah Anderson, David Blight, Hazel Carby, Kamari Clarke, Glenda Gilmore, Jacqueline Goldsby, Jonathan Holloway, Matthew Jacobson, Gerald Jaynes, Kobena Mercer, Christopher L. Miller, Joseph Roach, Robert Stepto, John Szwed (*Emeritus*), Robert Thompson, Emilie Townes, Michael Veal

Associate Professor Terri Francis

Assistant Professors Jafari Allen, GerShun Avilez, Crystal Feimster, Erica James, Paige McGinley, Anthony Reed, Edward Rugemer

Lecturers Kathleen Cleaver, Flemming Norcott, Deborah Thomas

The African American Studies major examines, from numerous disciplinary perspectives, the experiences of people of African descent in Black Atlantic societies including the United States, the Caribbean, and Latin America. Students in the department explore the historical, cultural, political, economic, and social development of Black Atlantic societies. The major demands that students acquire both an analytic ability rooted in a traditional discipline and interdisciplinary skills of investigation and research.

African American Studies offers training of special interest to those considering admission to graduate or professional schools and careers in education, journalism, law, business management, city planning, international relations, politics, psychology, publishing, or social work. The interdisciplinary structure of the department offers students an opportunity to satisfy the increasingly rigorous expectations of admissions committees and prospective employers for a broad liberal arts perspective that complements specialized knowledge of a field.

African American Studies can be taken either as a primary major or as one of two majors in consultation with the director of undergraduate studies. Appropriate majors to combine with African American Studies might include, but are not limited to, American Studies, Anthropology, Economics, English, Ethnicity, Race, and Migration, History, History of Art, Music, Political Science, Psychology, Sociology, Theater Studies, and foreign languages. Regulations concerning the completion of two majors can be found in chapter II, section K, of this bulletin.

Requirements of the major The major in African American Studies requires twelve term courses including a yearlong history sequence (AFAM 160, 162), one course in the humanities relevant to African American studies, one course in the social sciences relevant to African American studies, the junior seminar (AFAM 410), the senior colloquium (AFAM 480), and the senior essay (AFAM 491). These courses examine ideas and problems that may originate in many fields but that have a common concern—the black experience. The distribution of requirements is intended to provide students with a broad interdisciplinary experience. Students are strongly encouraged to complete the history sequence by the end of their sophomore year.

Area of concentration Students majoring in African American Studies are required to choose an area of concentration comprising five courses. This cluster of interrelated courses is intended to ground the student's learning experience in one area of investigation. Often students will choose an area of concentration in a traditional discipline such as political science, sociology, American studies, history, or English language and literature. (This strategy is especially helpful for students planning to fulfill the requirements of two majors.) Students can also construct interdisciplinary areas of concentration that span traditional departments and encompass broader theoretical frameworks such as race and ethnicity, cultural studies, or feminism and gender studies. All majors are encouraged to take upper-level courses as part of their concentration, especially those courses centering on research and methodology. None of the seven required courses in African American Studies may be counted among the five electives in the area of concentration.

Junior seminar In their junior year students must take the junior seminar (AFAM 410, *Interdisciplinary Approaches to African American Studies*). This course provides majors with theoretical and methodological bases for the work they will do during their research-oriented senior year.

Senior requirement Senior majors participate in a colloquium (AFAM 480) that gives them an opportunity to exchange ideas with each other and with more advanced scholars; students submit a prospectus, compile a working bibliography, begin or continue research, and write the first eight to ten pages of the senior essay. After completing the colloquium,

each student carries out the remaining research and writing of a senior essay (AFAM 491) under the guidance of a faculty member in the chosen discipline or area of concentration.

Students are strongly encouraged to use the summer between the junior and senior years for research directly related to the senior essay. For example, field or documentary research might be undertaken in urban or rural communities throughout the Black Atlantic diaspora. The particular research problem and design are to be worked out in each case with a faculty adviser.

Procedures Students considering a program of study in African American Studies should consult the director of undergraduate studies as early as possible. Areas of concentration and schedules for majors must be approved by the director of undergraduate studies.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Specific courses required AFAM 160, 162, 410

Distribution of courses 1 relevant humanities course and 1 relevant social science course, both approved by DUS; 5 courses in area of concentration

Senior requirement Senior colloq (AFAM 480) and senior essay (AFAM 491)

*AFAM 049b/ANTH 013b/WGSS 013b, *Feminism, Race, Gender, and Sexuality*

Jafari Allen

For description see under Anthropology.

*AFAM 060b/HIST 016b, *Significance of American Slavery* Edward Rugemer

The history of American slavery, its destruction during the nineteenth century, and its significance today. Topics include the origins of slavery, the development of racism, the transatlantic slave trade, the experience of enslavement, resistance to slavery, the abolitionist movement, the process of emancipation, and the perpetuation of slavery and other forms of unfree labor in the twenty-first century. HU Fr sem

AFAM 112a/HSAR 379a, *New York Mambo: Microcosm of Black Creativity*

Robert Thompson

For description see under History of Art.

AFAM 160a/AMST 160a/HIST 184a, *Slavery and Abolition in Atlantic History,*

1500–1888 Edward Rugemer, Alejandra Dubcovsky

For description see under History.

*AFAM 162b/AMST 162b/HIST 187b, *African American History from Emancipation to the Present* Jonathan Holloway

An examination of the African American experience since 1861. Meanings of freedom and citizenship are distilled through appraisal of race and class formations, the processes and effects of cultural consumption, and the grand narrative of the civil rights movement. HU

AFAM 172b/HIST 119b, *The Civil War and Reconstruction Era, 1845–1877*

David Blight

For description see under History.

AFAM 178b/AFST 188b/ER&M 278b/HSAR 378b, From West Africa to the Black**Americas: The Black Atlantic Visual Tradition** Robert Thompson

For description see under History of Art.

***AFAM 200b/FILM 270b, The Filmworks of Spike Lee** Terri Francis

For description see under Film Studies.

***AFAM 242a/FILM 370a^c, African American Cinema** Terri Francis

For description see under Film Studies.

***AFAM 279a/AMST 273a/ENGL 298a/WGSS 342a, Black Women's Literature**

Jacqueline Goldsby

Examination of black women's literary texts, with a focus on the post–civil rights era. Exploration of the ways writers construct and contest the cultural, ideological, and political parameters of black womanhood. Topics include narrative strategy, modes of representation, and textual depictions of the intersections of race, gender, sexuality, color, ethnicity, nationality, class, and generation. Texts placed within the context of black women's literary legacies. HU

AFAM 282a/ECON 280a, Poverty under Postindustrial Capitalism Gerald Jaynes

Political economy of contemporary social welfare policy as it has been affected by economic restructuring, the development of the underclass, and the effects of immigration on the economy and its social structure. Prerequisite: introductory microeconomics. SO

***AFAM 294a/ENGL 294a, African American Literature I: 1740–1900** Anthony Reed

The literary reaction to slavery; the evolution in form from slave narratives to autobiographies and fictions; the incorporation of folk and popular materials into formal literature. Authors include Phyllis Wheatley, Jupiter Hammon, Frederick Douglass, Harriet Jacobs, Frances Ellen Watkins Harper, Charles Chesnutt, Paul Laurence Dunbar, and James Weldon Johnson. HU

[AFAM 295b/AMST 295b/ENGL 295b, African American Literature II: 1900–1970]***AFAM 296b/AMST 296b/ENGL 296b/WGSS 292b, African American Literature III: 1970 to the Present** GerShun Avilez

A survey of African American literature since 1970. Authors include Toni Morrison, Alice Walker, Rita Dove, Yusef Komunyakaa, Anna Deavere Smith, Danzy Senna, and others. Topics include black feminist literature, black gay and lesbian literature, developments in literary criticism and theory, and contemporary black drama. HU

***AFAM 318b, Race in the Post–Civil Rights Era** Lauren Pearlman

Examination of racial ideology as it informs contemporary debates about American culture, politics, and social life. Ways that public policy advocates, journalists, academics, filmmakers, and legal analysts write about race as a feature of American life. The complex question of racial identity; how writing and reading about race can both reflect and challenge racial categories, hierarchies, and perceptions. HU

***AFAM 321a, Black Faith and Sexuality** Jennifer Leath

Introduction to applied religious ethics through an exploration of black faith and sexuality in the United States. Basic foundational models for understanding religious ethics in

philosophical, theological, and social terms; the roles of creativity and imagination in the formations of race, gender, sexuality, and faith. Topics include sexual violence and exploitation, respectability and the black family, reclaiming the erotic, and new spiritualities. HU

***AFAM 327a/AMST 373a/ENGL 339a/ER&M 399a/WGSS 336a, American Literary Nationalisms** GerShun Avilez

The influence of nationalist frameworks on American artistic production in the 1960s and 1970s. The treatment of gender expression in nationalist sentiments. Focus on writings by and about the Black Arts Movement, the Chicano Movement, the Young Lords Party, Asian American nationalism, and feminist and queer organizing. Works by Arturo Islas, Alice Walker, Frank Chin, Gloria Anzaldua, Amiri Baraka, and Maxine Hong Kingston. WR, HU

***AFAM 333a/ANTH 315a, Critical Ethnography: Methods, Ethics, Poetics** Jafari Allen

For description see under Anthropology.

***AFAM 337a/ENGL 310a, Modern Poetry** Anthony Reed

For description see under English Language & Literature.

***AFAM 338b/ENGL 335b/LITR 280b, Caribbean Poetry** Anthony Reed

For description see under English Language & Literature.

***AFAM 339a/AMST 339a/ER&M 343a/LITR 272a, Caribbean Fiction** Hazel Carby

The development of Caribbean literature from the 1930s to the present. Authors include V.S. Naipaul, George Lamming, Jamaica Kincaid, Maryse Conde, and Patricia Powell. HU

***AFAM 346a/HSAR 471a, Black Atlantic Photography** Kobena Mercer

For description see under History of Art.

***AFAM 349a/AMST 326a/HIST 115Ja/WGSS 388a, Civil Rights and Women's Liberation** Crystal Feimster

The dynamic relationship between the civil rights movement and the women's liberation movement from 1940 to the present. When and how the two movements overlapped, intersected, and diverged. The variety of ways in which African Americans and women campaigned for equal rights. Topics include World War II, freedom summer, black power, the Equal Rights Amendment, feminism, abortion, affirmative action, and gay rights. HU

***AFAM 353b/HSAR 472b, Black British Art and Culture** Kobena Mercer

For description see under History of Art.

***AFAM 356b/AMST 432b, Re-Visioning Subjectivities through Image, Text, and Performance** Hazel Carby

Modes and methods of describing, imaging, illuminating, and filming black women's bodies. Emphasis on ways that the bodies have acquired particular cultural meanings. Works by a wide variety of creative artists from multiple sites in the Black Atlantic. Images viewed in the Yale Art Gallery, the Yale Center for British Art, and the Beinecke Library. HU

***AFAM 369b/AMST 378b/ENGL 364b/LITR 271b/THST 369b, African American Theater** Paige McGinley

For description see under Theater Studies.

***AFAM 383b/AFST 476b/FREN 376b, The Two Congos: Literature and Culture in the Heart of Africa** Christopher L. Miller

For description see under French.

***AFAM 389b/ENGL 371b/ER&M 389b/WGSS 389b, Black Sexuality in Literature and Popular Culture** GerShun Avilez

Sexual imagery and content in African American literature and popular culture. Ways that artists and social critics understand the relationship between sexual identity and racial identity. Writers and artists include Alice Walker, Gayl Jones, Spike Lee, Marlon Riggs, Essex Hemphill, Patricia H. Collins, Mark Anthony Neal, and Audre Lorde. HU

***AFAM 406b^c/AMST 405b^c/ENGL 405b, Autobiography in America** Robert Stepto

For description see under American Studies.

***AFAM 410b/WGSS 410b, Interdisciplinary Approaches to African American Studies**
Crystal Feimster

An interdisciplinary, thematic approach to the study of race, nation, and ethnicity in the African diaspora. Topics include class, gender, color, and sexuality; the dynamics of reform, Pan-Africanism, neocolonialism, and contemporary black nationalism. Use of a broad range of methodologies. HU, SO Junior sem

***AFAM 414b/WGSS 438b, Women, Law, and the Black Freedom Movement**

Kathleen Cleaver

Writings and scholarship of women are used to examine struggles against slavery, racial segregation, economic exploitation, and gender discrimination in the United States. Focus on women who were abolitionists, civil rights leaders, and freedom fighters. SO

***AFAM 423b^c/AMST 384b^c/ENGL 306b^c, American Artists and the African American Book** Robert Stepto

Visual art in African American books since 1900. Artists include Winold Reiss, Aaron Douglas, E. S. Campbell, Tom Feelings, and the FSA photographers of the 1940s. Topics include Harlem Renaissance book art, photography and literature, and children's books. Research in collections of the Beinecke Library and the Yale Art Gallery is encouraged. HU

***AFAM 429b/ENGL 448b, Black Pulp Fiction** Jacqueline Goldsby

For description see under English Language & Literature.

***AFAM 461a/FILM 436a/FREN 411a/LITR 263a, Novel and Film in the Francophone Colonial and Postcolonial World** Christopher L. Miller

For description see under French.

***AFAM 471a and 472b, Independent Study: African American Studies**

Crystal Feimster

Independent research under the direction of a member of the department on a special topic in African American studies not covered in other courses. Permission of the director of undergraduate studies and of the instructor directing the research is required. A proposal signed by the instructor must be submitted to the director of undergraduate studies by the end of the second week of classes. The instructor meets with the student regularly, typically for an hour a week, and the student writes a final paper or a series of short essays. May be elected for one or two terms.

***AFAM 480a, Senior Colloquium: African American Studies** Edward Rugemer

A seminar on issues and approaches in African American studies. The colloquium offers students practical help in refining their senior essay topics and developing research strategies. Students discuss assigned readings and share their research experiences and findings. During the term, students are expected to make substantial progress on their senior essays; they are required to submit a prospectus, an annotated bibliography, and a draft of one-quarter of the essay.

***AFAM 491a or b, The Senior Essay** Crystal Feimster

Independent research on the senior essay. The senior essay form must be submitted to the director of undergraduate studies by the end of the second week of classes. The senior essay should be completed according to the following schedule: (1) end of the sixth week of classes: a rough draft of the entire essay; (2) end of the last week of classes (fall term) or three weeks before the end of classes (spring term): two copies of the final version of the essay.

African Languages

(See under African Studies.)

African Studies

Director of undergraduate studies: Ann Biersteker, 309A LUCE, 432-9902, ann.biersteker@yale.edu; director of the Program in African Languages: Kiarie Wa’Njogu, 309B LUCE, 432-0110, john.wanjogu@yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF AFRICAN STUDIES

Professors Lea Brilmayer (*Law School*), Kamari Clarke (*Anthropology*), John Darnell (*Near Eastern Languages & Civilizations*), Owen Fiss (*Law School*), Robert Harms (*History*), Andrew Hill (*Anthropology*), Roderick McIntosh (*Anthropology*), Christopher L. Miller (*French*), Nicoli Nattrass (*Ethics, Politics, & Economics*) (*Visiting*), Catherine Panter-Brick (*Anthropology*), Lamin Sanneh (*History, Divinity School*), Jeremy Seekings (*Global Affairs*) (*Visiting*), Ian Shapiro (*Political Science*), Robert Thompson (*History of Art*), Christopher Udry (*Economics*), Michael Veal (*Music*), David Watts (*Anthropology*), Elisabeth Wood (*Political Science*)

Associate Professor Ann Biersteker (*Adjunct*) (*Linguistics*)

Assistant Professors Christopher Blattman (*Political Science*), Daniel Magaziner (*History*), Michael McGovern (*Anthropology*), Ato Kwamena Onoma (*Political Science*), Edwige Tamalet-Talbayev (*French*), Jonathan Wyrzten (*Sociology*)

Lecturers Elizabeth Carlson (*MacMillan Center*), Lacina Coulibaly (*Theater Studies*), Anne-Marie Foltz (*Public Health*), Kristin McKie (*Political Science*), David Simon (*Political Science*)

Senior Lectors II Sandra Sanneh, Kiarie Wa’Njogu

Senior Lectors Oluseye Adesola, Matuku Ngame

The program in African Studies enables students to undertake interdisciplinary study of the arts, history, cultures, politics, and development of Africa. As a foundation, students in the program gain a cross-disciplinary exposure to Africa. In the junior and senior years, students develop analytical ability and focus their studies on research in a particular discipline such as anthropology, art history, history, languages and literatures, political science, or sociology.

African Studies provides training of special interest to those considering admission to graduate or professional schools, or careers in education, journalism, law, management, medicine, politics, psychology, international relations, creative writing, or social work. The interdisciplinary structure of the program offers students an opportunity to satisfy the increasingly rigorous expectations of admissions committees and prospective employers for a broad liberal arts perspective that complements specialized knowledge of a field.

Requirements of the major The program in African Studies consists of thirteen term courses including (1) one African Studies course in the humanities and one in the social sciences; (2) two years of an African language (Arabic, Kiswahili, Yorùbá, isiZulu, or others with permission of the director of undergraduate studies), unless waived by examination; (3) the junior seminar on research methods, AFST 401; and (4) a concentration of four term courses in a discipline such as anthropology, art history, history, languages and literatures, political science, or sociology, or in an interdisciplinary program such as African American Studies; Ethnicity, Race, and Migration; or Women's, Gender, and Sexuality Studies. Other areas of concentration (e.g., diaspora studies, development studies) may be chosen in consultation with the director of undergraduate studies.

The required courses represent the core of the program and are intended to expose the student both to the interdisciplinary nature of African studies and to the methodologies currently being brought to bear on the study of African cultures and societies. Students are encouraged to include upper-level courses, especially those centering on research and methodology.

Senior requirement Senior majors enroll in AFST 490, a colloquium that gives them an opportunity to exchange ideas with each other and to give presentations on their research. In the course, students also prepare a prospectus, compile a bibliography, and write a draft chapter of the senior essay. After completing the colloquium, each student carries out the remaining research and writing of the senior essay in AFST 491 under the guidance of a faculty adviser.

A preliminary statement indicating the topic to be addressed and the name of the faculty adviser must be submitted to the director of undergraduate studies by the end of the second week of the fall term in the senior year. Students should also inform the director of undergraduate studies of their preferred second reader by this time.

Language requirement African Studies majors are required to complete two years of college-level study of an African language or the equivalent, and they are encouraged to continue beyond this level. For the major's language requirement to be waived, a student must pass a placement test for admission into an advanced-level course or, for languages not regularly offered at Yale, an equivalent test of speaking, listening, reading, and writing skills administered through the Center for Language Study. Students should begin their language study as early as possible.

Program in African Languages The language program offers instruction in three major languages from sub-Saharan Africa: Kiswahili (eastern and central Africa), Yorùbá (West Africa), and isiZulu (southern Africa). African language courses emphasize communicative competence, using multimedia materials that focus on the contemporary African context. Course sequences are designed to enable students to achieve advanced competence in all skill areas by the end of the third year, and students are encouraged to spend a summer or term in Africa during their language study.

Courses in Arabic are offered through the department of Near Eastern Languages and Civilizations. Noncredit instruction in other African languages is available by application through the Directed Independent Language Study program at the Center for Language Study. Contact the director of the Program in African Languages for information.

Procedure Students planning to major in African Studies should consult the director of undergraduate studies as early as possible.

M.A. program The African Studies program does not offer the simultaneous award of the B.A. and M.A. degrees. However, students in Yale College are eligible to complete the M.A. in African Studies in one year of graduate work if they begin the program in the third and fourth undergraduate years. Students interested in this option must complete eight graduate courses in the area by the time of the completion of the bachelor's degree. Only two courses may be counted toward both graduate and undergraduate degrees. Successful completion of graduate courses while still an undergraduate does not guarantee admission into the M.A. program.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 13 term courses (incl senior req)

Distribution of courses 1 African Studies course in humanities and 1 in social sciences; 2 years of an African lang; 4 courses in area of concentration

Specific course required AFST 401

Senior requirement Senior colloquium (AFST 490) and senior essay (AFST 491)

***AFST 110a^c, Introduction to an African Language I** Kiarie Wa'Njogu

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. Credit only on completion of AFST 120. Students may also study an African language through the noncredit Directed Independent Language Study program, described in chapter I of this bulletin. L1 1½ Course cr

***AFST 120b^c, Introduction to an African Language II** Kiarie Wa'Njogu

Continuation of AFST 110. After AFST 110. L2 1½ Course cr

AFST 180b^c/ER&M 313b, Nigeria and Its Diaspora Oluseye Adesola

Nigerians in the modern diaspora, both those who endured forced migration and those who migrated voluntarily. Specific reference to the Igbos and the Yorùbás. The preservation and maintenance of Nigerian culture, history, dance, literature, traditional education, theater, politics, art, music, film, religion, and folklore, especially in African American and Nigerian American contexts. SO

AFST 188b/AFAM 178b/ER&M 278b/HSAR 378b, From West Africa to the Black Americas: The Black Atlantic Visual Tradition Robert Thompson
For description see under History of Art.

***AFST 322a/FREN 422a/LITR 321a/MMES 362a/WGSS 344a, Francophone Postcolonial Theory and Literature** Edwige Tamalet-Talbayev
For description see under French.

***AFST 331a/HIST 349Ja^c, South African Apartheid and Its Afterlives**
Daniel Magaziner
For description see under History.

***AFST 332a/HIST 346Ja^c, Africa after Colonialism** Daniel Magaziner
For description see under History.

AFST 340a/HIST 340a, Africa in the Era of the Slave Trade Robert Harms
For description see under History.

***AFST 345a^c/GLBL 319a/SAST 343a, Political Economy of Natural Disasters**
Jennifer Bussell
For description see under South Asian Studies.

AFST 347a/LAST 348a/PLSC 347a, Post-Conflict Politics David Simon
For description see under Political Science.

***AFST 364b/PLSC 364b^c, Identities** Ato Kwamena Onoma
For description see under Political Science.

AFST 365b, Language and Identity in South Africa Sandra Sanneh
The role of language in the construction of identity in South Africa. Focus on shifting identities during the apartheid period and since independence. SO

AFST 385a/PLSC 385a, Introduction to African Politics Elizabeth Carlson
For description see under Political Science.

***AFST 389b/MMES 181b/PLSC 389b, Middle East Exceptionalism** Adria Lawrence
For description see under Political Science.

***AFST 401a^c, Research Methods in African Studies** Cheryl Doss
Disciplinary and interdisciplinary research methodologies in African studies, with emphasis on field methods and archival research in the social sciences and humanities. Research methodologies are compared by studying recent works in African studies. Junior sem

***AFST 420a/EP&E 246a/LAST 406a/PLSC 430a, The Politics of Development Assistance** David Simon
For description see under Ethics, Politics, & Economics.

***AFST 421b^c, Comparative Perspectives on African Literatures** Ann Biersteker
Introduction to a wide range of topics in African literature through 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 and between composition and transmission. HU

*AFST 426a^G/THST 421a, **Performance in Africa** Frederick Lamp

For description see under Theater Studies.

*AFST 430b^G, **Language Planning in Sub-Saharan Africa** Kiarie Wa’Njogu

Examination of language policies in selected sub-Saharan African countries. Analysis of language use in different contexts; assessment of the impact of globalization on African languages. HU

*AFST 432b/PLSC 414b, **Development and Democracy in Africa** Elizabeth Carlson

For description see under Political Science.

*AFST 433b^G, **Corruption in Comparative Perspective** Elizabeth Carlson

The issue of corruption examined in the context of political and economic development. Petty bureaucratic and grand political corruption in countries throughout the developed and developing world, with special focus on African nations. Defining and measuring corruption; causes and effects of corruption and the practical difficulties of identifying and combating it; possible solutions to the problem. SO

*AFST 435a/THST 335a, **West African Dance: Traditional to Contemporary**

Lacina Coulibaly

For description see under Theater Studies.

*AFST 447b^G/EP&E 271b/ER&M 271b/PLSC 447b^G, **The Rwandan Genocide in Comparative Context** David Simon

For description see under Ethics, Politics, & Economics.

*AFST 471a and 472b, **Independent Study** Ann Biersteker

Independent research under the direction of a faculty member in the program on a special topic in African Studies not covered in other courses. Permission of the director of undergraduate studies and of the instructor directing the research is required. A proposal signed by the instructor must be submitted to the director of undergraduate studies by the end of the second week of classes. The instructor meets with the student regularly, typically for an hour a week, and the student writes a final paper or a series of short essays. Either term or both terms may be elected.

*AFST 476b/AFAM 383b/FREN 376b, **The Two Congos: Literature and Culture in the Heart of Africa** Christopher L. Miller

For description see under French.

*AFST 487a/HIST 387Ja, **West African Islam: Jihad Tradition and Its Pacifist Opponents** Lamin Sanneh

For description see under History.

*AFST 490a^G, **African Studies Colloquium** Ann Biersteker

Students conduct research for the senior essay, give presentations on their research, and prepare a bibliography, a prospectus, and a draft chapter of the senior essay. Discussion of model essays and other examples of writing. HU, SO

*AFST 491a or b, **The Senior Essay** Ann Biersteker and staff

Independent research on the senior essay. The senior essay should be completed according to the following schedule: (1) end of the sixth week of classes: a rough draft of the entire

essay; (2) end of the last week of classes (fall term) or three weeks before the end of classes (spring term): two copies of the final version of the essay.

SWAH 110a^c, Beginning Kiswahili I Kiarie Wa’Njogu

A beginning course with intensive training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken language and conversation. Credit only on completion of SWAH 120. L1 1½ Course cr

SWAH 120b^c, Beginning Kiswahili II Kiarie Wa’Njogu

Continuation of SWAH 110. Texts provide an introduction to the basic structure of Kiswahili and to the culture of the speakers of the language. Prerequisite: SWAH 110. L2 1½ Course cr

SWAH 130a^c, Intermediate Kiswahili I Kiarie Wa’Njogu

Further development of students’ speaking, listening, reading, and writing skills. Prepares students for further work in literary, language, and cultural studies as well as for a functional use of Kiswahili. Study of structure and vocabulary is based on a variety of texts from traditional and popular culture. Emphasis on command of idiomatic usage and stylistic nuance. After SWAH 120. L3 1½ Course cr

SWAH 140b^c, Intermediate Kiswahili II Ann Biersteker, Kiarie Wa’Njogu

Continuation of SWAH 130. After SWAH 130. L4 1½ Course cr

SWAH 150a^c, Advanced Kiswahili I Kiarie Wa’Njogu

Development of fluency through readings and discussions on contemporary issues in Kiswahili. Introduction to literary criticism in Kiswahili. Materials include Kiswahili oral literature, prose, poetry, and plays, as well as texts drawn from popular and political culture. After SWAH 140. L5

SWAH 160b^c, Advanced Kiswahili II Ann Biersteker, Kiarie Wa’Njogu

Continuation of SWAH 150. After SWAH 150. L5

SWAH 170a^c or b^c, Topics in Kiswahili Literature Ann Biersteker

Advanced readings and discussion with emphasis on literary and historical texts. Reading assignments include materials on Kiswahili poetry, Kiswahili dialects, and the history of the language. After SWAH 160. L5, HU

YORU 110a^c, Beginning Yorùbá I Oluseye Adesola

Training and practice in speaking, listening, reading, and writing. Initial emphasis is on the spoken aspect, with special attention to unfamiliar consonantal sounds, nasal vowels, and tone, using isolated phrases, set conversational pieces, and simple dialogues. Multimedia materials provide audio practice and cultural information. Credit only on completion of YORU 120. L1 1½ Course cr

YORU 120b^c, Beginning Yorùbá II Oluseye Adesola

Continuing practice in using and recognizing tone through dialogues. More emphasis is placed on simple cultural texts and role playing. Prerequisite: YORU 110. L2 1½ Course cr

YORU 130a^c, Intermediate Yorùbá I Oluseye Adesola

Refinement of students’ speaking, listening, reading, and writing skills. More natural texts are provided to prepare students for work in literary, language, and cultural studies as well as for a functional use of Yorùbá. After YORU 120. L3 1½ Course cr

YORU 140b^G, Intermediate Yorùbá II Oluseye Adesola

Students are exposed to more idiomatic use of the language in a variety of interactions, including occupational, social, religious, and educational. Cultural documents include literary and nonliterary texts. After YORU 130. L4 1½ Course cr

YORU 150a^G, Advanced Yorùbá I Oluseye Adesola

An advanced course intended to improve students' aural and reading comprehension as well as speaking and writing skills. Emphasis on acquiring a command of idiomatic usage and stylistic nuance. Study materials include literary and nonliterary texts; social, political, and popular entertainment media such as movies and recorded poems (*ewi*); and music. After YORU 140. L5

YORU 160b^G, Advanced Yorùbá II Oluseye Adesola

Continuing development of students' aural and reading comprehension and speaking and writing skills, with emphasis on idiomatic usage and stylistic nuance. Study materials are selected to reflect research interests of the students. After YORU 150. L5

YORU 170a^G and 171b^G, Topics in Yorùbá Literature and Culture Oluseye Adesola

Advanced readings and discussion concerning Yorùbá literature and culture. Focus on Yorùbá history, poetry, novels, movies, dramas, and oral folklore, especially from Nigeria. Insight into Yorùbá philosophy and ways of life. Prerequisite: YORU 160. L5, HU

YORU 180a^G and 181b^G, Advanced Topics in Yorùbá Literature and Culture

Oluseye Adesola

Designed for students with superior proficiency in Yorùbá who have an interest in topics not otherwise covered by existing courses. Development of language proficiency to the level of an educated native speaker. Discussion of advanced readings on Yorùbá philosophy, history, literature, and culture. Prerequisite: YORU 171. L5

ZULU 110a^G, Beginning isiZulu I Sandra Sanneh

A beginning course in conversational isiZulu, using Web-based materials filmed in South Africa. Emphasis on the sounds of the language, including clicks and tonal variation, and on the words and structures needed for initial social interaction. Brief dialogues concern everyday activities; aspects of contemporary Zulu culture are introduced through readings and documentaries in English. Credit only on completion of ZULU 120. L1 1½ Course cr

ZULU 120b^G, Beginning isiZulu II Sandra Sanneh

Development of communication skills through dialogues and role play. Texts and songs drawn from traditional and popular literature. Students research daily life in selected areas of South Africa. Prerequisite: ZULU 110. L2 1½ Course cr

ZULU 130a^G, Intermediate isiZulu I Sandra Sanneh

Development of fluency in speaking, listening, reading, and writing, using Web-based materials filmed in South Africa. Students describe and narrate spoken and written paragraphs. Review of morphology; concentration on tense and aspect. Materials are drawn from contemporary popular culture, folklore, and mass media. After ZULU 120. L3 1½ Course cr

ZULU 140b⁶, Intermediate isiZulu II Sandra Sanneh

Students read longer texts from popular media as well as myths and folktales. Prepares students for initial research involving interaction with speakers of isiZulu in South Africa and for the study of oral and literary genres. After ZULU 130. L4 1½ Course cr

ZULU 150a⁶, Advanced isiZulu I Sandra Sanneh

Development of fluency in using idioms, speaking about abstract concepts, and voicing preferences and opinions. Excerpts from oral genres, short stories, and television dramas. Introduction to other South African languages and to issues of standardization, dialect, and language attitude. After ZULU 140. L5

ZULU 160b⁶, Advanced isiZulu II Sandra Sanneh

Readings may include short stories, a novel, praise poetry, historical texts, or contemporary political speeches, depending on student interests. Study of issues of language policy and use in contemporary South Africa; introduction to the Soweto dialect of isiZulu. Students are prepared for extended research in South Africa involving interviews with isiZulu speakers. After ZULU 150. L5

Air Force

(See under Aerospace Studies.)

Akkadian

(See under Near Eastern Languages and Civilizations.)

American Studies

Director of undergraduate studies: George Chauncey, 233 HGS, 432-1188, george.chauncey@yale.edu [F]; Matthew Jacobson, 230 HGS, 432-1186, matthew.jacobson@yale.edu [Sp]; www.yale.edu/amstud

FACULTY ASSOCIATED WITH THE PROGRAM OF AMERICAN STUDIES

Professors Jean-Christophe Agnew (*History*), Elizabeth Alexander (*African American Studies, English*), Ned Blackhawk (*History*), David Blight (*History, African American Studies*), Alicia Schmidt Camacho, Hazel Carby (*African American Studies*), George Chauncey (*History*), Edward Cooke, Jr. (*History of Art*), Michael Denning (*English*), Wai Chee Dimock (*English*), Kathryn Dudley (*Anthropology*), John Mack Faragher (*History*), Glenda Gilmore (*History*), Inderpal Grewal (*Women's, Gender, & Sexuality Studies*), Dolores Hayden (*Architecture*), Jonathan Holloway (*African American Studies, History*), Amy Hungerford (*English*), Matthew Jacobson (*African American Studies, History*), Daniel Kevles (*History*), Mary Lui (*History*), Joanne Meyerowitz (*History*), Charles Musser (*Film Studies*), Alexander Nemerov (*History of Art*), Stephen Pitti (*History*), Sally Promey (*Divinity School*), Joseph Roach (*English, Theater Studies*), Michael Roemer (*Adjunct*) (*Film Studies, Art*), Caleb Smith (*English*), Robert Stepto (*English, African*

American Studies), Harry Stout (*Religious Studies, History*), John Warner (*History of Medicine*), Michael Warner (*English*), Laura Wexler (*Women's, Gender, & Sexuality Studies*)

Assistant Professors Jafari Allen (*Anthropology, African American Studies*), GerShun Avilez (*English, African American Studies*), Crystal Feimster (*African American Studies*), Zareena Grewal (*Ethnicity, Race, & Migration*), Kathryn Lofton (*Religious Studies*), Paige McGinley (*Theater Studies*), Alyssa Mt. Pleasant (*History*), Birgit Brander Rasmussen, Jennifer Van Vleck (*History*)

Senior Lecturers James Berger, Ron Gregg (*Film Studies*)

Lecturers Michael Kerbel (*Film Studies*), Joel Silverman, Rebecca Tannenbaum (*History*)

The American Studies program encourages the interdisciplinary study of the cultures and politics of the United States, the changing representations of national identity, and the construction of borderland and diasporic cultures over time. Each student in the major combines courses in American Studies with courses from other relevant disciplines (literature, history, the arts, and the social sciences) to explore these broad topics from local, national, and global perspectives. Through the selection of an area of concentration, each student develops a focus for course work in the major. The program encourages scholarly work in nontraditional combinations of disciplines; at the same time, however, it assumes and requires a substantial foundation of knowledge in the history and culture of the United States. Students interested in the major are encouraged to consult with the director of undergraduate studies as early as possible.

Requirements of the major All students majoring in American Studies must take four-term courses approved by the program's faculty. Although a good deal of freedom in course selection is permitted, it is expected that all students will acquaint themselves with the materials, skills, and perspectives of cultural studies. Accordingly, the major requires completion—preferably by the end of the sophomore year, but no later than the end of the junior year—of at least four gateway courses (AMST 111–299), including two in cultural history/cultural studies, one broad survey course in American literature, and one course preparatory for work in the student's area of concentration, to be selected in consultation with the director of undergraduate studies. One of these four courses must address material produced before the Civil War. An additional five concentration courses from diverse disciplines must be taken for a letter grade, one of which must incorporate a comparable topic from a non-U.S. perspective. Two electives chosen from the American Studies course offerings are also required.

Students must take two junior seminars (AMST 300–399) during their junior year. At least one of the seminars must fall within the student's area of concentration, described below. In each of the seminars, students are expected to demonstrate proficiency in interdisciplinary research and analysis through the production of critical essays on primary source materials or a paper of fifteen to twenty pages. Sophomores contemplating a junior term abroad are urged to take one of the junior seminars in the spring term of their sophomore year.

Area of concentration Each American Studies major selects an area of concentration, normally in the fall of the junior year, from five possible choices: (1) national formations, (2) the international United States, (3) material cultures and built environments, (4) politics and American communities, and (5) visual, audio, literary, and performance cultures. The concentration in national formations explores historic migrations, settlements, and encounters among peoples who have formed the American nation, with an emphasis on Native American history and the construction of America's frontiers and borderlands. The international United States concentration focuses on historic and contemporary diasporas, the role of the United States outside its national borders, and the flows of American peoples, ideas, and goods throughout the globe. Students in the material cultures and built environments concentration examine the formation of the American landscape from the natural to the human-made, including the development of American architecture, and the visual and decorative arts. The concentration in politics and American communities investigates the emergence of social groups and their political struggles at the local and national levels, emphasizing the themes of power, inequality, and social justice. Majors with a concentration in visual, audio, literary, and performance cultures study American consumer culture, popular culture, representations, and media in relation to U.S. literatures. Students may also petition the director of undergraduate studies to develop an independent concentration.

Senior requirement During the senior year, each student in the major completes work in the area of concentration in one of three ways. First, the student may enroll in a senior seminar within the area of concentration (AMST 400–490). Students should apply interdisciplinary methods and undertake original research to produce a final paper of twenty to twenty-five pages. Students must complete all course requirements to fulfill the senior requirement.

Second, the student may complete a one-term senior project or essay (AMST 491). The product should be a thirty-page essay or its equivalent in another medium. All students writing a one-term senior essay participate in a proseminar on theory and method. To apply for admission to AMST 491, a student should submit a prospectus, signed by the faculty adviser, to the director of undergraduate studies.

Third, the student may enroll in the intensive major (AMST 493 and 494) and work independently for two terms. The intensive major offers an opportunity for significant original research leading to a substantial senior project. AMST 493, 494 carries two terms of credit; its final product should be a sixty-page essay or its equivalent in another medium. All students in the intensive major participate in a yearlong proseminar on theory and method. One term of the two-term project may count as a course in the area of concentration. To apply for admission to AMST 493 and 494, a student should submit a prospectus, signed by the faculty adviser, to the director of undergraduate studies.

As a multidisciplinary program, American Studies draws on the resources of other departments and programs in the University. The following list of courses is meant to be suggestive only: apart from those courses required for the major, it is neither restrictive nor exhaustive. Students are encouraged to examine the offerings of other departments in both the humanities and the social sciences, as well as residential college seminars, for additional relevant courses. The stated area of concentration of each student determines the relevance and acceptability of other courses.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 14 term courses (incl senior req)

Distribution of courses 4 gateway courses, as specified; 2 junior sems, 1 in area of concentration; 5 courses in area of concentration for letter grades, 1 on a related non-U.S. topic (one may be one term of two-term senior project); 2 electives

Substitution permitted 1 freshman sem for 1 gateway course; others with DUS permission

Senior requirement Senior sem (AMST 400–490) or one-term senior project (AMST 491) related to area of concentration

Intensive major Same, except a two-term senior project (AMST 493 and 494) replaces AMST 491

FRESHMAN SEMINARS

*AMST 002a, American Consumer Culture in the Twentieth Century

Jean-Christophe Agnew

An interdisciplinary introduction to twentieth-century American consumer culture, exploring the rise (and fall) of mass consumption and its impact on the experience of family, faith, citizenship, community, gender, race, ethnicity, and politics. The changing moral valuations of consumption; the effect of consumerism on ritual life; the Americanization of immigrants and the marketing of race and ethnicity; consumer culture's reciprocal relations with literature and the arts; the politics of consumer resistance; suburbanization; the consumer model of citizenship. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem

*AMST 004b, Narrations of Native America Alyssa Mt. Pleasant

Introduction to contemporary and historic writing by American Indian authors of non-fiction and fiction. Focus on the varied ways American Indians have employed literacy and recorded oratory as means to document, interpret, represent, and comment on their histories and experiences. Use of materials from the Beinecke Library. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem

GATEWAY COURSES

AMST 111b/HIST 129b/RLST 111b/WGSS 111b, Sexuality and Religion

Kathryn Lofton

For description see under Religious Studies.

AMST 115b/ANTH 115b/WGSS 115b, Gender in a Transnational World

Inderpal Grewal

For description see under Women's, Gender, & Sexuality Studies.

AMST 131a/HIST 131a, American Politics and Society, 1900–1945 Beverly Gage

For description see under History.

AMST 132b/HIST 132b/WGSS 132b, American Politics and Society, 1945 to the Present

Jennifer Klein

For description see under History.

AMST 135a/HIST 127a/WGSS 200a, U.S. Lesbian and Gay History George Chauncey
For description see under History.

AMST 141b/HIST 141b, The American West John Mack Faragher
For description see under History.

AMST 160a/AFAM 160a/HIST 184a, Slavery and Abolition in Atlantic History, 1500–1888 Edward Rugemer, Alejandra Dubcovsky
For description see under History.

***AMST 162b/AFAM 162b/HIST 187b, African American History from Emancipation to the Present** Jonathan Holloway
For description see under African American Studies.

AMST 163a/EVST 120a/HIST 120a/HSHM 204a, Introduction to Environmental History Paul Sabin
For description see under Environmental Studies.

AMST 176a/EVST 206a/HIST 144a/HSHM 206a/HUMS 323a, Science and Technology in the United States Daniel Kevles
For description see under History of Science, Medicine, and Public Health.

AMST 191b/HIST 106b, The Formation of Modern American Culture, 1920 to the Present Matthew Jacobson

An introduction to the cultural history of the United States in the modern and postmodern eras, with special attention to the development of the culture industries, the popular cultures of working peoples, and the political and social meanings of cultural conflict. HU

***AMST 192a, Work and Daily Life in Global Capitalism** Michael Denning and staff
Introduction to the worlds of twentieth-century capitalism, from Ford to Sony and from Unilever to Microsoft, with a focus on transformations in work and daily life. Metal-working cities and industrial plantations of the first decades of the century; the social and cultural upheavals of global depression and world war; the midcentury challenges of communism, social democracy, and decolonization; the rise of service economies and the shifts in women's work; popular uprisings and cultural revolutions of the 1960s and 1970s; conflicts over globalization and neoliberalism in the last quarter century. WR, HU

AMST 193b/HIST 122b, Origins of U.S. Global Power Jenifer Van Vleck
For description see under History.

AMST 207a/ARCH 340a^C, American Cultural Landscapes: An Introduction to the History of the Built Environment Dolores Hayden

Introduction to land use, transportation, town planning, and vernacular building patterns in the United States. After a brief review of Native American and colonial settlement patterns, the first section of the course (1800–1920) deals with traditional towns and large cities, the second (1920–2000) with peripheral growth that transformed downtowns and shaped diffuse metropolitan regions. WR, HU, SO

***AMST 208b/ANTH 366b, Anthropology of Inequality in America** Kathryn Dudley, Sierra Bell

For description see under Anthropology.

***AMST 235b/ENGL 354b, Language, Disability, Fiction** James Berger
 Portrayals of cognitive and linguistic impairment in modern fiction. Characters with limited capacities for language as figures of “otherness.” Contemporaneous discourses of science, sociology, ethics, politics, and aesthetics. The ethics of speaking about or for subjects at the margins of discourse. HU

***AMST 257b/ENGL 325b, Modern Apocalyptic Narratives** James Berger
 The persistent impulse in Western culture to imagine the end of the world and what might follow. Social and psychological factors that motivate apocalyptic representations. Differences and constant features in apocalyptic representations from the Hebrew Bible to contemporary science fiction. Attitudes toward history, politics, sexuality, social class, and the process of representation in apocalyptic texts. HU

AMST 261b/ENGL 291b, The American Novel since 1945 Amy Hungerford
 For description see under English Language & Literature.

AMST 270a/HIST 170a, Women in America from the Colonial Period to 1900
 Rebecca Tannenbaum
 For description see under History.

AMST 272b/ER&M 282b/HIST 183b/WGSS 272b, Asian American History, 1800 to the Present Mary Lui
 An introduction to the history of East, South, and Southeast Asian migrations and settlement to the United States from the late eighteenth century to the present. Major themes include labor migration, community formation, U.S. imperialism, legal exclusion, racial segregation, gender and sexuality, cultural representations, and political resistance. HU

***AMST 273a/AFAM 279a/ENGL 298a/WGSS 342a, Black Women’s Literature**
 Jacqueline Goldsby
 For description see under African American Studies.

***AMST 274a/ER&M 260a, American Captivity Narratives** Birgit Brander Rasmussen
 Introduction to captivity narratives from colonial and nineteenth-century America. Settler narratives placed in dialogue with slave narratives and Native American pictographic sketchbooks produced in military forts. Contemporary captivity narratives from the U.S. war in Iraq and other conflicts compared with narrative forms and themes from the colonial period. HU

AMST 282a/ENGL 282a, American Literature, Civil War to Modernism Caleb Smith
 For description see under English Language & Literature.

***AMST 283b/ER&M 383b, The Latina/o Novel** Albert Laguna
 For description see under Ethnicity, Race, & Migration.

***AMST 284a/ER&M 382a, Introduction to Latino Studies** Albert Laguna
 For description see under Ethnicity, Race, & Migration.

AMST 288a/ER&M 308a/HIST 134a^G, American Indian Law and Policy
 Ned Blackhawk
 For description see under History.

***AMST 296b/AFAM 296b/ENGL 296b/WGSS 292b, African American Literature**

III: 1970 to the Present GerShun Avilez

For description see under African American Studies.

ER&M 200a, Introduction to Ethnicity, Race, and Migration

Alicia Schmidt Camacho

JUNIOR SEMINARS

***AMST 301a/ENGL 299a/FILM 311a, East Asia in U.S. Literature and Film**

R. John Williams

For description see under English Language & Literature.

***AMST 303b/HIST 128Jb/RLST 307b, Classic American Histories** Harry Stout

For description see under Religious Studies.

***AMST 306b/FILM 469b, The Films of Martin Scorsese** Michael Kerbel

For description see under Film Studies.

***AMST 311b/ER&M 311b, Latina/o New Haven** Alicia Schmidt Camacho

For description see under Ethnicity, Race, & Migration.

***AMST 318a/HIST 415Ja, Perspectives on World Poverty** Joanne Meyerowitz

For description see under History.

***AMST 319a/FILM 427a, American Documentary Films** Michael Roemer

The documentary film from Flaherty to cinéma-vérité and beyond. Films examined for aesthetic value as well as social and political relevance. Emphasis on individual films and filmmakers. Screenings in class. Enrollment limited to juniors and seniors majoring in American Studies or in Film Studies. HU RP

***AMST 320a/ER&M 422a, Latino New York** Albert Laguna

For description see under Ethnicity, Race, & Migration.

***AMST 322a/ER&M 323a/WGSS 371a, Gender, Family, and Cultural Identity in Asia and the United States** Geetanjali Singh Chanda

For description see under Women's, Gender, & Sexuality Studies.

***AMST 325a/ER&M 322a/HIST 155Ja, Natives and Newcomers in Early America**

Alyssa Mt. Pleasant

Intensive survey of American Indian nations and their relationships with colonial regimes. Regional studies are brought together into a continental examination of the structure and significance of colonialism for American Indian peoples up to the early nineteenth century. Emphasis on colonial regimes operating within the political boundaries of the contemporary United States. WR, HU

***AMST 326a/AFAM 349a/HIST 115Ja/WGSS 388a, Civil Rights and Women's Liberation** Crystal Feimster

For description see under African American Studies.

***AMST 329b/ER&M 423b, Cuban America** Albert Laguna

For description see under Ethnicity, Race, & Migration.

- *AMST 330a/ENGL 236a, Dystopic and Utopian Fictions** James Berger
Attempts since the late nineteenth century to imagine, in literature, cinema, and social theory, a world different from the existing world. The merging of political critique with desire and anxiety; the nature and effects of social power; forms of authority, submission, and resistance. HU
- *AMST 338b/ENGL 414b/THST 410b/WGSS 333b, Gertrude Stein** Sam See
For description see under English Language & Literature.
- *AMST 339a/AFAM 339a/ER&M 343a/LITR 272a, Caribbean Fiction** Hazel Carby
For description see under African American Studies.
- *AMST 343b/ER&M 303b, Muslim Diasporas in America** Zareena Grewal
Exploration of the meanings and attachments that connect Muslims in the U.S. to homelands in the Muslim world. How to define and apply the concept of diaspora to an ever-broadening set of Muslim populations dispersed in space, including immigrants, expatriates, refugees, guest workers, exiles, and religious seekers. Analysis of newspaper articles, political comics, memoirs, fiction, ethnographies, political essays, sociological surveys, and documentary films. SO
- *AMST 358a/ENGL 281a, Animals in Modern American Fiction** James Berger
Literary portrayals of animals used to examine the relations between literature, science, and social and political thought since the late nineteenth century. Topics include Darwinist thought, socialism, fascism, gender and race relations, new thinking about ecology, and issues in neuroscience. HU RP
- *AMST 360b/ER&M 460b, Mexicans and Mexican Americans since 1848**
Stephen Pitti
For description see under Ethnicity, Race, & Migration.
- *AMST 365a/FILM 453a^c, Media and U.S. Presidential Elections, 1892–2012**
Charles Musser
For description see under Film Studies.
- *AMST 370b/THST 380b, The History of Dance** Emily Coates
For description see under Theater Studies.
- *AMST 373a/AFAM 327a/ENGL 339a/ER&M 399a/WGSS 336a, American Literary Nationalisms** GerShun Avilez
For description see under African American Studies.
- *AMST 375b/FILM 375b/WGSS 375b, LGBTQ Cinema** Ron Gregg
For description see under Film Studies.
- *AMST 378b/AFAM 369b/ENGL 364b/LITR 271b/THST 369b, African American Theater** Paige McGinley
For description see under Theater Studies.
- *AMST 381a/ARCH 351a, Poets' Landscapes** Dolores Hayden
Introduction to techniques poets have used to ground their work in the landscapes and buildings of American towns and cities including Chicago, New York, and Los Angeles.

Attention to poems from a national automotive landscape as well as narrative poems about cities. Writing exercises in different poetic forms and readings from the works of Dickinson, Frost, Bishop, Lowell, Wilbur, Dickey, Pinsky, Cervantes, and Merrill. WR, HU

***AMST 384b^c/AFAM 423b^c/ENGL 306b^c, American Artists and the African American Book** Robert Stepto

For description see under African American Studies.

***AMST 392b/RLST 311b^c, Religion and Popular Culture** Kathryn Lofton

For description see under Religious Studies.

SENIOR SEMINARS

***AMST 402a/ANTH 302a/FILM 324a/WGSS 380a, Gender and Sexuality in Media and Popular Culture** Laura Wexler, Inderpal Grewal

For description see under Women's, Gender, & Sexuality Studies.

***AMST 404a/ER&M 348a/HIST 185Ja, Latina/o Histories** Stephen Pitti

For description see under Ethnicity, Race, & Migration.

***AMST 405b^c/AFAM 406b^c/ENGL 405b, Autobiography in America** Robert Stepto

A study of autobiographical writings from Mary Rowlandson's Indian captivity narrative (1682) to the present. Classic forms such as immigrant, education, and cause narratives; prevailing autobiographical strategies involving place, work, and photographs. Authors include Franklin, Douglass, Jacobs, Antin, Kingston, Uchida, Balakian, Als, and Karr. WR, HU

***AMST 409b/ER&M 447b/HIST 163Jb, Northeastern Native America, 1850 to the Present** Alyssa Mt. Pleasant

Investigation of American Indian experiences in northeastern North America. Various disciplinary approaches are applied to the study of American Indian peoples and nations in the region. HU

***AMST 421a/ER&M 421a/HIST 109Ja, The American Gulf Coast** Ryan Brasseaux

Gulf Coastal communities from Florida to Texas during three historical periods: the colonial era, the antebellum and Civil War era, and the New South. Topics include the role of indigenous populations; transatlantic trade and cultural exchange, including the slave trade and relations with Latin America; pre- and post-Civil War New Orleans and other cities; the region's rise as America's energy corridor; Hurricane Katrina's exposure of racial inequality in the region; and the profound changes since Katrina. HU

***AMST 422b/ER&M 307b/HIST 156Jb, Writing Tribal Histories** Ned Blackhawk

For description see under History.

***AMST 432b/AFAM 356b, Re-Visioning Subjectivities through Image, Text, and Performance** Hazel Carby

For description see under African American Studies.

***AMST 437b^c/ER&M 411b, Recording Vernacular Musics** Michael Denning

Introduction to the cultural study of vernacular musics in the era of sound recording. The rise of the music industry from sheet music to MP3s. Ethnographic field recording

and twentieth-century revivals of folk musics; popular urban music cultures of ports and industrial cities; and global circulation of commercial vernacular musics from jazz, tango, and hula to salsa and hip-hop. HU

***AMST 449b/WGSS 451b^c, Photography and Memory: Public and Private Lives**

Laura Wexler

For description see under Women's, Gender, & Sexuality Studies.

***AMST 456b/HIST 125Jb, Making America Modern, 1880–1930**

Jean-Christophe Agnew

An exploration of the United States at the beginning of the twentieth century, with special attention to the different ways in which Americans looked to a new public sphere – corporate, consumerist, and imperial – to recast and update the social coordinates of their citizenship. HU

***AMST 471a and 472b, Individual Reading and Research for Juniors and Seniors**

George Chauncey

Special projects intended to enable the student to cover material not otherwise offered by the program. The course may be used for research or for directed reading, but in either case a term paper or its equivalent is required as evidence of work done. It is expected that the student will meet regularly with the faculty adviser. To apply for admission, a student should submit a prospectus signed by the faculty adviser to the director of undergraduate studies.

***AMST 482b/WGSS 305b, History of Feminist Thought** Laura Wexler

For description see under Women's, Gender, & Sexuality Studies.

SENIOR PROJECT

***AMST 491a or b, Senior Project** Karilyn Crockett and staff

Independent research and proseminar on a one-term senior project. For requirements see under “Senior requirement” in the text above.

***AMST 493a and 494b, Senior Project for the Intensive Major** George Chauncey and staff

Independent research and proseminar on a two-term senior project. For requirements see under “Senior requirement” in the text above.

Anthropology

Director of undergraduate studies: Kalyanakrishnan Sivaramakrishnan, Rm. 128, 10 Sachem St., 432-3684, kalyanakrishnan.sivaramakrishnan@yale.edu; www.yale.edu/anthro

FACULTY OF THE DEPARTMENT OF ANTHROPOLOGY

Professors Richard Bribiescas (*Chair*), Richard Burger, Kamari Clarke, †Michael Dove, Kathryn Dudley, J. Joseph Errington, †Inderpal Grewal, Andrew Hill, Marcia Inhorn, William Kelly, Roderick McIntosh, Catherine Panter-Brick, Eric Sargis, †James Scott, Helen Siu, Kalyanakrishnan Sivaramakrishnan, Anne Underhill, David Watts, †Harvey Weiss

Associate Professors Michael McGovern, Karen Nakamura, Douglas Rogers

Assistant Professors Jafari Allen, Brenda Bradley, Sean Brotherton, Narges Erami, Erik Harms, Karen Hébert, William Honeychurch, Sara Shneiderman, Brian Wood

Senior Lecturer †Carol Carpenter

†A joint appointment with primary affiliation in another department or school.

The major in Anthropology gives a firm grounding in this comparative discipline concerned with human cultural, social, and biological diversity. Anthropology deals not only with that small proportion of humankind in Europe and North America but with societies of the entire world, from the remotest past to the present day. It is thus an essential part of a sound liberal education, helping us to see our world from a perspective that challenges ethnocentric assumptions. The major in Anthropology covers the evolution of human and nonhuman primates and the evolutionary biology of living people; world prehistory and the emergence of civilization; diversity and commonality in social organization and culture; the importance of culture for understanding such topics as sickness and health, gender and sexuality, and religion; and language use as cultural behavior.

The subfields of anthropological inquiry—archaeology, biological anthropology, sociocultural anthropology, and linguistic anthropology—together offer a holistic perspective on humankind and its development.

Requirements of the major Students are required to present twelve course credits toward their major, including introductory or intermediate courses in at least three subfields of anthropology, a senior essay, and three advanced courses (not including ANTH 471, 472, 491, or a senior essay seminar). The major does not have formal tracks, but majors may choose to concentrate in one of the subfields of anthropology. They may also draw on courses in sociocultural and biological anthropology to pursue a concentration in medical anthropology. Those who concentrate in sociocultural anthropology are strongly encouraged to take a course in ethnographic methods and one in anthropological theory (e.g., ANTH 311). Those who concentrate in biological anthropology are strongly encouraged to take courses that give them hands-on experience working with material used in the study of human and nonhuman primate anatomy and evolution and that introduce them to laboratory methods.

Three term courses may be selected from other departments, with approval by the director of undergraduate studies. Majors are not required to present cognate courses, but those who do should choose courses that expand their knowledge in one of the subfields of anthropology or in an area of cross-disciplinary concentration. For example, cognate courses for biological anthropology can be found in Biology, Geology and Geophysics, Psychology, and Forestry & Environmental Studies; cognates for sociocultural anthropology can be found in Sociology, American Studies, and History. Appropriate areas of cross-disciplinary concentrations include such topics as area studies (e.g., Africa), anthropological approaches to law and health, gender and sexuality studies, evolutionary biology, and geology.

Senior essay All majors are required to complete a substantial paper during the senior year, either in a seminar or in ANTH 491. There are three options for completing the senior

essay. First, students can write a paper for an advanced seminar. A seminar senior essay must be more substantial than a typical term paper and is expected to be 20–25 pages long. It is evaluated by the seminar instructor and a second reader drawn from the Yale faculty. Students must obtain written approval for this option from the seminar instructor no later than the third week of the term. Students fulfilling the requirements of two majors may not apply a single seminar essay toward the senior requirement for both majors. The deadline for a seminar senior essay is the senior essay deadline, not the term paper deadline. Students choosing this option must take the seminar for which they write their essay in addition to the three advanced courses required for the major.

The second option for the senior essay is an independent essay on a subject of the student's choice, completed in ANTH 491. A student pursuing this option must choose a topic and identify a faculty adviser by the end of the third week of the term in which the essay is to be written. By the same date, the adviser must approve a prospectus that outlines the topic, objectives, and methods of the essay, as well as a preliminary bibliography. The student should also inform the director of undergraduate studies of a preferred second reader by this time. The adviser must have a faculty appointment in Anthropology, and the second reader must have a faculty appointment at Yale.

The third option for the senior essay is a yearlong paper, begun in ANTH 471 or 472 and completed in ANTH 491. The yearlong essay is designed for students who wish to pursue more extensive independent projects than can be completed in a single term. Students must have their project approved by a faculty adviser who establishes the requirements for ANTH 471 or 472; approval is required before the student registers for ANTH 471 or 472, typically in the fall term of the senior year.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 course credits (incl senior essay)

Distribution of courses At least 1 intro survey or intermediate course in each of 3 subfields; 3 advanced courses (not incl ANTH 471, 472, 491, or senior essay sem); up to 3 cognate courses in other depts or programs with DUS approval

Senior requirement Senior essay in advanced sem or ANTH 491

Archaeology 171, 232, 301, 316L, 320, 326, 385, 421, 444, 454, 473, 476

Biological anthropology 116, 204, 212, 242, 306, 335, 412, 420, 453, 456, 464

Sociocultural anthropology 011, 012, 013, 110, 114, 115, 216, 221, 234, 244, 245, 252, 254, 256, 276, 302, 303, 311, 315, 338, 342, 355, 357, 360, 362, 366, 371, 378, 382, 402, 406, 409, 414, 427, 453, 462

Linguistic anthropology 364, 413, 461

INTRODUCTORY COURSES

***ANTH 011b, Reproductive Technologies** Marcia Inhorn

Introduction to scholarship on the anthropology of reproduction. Focus on reproductive technologies such as contraceptives, prenatal diagnostics, childbirth technologies, abortion, assisted reproduction, surrogacy, and embryonic stem cells. The globalization of

reproductive technologies, including social, cultural, legal, and ethical responses. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SO Fr sem

***ANTH 012b, Exploring Sport, Society, and Culture** William Kelly

Introduction to critical sport studies. Exploration of the nature of sports, the emergence of modern sports, and implications of sports for health, technology, ethics, gender, sexuality, class, race, nationalism, and globalization. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. Fr sem

***ANTH 013b/AFAM 049b/WGSS 013b, Feminism, Race, Gender, and Sexuality**

Jafari Allen

Intersectional study of theoretical literature on feminism, gender, sexuality, and race. Transnational theory and praxis examined with perspectives from anthropology, literature, film, and experiential learning. How different embodied experiences, including race, gender, history, geography, and class, condition divergent perspectives. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SO Fr sem

ANTH 110b, An Introduction to Cultural Anthropology Erik Harms

Anthropological study of cosmology, tacit knowledge, and ways of knowing the world in specific social settings. Ways in which sociocultural specificity helps to explain human solutions to problems of cooperation and conflict, production and reproduction, expression, and belief. Introduction to anthropological ways of understanding cultural difference in approaches to sickness and healing, gender and sexuality, economics, religion, and communication. SO

***ANTH 114a, Introduction to Medical Anthropology** Sean Brotherton

Major theoretical orientations in medical anthropology. Medicine as a cultural system; medicalization of the life cycle; anthropology of the body; social implications of medicines, reemerging infections, and biomedical technologies; political dimensions of health policy. Use of ethnographic case studies. SO

ANTH 115b/AMST 115b/WGSS 115b, Gender in a Transnational World

Inderpal Grewal

For description see under Women's, Gender, & Sexuality Studies.

ANTH 116a, Introduction to Biological Anthropology David Watts

Introduction to human and primate evolution, primate behavior, and human biology. Topics include a review of principles of evolutionary biology and basic molecular and population genetics; the behavior, ecology, and evolution of nonhuman primates; the fossil and archaeological record for human evolution; the origin of modern humans; biological variation in living humans; and the evolution of human behavior. SC, SO

SURVEY COURSE

ANTH 171a/ARCG 171a, Great Civilizations of the Ancient World Anne Underhill

A survey of selected prehistoric and historical cultures through examination of archaeological sites and materials. Emphasis on the methodological and theoretical approaches by which archaeologists recover, analyze, and interpret the material remains of the past. SO

INTERMEDIATE COURSES

ANTH 204a, Molecular Anthropology Brenda Bradley

An introduction to the patterns and process of human genetic variation. Topics include human origins and migration; molecular adaptations to environment, lifestyle, and disease; ancient and forensic DNA analyses; and genealogical reconstructions. SC

ANTH 212b, Primate Molecular Ecology and Evolution Brenda Bradley

An overview of how molecular tools are used to answer questions about primate behavior, ecology, and evolution. Topics include primate phylogeography, molecular identification, kinship and paternity, conservation genetics, and the molecular basis of primate adaptations. SC

ANTH 216b/RLST 315b, Anthropology of Religion and Ritual Sara Shneiderman

Introduction to the anthropological study of religion and ritual, with a focus on political dimensions. Readings from a range of world traditions and geographical areas. Recommended preparation: a course in cultural anthropology, sociology, or religious studies. SO

ANTH 221a⁶/MMES 411a, Middle East Society and Culture Narges Erami

Introduction to ethnographic and historical works on the Middle East. Focus on relationships between sociocultural practices and experiences of living in the region. Themes include religion, nationalism, colonialism, Orientalism, kinship, media, informal networks, subjectivity, popular culture, the city, law, education, and gender and sexuality. WR, SO

ANTH 232a/ARCG 232a/LAST 232a, Ancient Civilizations of the Andes

Richard Burger

Survey of the archaeological cultures of Peru and Bolivia from the earliest settlement through the late Inca state. SO

***ANTH 234a, Disability and Culture** Karen Nakamura

Exploration of disability from a cross-cultural perspective, using examples from around the globe. Disability as it relates to identity, culture, law, and politics. Case studies may include deafness in Japan, wheelchair mobility in the United States, and mental illness in the former Soviet republics. SO RP

ANTH 242b, Human Evolutionary Biology and Life History Richard Bribiescas

The range of human physiological adaptability across environments and ecologies. Effects of energetic constraints on growth, reproduction, and behavior within the context of evolution and life history theory, with special emphasis on traditional non-Western societies. SC, SO

ANTH 244a, Modern Southeast Asia Erik Harms

Introduction to the peoples and cultures of Southeast Asia, with special emphasis on the challenges of modernization, development, and globalization. Southeast Asian history, literature, arts, belief systems, agriculture, industrialization and urbanization, politics, ecological challenges, and economic change. SO

ANTH 245b/EVST 250b, Nature and Globalization Karen Hébert

Examination of contemporary human relations to nature. Origins and consequences of the predominant ways humans interact with and conceive of the environment. Case studies

explore histories, theories, and experiences of resource production and consumption, development and conservation, environmental management and governance, and climate change and ecological risk. SO

***ANTH 252a/FILM 327a, Introduction to Visual Anthropology** Karen Nakamura

An introduction to visual anthropology, the study and production of visual and other sensory media in conjunction with long-term participant observation fieldwork. History of the production and analysis of ethnographic film and photography, as well as recent work in digital media and other sensory forms. Seminar discussion, film screenings, and mini-laboratories explore the theory, ethics, and methods of this subfield of anthropology. Enrollment limited. SO

ANTH 254a, Japan: Culture, Society, Modernity William Kelly

Introduction to Japanese society and culture. The historical development of Japanese society; family, work, and education in contemporary Japan; Japanese aesthetics; and psychological, sociological, and cultural interpretations of Japanese behavior. WR, SO

ANTH 256b/WGSS 366b, Minorities and Sexualities in Modern Japan

Karen Nakamura

The image of Japan as a homogenous society confronted through an exploration of post-colonial, native, caste, and sexual minorities that have become vocal in the past century. Focus on the mechanisms by which minoritization occurs and the development of social protest movements. SO

ANTH 264a/ARCG 264a, Archaeology of the Aztecs Staff

An anthropological and ethnohistorical examination of the Aztec civilization that dominated much of Mexico from the fourteenth century until the Spanish Conquest of 1521. SO

***ANTH 268b/ARCG 268b, The Rise of Civilization in Mesoamerica** Staff

A survey of the archaeological cultures of southern Mexico, Guatemala, Belize, and northern Honduras from the earliest inhabitants of the region through the emergence of the first states. Topics include the development of agriculture, the transition to sedentary villages, the origins of sociopolitical complexity, and the first states in the region. SO

ANTH 276a/SAST 219a, South Asian Social Worlds Sara Shneiderman

Study of a series of texts that introduce anthropological and critical approaches to South Asia's peoples and cultures while questioning the historical and political possibility of understanding such a diverse region. SO

**ADVANCED COURSES, INCLUDING SEMINARS,
READING COURSES, AND RESEARCH COURSES**

***ANTH 301a⁶, Foundations of Modern Archaeology** Richard Burger

Discussion of how method, theory, and social policy have influenced the development of archaeology as a set of methods, an academic discipline, and a political tool. Background in the basics of archaeology equivalent to one introductory course is assumed. SO

***ANTH 302a/AMST 402a/FILM 324a/WGSS 380a, Gender and Sexuality in Media
and Popular Culture** Laura Wexler, Inderpal Grewal

For description see under Women's, Gender, & Sexuality Studies.

***ANTH 303a, Field Methods in Cultural Anthropology** Kamari Clarke

Exploration of the fundamentals of cultural anthropology methods. The foundations of fieldwork approaches, including methods, theories, and the problem of objectivity. WR, SO

***ANTH 306a, Primates and Human Evolution** David Watts

Comparison of research on nonhuman primates with study of issues in human evolution and aspects of human behavior. Topics include use of other primates as models for humans and extinct hominins; apes, language, and the evolution of human minds; intergroup aggression; cooperation in humans and other primates; and whether chimpanzees have culture. SO

***ANTH 311a, Anthropological Theory** Sara Shneiderman

Key texts in the theoretical development of sociocultural anthropology. Theorists include Emile Durkheim, Marcel Mauss, A. R. Radcliffe-Brown, Bronislaw Malinowski, E. E. Evans-Pritchard, Claude Lévi-Strauss, Mary Douglas, Clifford Geertz, Sherry Ortner, Michele Rosaldo, and Talal Asad. SO

***ANTH 315a/AFAM 333a, Critical Ethnography: Methods, Ethics, Poetics**

Jafari Allen

Critique of theoretical, methodological, and aesthetic models in critical ethnography, drawn mostly from race theory, postcolonial theory, queer theory, and feminisms. Use of these models in students' own research practice. SO

ANTH 316Lb/ARCG 316Lb, Introduction to Archaeological Laboratory Sciences

Roderick McIntosh

For description see under Archaeological Studies.

***ANTH 320b^c/ARCG 320b^c, Mesopotamian Origins** Harvey Weiss

Analysis of the archaeological and paleoenvironmental data for rain-fed and irrigation agriculture settlement, subsistence, and politicoeconomic innovation in Mesopotamia, from sedentary agriculture villages to cities and states to early empire. Focus on combinations of dynamic social and environmental forces that drove these developments. SO

***ANTH 326a^c/ARCG 326a, Ancient Civilizations of the Eurasian Steppes**

William Honeychurch

Examination of peoples of the steppe zone that stretches from Eastern Europe to Mongolia. Overview of what archaeologists know about Eurasian steppe societies, with emphasis on the Neolithic, Bronze and Iron, and medieval ages. Attention both to material culture and to historical sources. Topics range from the domestication of the horse to Genghis Khan's world empire, including the impact these events had on neighboring civilizations in Europe and Asia. SO

***ANTH 335b^c/E&EB 342b^c, Primate Diversity and Evolution** Eric Sargis

Examination of the diversity and evolutionary history of living and extinct primates. Focus on major controversies in primate systematics and evolution, including the origins and relationships of several groups. Consideration of both morphological and molecular studies. Morphological diversity and adaptations explored through museum specimens and fossil casts. Recommended preparation: ANTH 116 and E&EB 123L. SC

***ANTH 338a/FILM 329a/SAST 372a^G, Himalaya through Film and Text** Mark Turin
For description see under South Asian Studies.

***ANTH 342b^G, Cultures and Markets in Asia** Helen Siu
Historical and contemporary movements of people, goods, and cultural meanings that have defined Asia as a region. Reexamination of state-centered conceptualizations of Asia and of established boundaries in regional studies. The intersections of transregional institutions and local societies and their effects on trading empires, religious traditions, colonial encounters, and cultural fusion. Finance flows that connect East Asia and the Indian Ocean to the Middle East and Africa. The cultures of capital and market in the neoliberal and postsocialist world. so

***ANTH 355b^G, China-Africa Encounters** Helen Siu, Michael McGovern
The history, effects, and implications of Chinese involvement in and with African countries over the past century. Diasporic experiences, with attention to informal economies, cultural strategies, and ethnic and religious tensions; land, finance, and infrastructure; Chinese aid and development in Africa since the late 1960s, including medical aid and charitable groups. so

***ANTH 357a^G, Anthropology of the Body** Sean Brotherton
Theoretical debates about the body as a subject of anthropological, historical, psychological, medical, and literary inquiry. The persistence of the mind-body dualism, experiences of embodiment and alienation, phenomenology of the body, Foucauldian notions of biopolitics, biopower and the ethic of the self, the medicalized body, and the gendered body. so

***ANTH 360b/MMES 111b, Representing Iran** Narges Erami
Major themes in Iranian history and culture used as a critical framework for understanding challenges that face Iran today. Examination of Western production of knowledge about Iran. Topics include local and oral history, revolutions, Islam and secularism, democracy and theocracy, and the role of cinema. so

***ANTH 362a^G, Unity and Diversity in Chinese Anthropology and History** Helen Siu
An exploration of the Chinese identity as it has been reworked over the centuries. 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 364a^G, Language, Nation, and Globalization** J. Joseph Errington
A study of ideologies and practices that link languages with nation-states, from the nineteenth century to the present. Ways in which the production of knowledge about language has influenced understandings of nationality, ethnicity, race, and citizenship. so

***ANTH 366b/AMST 208b, Anthropology of Inequality in America** Kathryn Dudley, Sierra Bell
Sociocultural dimensions of social inequality in the contemporary United States. Ways in which the socioeconomic processes that produce inequality are inextricably embedded in worlds of cultural meaning; how those meanings are constructed and embodied in everyday practice. Perspectives from anthropology, sociology, economics, history, and popular media. so

***ANTH 371b⁶, Modern Indonesia** J. Joseph Errington

Political and cultural dynamics in contemporary Indonesia explored from historical and anthropological perspectives. Major ethnic groups, key historical dynamics, political culture, and interaction between modernization and traditional lifeways. Issues of ethnicity, gender, religion, and economy in situations of rapid social change. SO

***ANTH 378b⁶, Postwar Vietnam** Erik Harms

An introduction to the study of Vietnamese society since the end of the Vietnam War in 1975, with a focus on how economic and political changes intersect with cultural and social life. The historical challenges of postwar socialism, economic renovation, and the intersection of “market-oriented socialism” with class dynamics, urbanization, gender, health care, and ritual life. SO

***ANTH 382a/EVST 345a/F&ES 384a, Environmental Anthropology** Michael Dove,
Carol Carpenter

For description see under Environmental Studies.

***ANTH 385b⁶/ARCG 385b⁶, Archaeological Ceramics** Anne Underhill

Archaeological methods for analyzing and interpreting ceramics, arguably the most common type of object found in ancient sites. Focus on what different aspects of ceramic vessels reveal about the people who made them and used them. SO

***ANTH 402b⁶/FILM 454b⁶, Ethnographic Filmmaking and Visual Field Methods**
Karen Nakamura

A study of visual anthropology production, with readings from core texts in the analysis of visual culture and visual anthropology field methods. Analysis of the history, philosophy, ethics, production, and consumption of ethnographic film and photoethnography within both the field of anthropology and popular culture. HU, SO RP

***ANTH 406a/EVST 424a/PLSC 420a, Rivers: Nature and Politics** James Scott

For description see under Political Science.

***ANTH 409a/EVST 422a/F&ES 422a, Anthropology of Climate Change, Past and Present** Michael Dove

For description see under Environmental Studies.

***ANTH 412a⁶, Topics in Anthropological Genetics** Brenda Bradley

A detailed examination of molecular approaches to understanding human evolution and diversity. Emphasis on current research findings and new methodologies exploring topics such as human origins and hominin evolution, population genomics, molecular adaptations, epigenetics, and gene-culture interactions. Consideration of relevant social and ethical issues, including commercial DNA testing and ownership of biological samples. SC

***ANTH 413b⁶, Language, Culture, and Ideology** J. Joseph Errington

Review of influential anthropological theories of culture, with reference to theories of language that inspired or informed them. American and European structuralism; cognitivist and interpretivist approaches to cultural description; the work of Bakhtin, Bourdieu, and various critical theorists. SO RP

***ANTH 414a^G, Urban Anthropology and Global History** Helen Siu

Analysis of urban life in historical and contemporary societies. Topics include capitalist and postmodern transformations; class, gender, ethnicity, and migration; and global landscapes of power and citizenship. SO RP

***ANTH 420b^G, Primate Genomics** Brenda Bradley

A detailed exploration of molecular approaches to understanding primate behavior, ecology, and evolution. How the new wealth of genomic data aids primatological research on issues such as sexual selection; sociality and cooperation among kin and non-kin; phylogenomics and taxonomy; dietary, morphological, and behavioral adaptations; and migration, distribution, and conservation. SC

***ANTH 421a/ARCG 421a/EAST 423a, Approaches to Korean Archaeology**

Martin Bale

For description see under East Asian Studies.

***ANTH 427b, Topics in Medical Anthropology** Sean Brotherton

Anthropological approaches to medicine, science, technology, and the body examined through close reading of ethnographies and canonical texts. Theoretical, political, sub-disciplinary, and area studies debates in medical anthropology and the larger fields of global health, international development, and science and technology studies. Recommended preparation: ANTH 114 or equivalent. SO

***ANTH 444b^G/ARCG 444b^G, Social Archaeology** Anne Underhill

Methods for using material remains to make inferences about the social organization of the groups responsible for the remains. Analysis of social groups at different scales of size and complexity; the formation of groups on the basis of residence, gender, class, occupation, and other factors. SO

***ANTH 453a, Health Disparities and Health Equity** Catherine Panter-Brick

A biocultural perspective on debates in medical anthropology and global health that focus on health disparities and equity. The intersection of biological and cultural issues in matters of health research and intervention. Application of theoretical frameworks to case studies in global health inequality. SO

***ANTH 454a^G/ARCG 454a^G, Statistics for Archaeological Analysis**

William Honeychurch

An introduction to quantitative data collection, analysis, and argumentation for archaeologists. Emphasis on the exploration, visualization, and analysis of specifically archaeological data using simple statistical approaches. No prior knowledge of statistics required.

***ANTH 456a^G/ARCG 456a^G, Reconstructing Human Evolution: An Ecological**

Approach Andrew Hill

Methods for obtaining data relevant to ecological factors that have affected human evolutionary change, such as changes in climate, competition with other animals, and availability and kinds of food supply. Evaluation of techniques for obtaining ecological data in such fields as geology, paleobotany, and paleozoology. Ethnographic, primatological, and other biological models of early human behavior. SO

***ANTH 461a, The Ethnography of Speaking** J. Joseph Errington

The social use of language; how language use both reflects and is productive of social relations. Focus on the interrelationships between verbal form, social function, and cultural meaning in varying modalities of spoken communicative interaction. SO

***ANTH 462b^c, Ethnographic Perspectives on Global Health** Marcia Inhorn

Study of anthropological ethnographies on serious health problems facing populations in resource-poor societies. Poverty and structural violence; health as a human right; struggles with infectious disease; the health of women and children. Focus on health issues facing sub-Saharan Africa and Latin America. SO RP

***ANTH 463b^c/ER&M 366b/SAST 419b^c, Ethnicity, Indigeneity, Mobility**

Sara Shneiderman

Classic literature on ethnicity in conversation with more recent work on indigeneity and mobility. Relationships among place, belonging, and citizenship in shaping contemporary identity practices and discourses. Focus on South Asia, with attention to Latin America, Native North America, Southeast and East Asia, Australia/New Zealand, and Africa. SO

***ANTH 464b/ARCG 464b, Human Osteology** Eric Sargis

A lecture and laboratory course focusing on the characteristics of the human skeleton and its use in studies of functional morphology, paleodemography, and paleopathology. Laboratories familiarize students with skeletal parts; lectures focus on the nature of bone tissue, its biomechanical modification, sexing, aging, and interpretation of lesions. SO

***ANTH 471a and 472b, Readings in Anthropology** David Watts

For students who wish to investigate an area of anthropology not covered by regular departmental offerings. The project must terminate with at least a term paper or its equivalent. No student may take more than two terms for credit. To apply for admission, a student should present a prospectus and bibliography to the director of undergraduate studies no later than the third week of the term. Written approval from the faculty member who will direct the student's reading and writing must accompany the prospectus.

***ANTH 473b^c/ARCG 473b^c/EVST 473b, Abrupt Climate Change and Societal Collapse**

Harvey Weiss

The coincidence of societal collapses throughout history with decadal and century-scale drought events. Challenges to anthropological and historical paradigms of cultural adaptation and resilience. Examination of archaeological and historical records and high-resolution sets of paleoclimate proxies. HU, SO

***ANTH 476b^c/ARCG 476b^c, GIS and Spatial Analysis for Archaeology**

William Honeychurch

Introduction to the use of geographical information systems (GIS) in anthropology, with attention to archaeological applications. Examples from theoretical, analytical, and geographical contexts; introduction to current software. SO

***ANTH 491a or b, The Senior Essay** David Watts

Supervised investigation of some topic in depth. The course requirement is a long essay to be submitted as the student's senior essay. By the end of the third week of the term in which

the essay is written, the student must present a prospectus and a preliminary bibliography to the director of undergraduate studies. Written approval from an Anthropology faculty adviser and an indication of a preferred second reader must accompany the prospectus.

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Most graduate seminars in anthropology are open to qualified undergraduates. Descriptions are available in the departmental office, 10 Sachem St. Permission of the instructor and of the director of graduate studies is required.

Applied Mathematics

Director of undergraduate studies: Daniel Spielman, 201 AKW, 436-1264, daniel.spielman@yale.edu; senior coordinator: Andrew Barron, 24 Hillhouse Ave., 432-0634, andrew.barron@yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF APPLIED MATHEMATICS

Professors Andrew Barron (*Statistics*), Donald Brown (*Economics, Mathematics*), Joseph Chang (*Statistics*), Ronald Coifman (*Mathematics*), Gustave Davis (*School of Medicine*), Eric Denardo (*Operations Research*), Stanley Eisenstat (*Computer Science*), Michael Fischer (*Computer Science*), Igor Frenkel (*Mathematics*), Roger Howe (*Mathematics*), Peter Jones (*Mathematics*), A. Stephen Morse (*Electrical Engineering*), David Pollard (*Statistics*), Nicholas Read (*Physics, Applied Physics*), Vladimir Rokhlin (*Computer Science, Mathematics*), Herbert Scarf (*Economics*), Peter Schultheiss (*Emeritus*) (*Electrical Engineering*), Martin Schultz (*Computer Science*), Mitchell Smooke (*Mechanical Engineering, Applied Physics*), Daniel Spielman (*Computer Science*), Van Vu (*Mathematics*), Günter Wagner (*Ecology & Evolutionary Biology*), John Wettlaufer (*Geology & Geophysics, Physics*), Huibin Zhou (*Statistics*), Steven Zucker (*Computer Science, Biomedical Engineering*)

Associate Professors John Emerson (*Statistics*), Josephine Hoh (*Epidemiology & Public Health*), Sekhar Tatikonda (*Electrical Engineering, Statistics*)

Assistant Professors Lisha Chen (*Statistics*), Thierry Emonet (*Molecular, Cellular, & Developmental Biology, Physics*), Mokshay Madiman (*Statistics*)

J. W. Gibbs Assistant Professors Yael Algom-Kfir, Dan Kushnir, Adam Marcus, Neta Rabin, Andrew Wells

Lecturer Matthew Hirn

Mathematical models are widely used throughout science and engineering in fields as diverse as physics, bioinformatics, robotics, image processing, and economics. Despite the broad range of applications, there are a few essential techniques used in addressing most problems. The Applied Mathematics major provides a foundation in these mathematical techniques and trains the student to use them in a substantive field of application.

The interdisciplinary major permits a great deal of flexibility in design. It is intended to appeal to students who wish to study the more mathematical aspects of science or engineering as well as those whose primary interest is in mathematics and statistics and who wish to become acquainted with applications. Core courses are drawn from Computer Science, Mathematics, Statistics, and Engineering and Applied Science. Courses applying mathematics may be drawn from participating programs in Applied Physics, Astronomy, the biological sciences (Ecology and Evolutionary Biology, Molecular Biophysics and Biochemistry, and Molecular, Cellular, and Developmental Biology), Chemistry, Computer Science, Economics, the various programs in engineering (Biomedical, Chemical, Electrical, Environmental, and Mechanical Engineering), Geology and Geophysics, Mathematics, Operations Research, Physics, Political Science, and Statistics. The Applied Mathematics degree program requires a three-course concentration in a field in which mathematics is used.

Students may pursue a major in Applied Mathematics as one of two majors and can thereby equip themselves with mathematical modeling skills while being fully engaged in a field of application. In this case, the concentration requirement of the Applied Mathematics program is flexible in order to recognize the contribution of the other major. A two-course overlap is permitted in satisfying the requirements of the two majors.

Prerequisite and introductory courses Multivariable calculus and linear algebra are required and should be taken before or during the sophomore year. This requirement may be satisfied by MATH 120 and MATH 222 or 225, or equivalents. It may also be satisfied by MATH 230, 231. Computer programming skills are also required and may be acquired by taking ENAS 130 or CPSC 112.

Details of individual programs must be worked out in consultation with the director of undergraduate studies, whose signed permission is required.

Requirements of the major for the B.A. degree program The program requires eleven term courses beyond the prerequisites, including the senior project, comprising a coherent program:

1. A course in differential equations (ENAS 194 or MATH 246)
2. A course in probability (STAT 241 or 238)
3. A course in data analysis (STAT 361 or 230)
4. A course in discrete mathematics (AMTH 244 or CPSC 202)
5. Courses in at least three of the following areas: (a) optimization: AMTH 235, 237; (b) probability and statistics: STAT 242, 251, 312, 364, ECON 136, ENAS 496; (c) partial differential equations and analysis: MATH 247, 250, 260, 300, 301, 310; (d) algorithms and numerical methods: CPSC 365, 440, ENAS 440, 441; (e) graph theory: AMTH 462; (f) mathematical economics: ECON 350, 351; (g) electrical engineering: EENG 397, 436, 442, STAT 364; (h) data mining and machine learning: STAT 365, CPSC 445; (i) biological modeling and computation: AMTH 465, CPSC 475, BENG 445, ENAS 391; (j) physical sciences and engineering: MENG 280, 285, 361, 383, 463, 469, CENG 301, 315, ASTR 320, 420, G&G 322, 323, 421, PHYS 343, 401, 402, 410, 420, 430, 440, 442, 460, APHY 439, 448

6. At least three courses in a field of concentration involving the application of mathematics to that field, at least two of which are advanced courses. Programs in science, engineering, computer science, statistics, economics, and operations research are natural sources of concentration. Alternatively, when two majors are undertaken, if the second major is in a participating program, then, recognizing that there can be an overlap of two courses, the student may take for the remaining course an additional choice relevant to the Applied Mathematics major such as listed in point 5 above or for the B.S. degree below. Details of a student's program to satisfy the concentration requirement must be worked out in consultation with, and approved by, the director of undergraduate studies
7. Senior seminar (AMTH 490) or special project completed during senior year (AMTH 491)

A maximum of one course credit taken Credit/D/Fail may be counted toward the requirements of the major.

The B.S. degree program In addition to the courses indicated for the B.A. degree, the B.S. degree, which totals fourteen term courses beyond the prerequisites, must also include:

1. Topics in analysis (MATH 300) or introduction to analysis (MATH 301); the course selected may not be counted toward the area requirement for the major (see item 5 above)
2. An additional course selected from the list in item 5 above
3. Another course numbered 300 or higher from the list above, or a course numbered 300 or higher in mathematics, applied mathematics, statistics, or quantitative computer science or engineering, subject to the approval of the director of undergraduate studies

Alternatively, students may petition to receive a B.S. in Applied Mathematics by fulfilling the B.A. requirements in Applied Mathematics and the B.S. requirements in another program.

REQUIREMENTS OF THE MAJOR

Prerequisites MATH 120 and MATH 222 or 225, or equivalents; ENAS 130 or CPSC 112

Number of courses *B.A.* – 11 term courses beyond prereqs (incl senior req); *B.S.* – 14 term courses beyond prereqs (incl senior req)

Specific courses required *B.A.* – ENAS 194 or MATH 246; STAT 241 or 238; STAT 361 or 230; AMTH 244 or CPSC 202; *B.S.* – same, plus MATH 300 or 301

Distribution of courses *B.A.* – at least 3 courses in a field of concentration concerning the application of math to that field, at least 2 of them advanced; 3 addtl courses as specified; *B.S.* – same, with 2 addtl courses as specified

Substitution permitted MATH 230, 231 for mathematics prerequisites

Senior requirement Senior sem (AMTH 490) or special project (AMTH 491)

INTRODUCTORY COURSES

AMTH 160b, The Structure of Networks Ronald Coifman and staff

Network structures and network dynamics described through examples and applications ranging from marketing to epidemics and the world climate. Study of social and biological

networks as well as networks in the humanities. Mathematical graphs provide a simple common language to describe the variety of networks and their properties. QR

AMTH 222a or b/MATH 222a or b, Linear Algebra with Applications

Yael Algom-Kfir, Peter Schultheiss

For description see under Mathematics.

INTERMEDIATE AND ADVANCED COURSES

AMTH 235a/OPRS 235a, Optimization Eric Denardo

For description see under Operations Research.

[AMTH 237a/OPRS 237a, Stochastic Models of Decision Making]

AMTH 244a/MATH 244a, Discrete Mathematics Van Vu

For description see under Mathematics.

AMTH 247b/G&G 247b/MATH 247b, Partial Differential Equations Igor Frenkel

For description see under Mathematics.

AMTH 260a/MATH 260a, Basic Analysis in Function Spaces Ronald Coifman

For description see under Mathematics.

***AMTH 342a/EENG 442a^G, Linear Systems** A. Stephen Morse

For description see under Electrical Engineering.

AMTH 361a^G/STAT 361a^G, Data Analysis Lisha Chen

For description see under Statistics.

[AMTH 462a^G/CPSC 462a^G, Graphs and Networks]

***AMTH 480a or b, Directed Reading** Daniel Spielman

Individual study for qualified students who wish to investigate an area of applied mathematics not covered in regular courses. A student must be sponsored by a faculty member who sets the requirements and meets regularly with the student. Requires a written plan of study approved by the faculty adviser and the director of undergraduate studies.

***AMTH 490b, Senior Seminar and Project** Andrew Barron

Under the supervision of a member of the faculty, each student works on an independent project. Students participate in seminar meetings at which they speak on the progress of their projects. Some meetings may be devoted to talks by visiting faculty members or applied mathematicians.

***AMTH 491a or b, Special Projects** Daniel Spielman

Individual research. Requires a faculty supervisor and the permission of the director of undergraduate studies. The student must submit a written report about the results of the project. May be taken more than once for credit.

Applied Physics

Director of undergraduate studies: Victor Henrich, 327 BCT, 432-4399, victor.henrich@yale.edu; appliedphysics.yale.edu

FACULTY OF THE DEPARTMENT OF APPLIED PHYSICS

Professors Charles Ahn, †Sean Barrett, Hui Cao, Richard Chang (*Emeritus*), Michel Devoret, Paul Fleury, †Steven Girvin, †Leonid Glazman, Victor Henrich, Arvid Herzenberg (*Emeritus*), †Marshall Long, †Tso-Ping Ma, Simon Mochrie, Daniel Prober, Nicholas Read, †Mark Reed, Robert Schoelkopf, †Ramamurti Shankar, †Mitchell Smooke, A. Douglas Stone, †John Tully, Robert Wheeler (*Emeritus*), Werner Wolf (*Emeritus*)

Associate Professors †Jack Harris, Sohrab Ismail-Beigi, †Karyn Le Hur

†A joint appointment with primary affiliation in another department.

Physics is the study of the fundamental laws of nature. Applied physics uses these laws to understand phenomena that have practical applications. Engineering in turn makes use of these phenomena for human purposes. Applied physics thus forms a link between the fundamental laws of nature and their applications. Students majoring in Applied Physics take courses in both physics and engineering, as well as courses specifically in applied physics. Students completing the program in Applied Physics are prepared for graduate study in applied physics, in physics, in nanoscience, or in engineering, and, with appropriate prerequisites, in medicine; or they may choose careers in a wide range of technical and commercial fields or in fields such as technical writing or patent law that draw on interdisciplinary subjects.

Contemporary physical science and engineering are becoming increasingly interdisciplinary. Traditional boundaries between fields have blurred, and new areas are constantly emerging, e.g., nanotechnology. The Applied Physics major provides a flexible framework on which students can build a curriculum tailored to their own interests, in consultation with the director of undergraduate studies.

Introductory courses During the freshman year, students interested in Applied Physics should start by taking courses in mathematics, and physics if possible, appropriate to their level of preparation. The choice between different starting points is generally made on the basis of performance on Advanced Placement tests (see the Freshman Web site at yalecollege.yale.edu/content/class-2016).

The recommended sequence in mathematics for students interested in Applied Physics or Electrical or Mechanical Engineering is MATH 115, APHY 151, MATH 222, and APHY 194. Either MATH 120 or MATH 230, 231 is an acceptable alternative to APHY 151, and MATH 225 is an acceptable alternative to MATH 222. Similarly, PHYS 301 may be substituted for APHY 194 and MATH 222.

The recommended starting courses in physics are PHYS 200 and 201. These courses should be taken in the freshman year by students who have a strong preparation in mathematics and physics. Students with a particularly strong background in physics and

mathematics may take PHYS 260 and 261 instead. Students who are less well prepared in physics and mathematics may choose to take PHYS 180 and 181 during their freshman year, or PHYS 200 and 201 during their sophomore year after they have taken more mathematics courses. Two laboratory courses, such as PHYS 205L and 206L, should be taken at some time during the freshman or sophomore year.

Because computers are ubiquitous in the practical applications of physics, students interested in Applied Physics should also take a course on the use of computers early in their studies. ENAS 130, Introduction to Computing for Engineers and Scientists, is recommended; a comparable course in computer science may be substituted with the approval of the director of undergraduate studies.

The multiplicity of choices facing students interested in this general area indicates the importance of informed advice for freshmen. Students should consult freely with directors of undergraduate studies and individual faculty members in their departments of interest to optimize choices and to ensure maximum flexibility at the time a major is selected.

The major in Applied Physics requires eight courses beyond the introductory sequence. Two of these must be APHY 471, 472. All majors are also required to take APHY 322, 439, and PHYS 420, or equivalents. The three remaining advanced courses should focus on a particular area of concentration. For example, a student interested in solid-state and/or quantum electronics might choose from APHY 321, 448, 449, EENG 320, and 325. A student interested in the physics of materials and/or nanoscience might choose from APHY 448, 449, CHEM 220, 450, and MENG 285. Many other concentrations are possible.

Senior requirement Seniors must complete an independent research project, taken as APHY 471 and 472. The independent research project is under the supervision of a faculty member in Applied Physics, engineering, or the departments of Physics, Computer Science, or Geology and Geophysics. The project may be started in the junior year and continued into the senior year. Students planning to do a research project should contact the project coordinator as early as possible to discuss available options and general requirements.

A well-prepared student interested in solid-state and/or quantum electronics might elect the following course sequence:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
APHY 151	APHY 194	APHY 439	APHY 448
MATH 222	APHY 322	APHY 472	APHY 449
PHYS 200	ENAS 130	EENG 320	APHY 471
PHYS 201	PHYS 206L	PHYS 420	
PHYS 205L			

A student starting physics in the sophomore year might elect:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
ENAS 130	APHY 194	APHY 322	APHY 448
MATH 115	MATH 222	APHY 439	APHY 449
MATH 120	PHYS 200	APHY 472	APHY 471
	PHYS 201	PHYS 420	EENG 320
	PHYS 205L		
	PHYS 206L		

A typical program in physics of materials and/or nanoscience for a well-prepared student might be:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
APHY 151	APHY 322	APHY 439	APHY 448
APHY 194	CHEM 118	APHY 472	APHY 449
PHYS 200	MATH 222	CHEM 220	APHY 471
PHYS 201		ENAS 130	PHYS 420
PHYS 205L			
PHYS 206L			

A typical program in physics of materials and/or nanoscience for a student starting physics in the sophomore year might be:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CHEM 118	APHY 194	APHY 322	APHY 448
CHEM 220	MATH 222	APHY 439	APHY 471
MATH 115	PHYS 200	ENAS 130	APHY 472
MATH 120	PHYS 201	PHYS 420	CHEM 450
	PHYS 205L		
	PHYS 206L		

Approval of programs The Applied Physics major provides for various programs corresponding to a range of student interests. Substitutions of equivalent courses may be permitted. Students interested in an Applied Physics major should contact the director of undergraduate studies as early as possible, and in any case by the end of the sophomore year.

REQUIREMENTS OF THE MAJOR

Prerequisites PHYS 180, 181, or 200, 201, with appropriate math coreqs and 2 lab courses as specified; APHY 151 or MATH 120; MATH 222 and APHY 194, or PHYS 301; ENAS 130

Number of courses 8 term courses beyond prereqs (incl senior req)

Distribution of courses 3 courses in physical or mathematical sciences or engineering in area of concentration, with DUS approval

Specific courses required APHY 322, 439, PHYS 420, or equivalents

Substitution permitted Any relevant course approved by DUS

Senior requirement APHY 471 and 472

*APHY 050a/PHYS 050a, Science of Modern Technology Daniel Prober

Examination of the science behind selected advances in modern technology. Focus on the scientific and contextual basis of each advance. Topics are developed by the participants with the instructor and with guest lecturers, and may include nanotechnology, quantum computation and cryptography, optical systems for communication and medical diagnostics, transistors, satellite imaging and global positioning systems, large-scale immunization, and DNA made to order. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SC RP Fr sem

***APHY 060b/ENAS 060b/PHYS 060b, Energy Technology and Society** Paul Fleury
The technology and use of energy. Impacts on the environment, climate, security, and economy. Application of scientific reasoning and quantitative analysis. Intended for non-science majors with strong backgrounds in math and science. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. QR, SC Fr sem

***APHY 110b/ENAS 110b, The Technological World** Victor Henrich
An exploration of modern technologies that play a role in everyday life, including the underlying science, current applications, and future prospects. Examples include solar cells, light-emitting diodes (LEDs), computer displays, the global positioning system, fiber-optic communication systems, and the application of technological advances to medicine. For students not committed to a major in science or engineering; no college-level science or mathematics required. Prerequisite: high school physics or chemistry. Enrollment limited to 90. QR, SC

APHY 151a or b/ENAS 151a or b, Multivariable Calculus for Engineers

Victor Henrich [F], Mitchell Smooke [Sp]

For description see under Engineering & Applied Science.

APHY 194a or b/ENAS 194a or b, Ordinary and Partial Differential Equations with Applications Richard Dobbins [F], Charles Ahn [Sp]

For description see under Engineering & Applied Science.

APHY 321b^c/EENG 401b^c, Semiconductor Silicon Devices and Technology

Minjoo Lee

For description see under Electrical Engineering.

APHY 322b, Electromagnetic Waves and Devices Robert Schoelkopf

Introduction to electrostatics and magnetostatics, time varying fields, and Maxwell's equations. Applications include electromagnetic wave propagation in lossless, lossy, and metallic media and propagation through coaxial transmission lines and rectangular waveguides, as well as radiation from single and array antennas. Occasional experiments and demonstrations are offered after classes. Prerequisites: PHYS 180, 181, or 200, 201. QR, SC

APHY 439a^c/PHYS 439a, Basic Quantum Mechanics Robert Schoelkopf

The 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. Prerequisites: PHYS 181 or 201, PHYS 301, or equivalents, or permission of instructor. QR, SC

APHY 448a^c/PHYS 448a^c, Solid-State Physics I Victor Henrich

The first term of a two-term sequence covering the principles underlying the electrical, thermal, magnetic, and optical properties of solids, including crystal structure, phonons, energy bands, semiconductors, Fermi surfaces, magnetic resonances, phase transitions, dielectrics, magnetic materials, and superconductors. Prerequisites: APHY 322, 439. QR, SC

APHY 449b^c/PHYS 449b^c, Solid-State Physics II A. Douglas Stone

The second term of the sequence described under APHY 448. QR, SC

***APHY 471a and 472b, Special Projects** Victor Henrich

Faculty-supervised individual or small-group projects with emphasis on research (laboratory or theory). Students are expected to consult the director of undergraduate studies and appropriate faculty members to discuss ideas and suggestions for suitable topics. These courses may be taken at any appropriate time in the student's career; they may be taken more than once. Permission of the faculty adviser and of the director of undergraduate studies is required.

Arabic

(See under Near Eastern Languages and Civilizations.)

Archaeological Studies

Director of undergraduate studies: William Honeychurch, Rm. 305, 51 Hillhouse Ave., 432-3676, william.honeychurch@yale.edu

COUNCIL ON ARCHAEOLOGICAL STUDIES

Anthropology Richard Burger (*Chair*), Andrew Hill, William Honeychurch, Roderick McIntosh, Eric Sargis, Anne Underhill

Classics, History of Art Milette Gaifman, Diana Kleiner

Geology & Geophysics Leo Hickey, Ronald Smith

History Valerie Hansen

History of Art Edward Cooke, Jr., Mary Miller

Near Eastern Languages & Civilizations John Darnell, Karen Foster, Eckart Frahm, Colleen Manassa, Harvey Weiss

This special interdepartmental major is supervised by the University's Council on Archaeological Studies. Inquiries about the major may be addressed to the chair of the council, Richard Burger, Department of Anthropology, 10 Sachem Street, or to the director of undergraduate studies.

The major in Archaeological Studies provides a program of interdepartmental offerings covering prehistoric, early historic, and medieval cultures and cultural developments in the Old and New Worlds, and introduces students to the analytic tools that facilitate archaeological studies. The major is designed to expose students to a variety of archaeological research perspectives (anthropological, historical, art historical, and physical science), while emphasizing substantive studies. These include: (1) study of such prehistoric–early historic transformations as the origins of agriculture, cities and states, and early empires, and (2) study of the material culture, art, and architecture of the prehistoric, early historic, and medieval cultures of the Old and New Worlds, including the iconography of ancient cultures, the relationship between art and society in ancient cultures, ancient writing systems, and American historical archaeology.

Requirements of the major for the Class of 2014 and previous classes Students in the Class of 2014 and previous classes may fulfill the requirements of the Archaeological

Studies major as described below for the Class of 2015 and subsequent classes. Alternatively, they may fulfill the requirements of the major that were in place when they entered it, as described in previous editions of this bulletin.

Requirements of the major for the Class of 2015 and subsequent classes The major consists of thirteen term courses including the senior project. The following six courses are required: an introductory survey; a summer course in field techniques or a Yale-affiliated summer research project, approved in advance by the Council; the introductory laboratory course ARCG 316L; an advanced laboratory course; a theory course; and the senior research project ARCG 491. The remaining seven courses required for the major must be distributed among the six subject areas represented by the departments and programs offering courses double-titled with Archaeological Studies, with three of those seven courses falling in different departments and programs. The departments and programs are: Anthropology, Classics, Environmental Studies, Geology and Geophysics, History of Art, and Near Eastern Languages and Civilizations. Some courses may be applied to categories other than the ones in which they are listed below, upon application to the director of undergraduate studies. For three of the seven archaeology electives students may, with permission of the director of undergraduate studies, substitute three courses from other departments in areas related to their research.

Students majoring in Archaeological Studies are strongly encouraged, but not required, to devote a second summer either to archaeological research in the field or laboratory, or to an additional field course in archaeology. Members of the Council faculty currently direct archaeological field projects in China, Syria, Egypt, Peru, Mali, Mongolia, and Guatemala. Qualified majors are encouraged to apply for research positions with these projects.

Senior requirement The final requirement for the major is a senior research project (ARCG 491) in some field of archaeology, preferably one involving more than one area or discipline.

Students majoring in Archaeological Studies should consult with the director of undergraduate studies at the beginning of each term.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 13 term courses (incl senior project)

Specific course required ARCG 316L

Distribution of courses 1 intro survey; 1 summer field techniques course or research project, as specified; 1 advanced lab; 1 theory course; 7 electives, at least 1 in each of 3 areas, as specified

Substitution permitted For 3 electives, 3 courses related to research, with DUS permission

Senior requirement Research project (ARCG 491)

ANTHROPOLOGY

ARCG 171a/ANTH 171a, Great Civilizations of the Ancient World Anne Underhill

For description see under Anthropology.

ARCG 232a/ANTH 232a/LAST 232a, Ancient Civilizations of the Andes

Richard Burger

For description see under Anthropology.

ARCG 264a/ANTH 264a, Archaeology of the Aztecs Staff

For description see under Anthropology.

***ARCG 268b/ANTH 268b, The Rise of Civilization in Mesoamerica** Staff

For description see under Anthropology.

ARCG 316Lb/ANTH 316Lb, Introduction to Archaeological Laboratory Sciences

Roderick McIntosh

Introduction to techniques of archaeological laboratory analysis, with quantitative data styles and statistics appropriate to each. Topics include dating of artifacts, sourcing of ancient materials, remote sensing, and microscopic and biochemical analysis. Specific techniques covered vary from year to year.

***ARCG 320b^G/ANTH 320b^G, Mesopotamian Origins** Harvey Weiss

For description see under Anthropology.

***ARCG 326a/ANTH 326a^G, Ancient Civilizations of the Eurasian Steppes**

William Honeychurch

For description see under Anthropology.

***ARCG 385b^G/ANTH 385b^G, Archaeological Ceramics** Anne Underhill

For description see under Anthropology.

***ARCG 421a/ANTH 421a/EAST 423a, Approaches to Korean Archaeology**

Martin Bale

For description see under East Asian Studies.

***ARCG 444b^G/ANTH 444b^G, Social Archaeology** Anne Underhill

For description see under Anthropology.

***ARCG 454a^G/ANTH 454a^G, Statistics for Archaeological Analysis**

William Honeychurch

For description see under Anthropology.

***ARCG 456a^G/ANTH 456a^G, Reconstructing Human Evolution: An Ecological Approach** Andrew Hill

For description see under Anthropology.

***ARCG 464b/ANTH 464b, Human Osteology** Eric Sargis

For description see under Anthropology.

***ARCG 473b^G/ANTH 473b^G/EVST 473b, Abrupt Climate Change and Societal Collapse**

Harvey Weiss

For description see under Anthropology.

***ARCG 476b^G/ANTH 476b^G, GIS and Spatial Analysis for Archaeology**

William Honeychurch

For description see under Anthropology.

ENVIRONMENTAL STUDIES

ARCG 226a/EVST 226a, Global Environmental History Harvey Weiss

For description see under Environmental Studies.

GEOLOGY AND GEOPHYSICS

***ARCG 362b/EVST 362b/G&G 362b, Observing Earth from Space** Ronald Smith

For description see under Geology & Geophysics.

HISTORY OF ART

ARCG 170a/CLCV 170a/HSAR 250a, Roman Art: Empire, Identity, and Society

Diana Kleiner

For description see under History of Art.

ARCG 238a/HSAR 238a/NELC 107a, Buried Cities: Thera, Pompeii, and Herculaneum

Karen Foster

For description see under History of Art.

ARCG 239b/HSAR 239b^G/HUMS 252b/NELC 104b^G, Art of the Ancient Near East and Aegean Karen Foster

For description see under History of Art.

ARCG 243b/CLCV 160b/HSAR 243b, Greek Art and Architecture Milette Gaifman

For description see under History of Art.

NEAR EASTERN LANGUAGES AND CIVILIZATIONS

***ARCG 001a/NELC 001a, Egypt and Northeast Africa: A Multidisciplinary Approach**

Colleen Manassa, John Darnell

For description see under Near Eastern Languages & Civilizations.

ARCG 221b^G/HSAR 234b/NELC 120b^G, Egyptomania Colleen Manassa, John Darnell

For description see under Near Eastern Languages & Civilizations.

ARCG 223a^G/NELC 220a^G/WGSS 226a^G, Lives in Ancient Egypt Colleen Manassa

For description see under Near Eastern Languages & Civilizations.

ADVANCED RESEARCH COURSES

***ARCG 471a and 472b, Directed Reading and Research in Archaeology**

William Honeychurch

Qualified students may pursue special reading or research under the guidance of an instructor. A written statement of the proposed research must be submitted to the director of undergraduate studies for approval.

***ARCG 491a or b, Senior Research Project in Archaeology** William Honeychurch
Required of all students majoring in Archaeological Studies. Supervised investigation of some archaeological topic in depth. The course requirement is a long essay to be submitted as the student's senior essay. The student should present a prospectus and bibliography to the director of undergraduate studies no later than the third week of the term. Written

approval from the faculty member who will direct the reading and writing for the course must accompany the prospectus.

Architecture

Director of undergraduate studies: Bimal Mendis, 328 RDH, 432-8325, bimal.mendis@yale.edu

MEMBERS OF THE SCHOOL OF ARCHITECTURE TEACHING IN YALE COLLEGE

Professors D. Michelle Addington, Kent Bloomer (*Adjunct*), Turner Brooks (*Adjunct*), Peggy Deamer, Keller Easterling, Alexander Garvin (*Adjunct*), Steven Harris (*Adjunct*), Dolores Hayden, Alan Plattus, Alexander Purves (*Emeritus*)

Associate Professors Eeva-Liisa Pelkonen, Emmanuel Petit

Assistant Professors Kyoung Sun Moon, Elihu Rubin (*Visiting*)

Lecturers Victor Agran, Karla Britton, Ariane Lourie Harrison, Amy Lelyveld, Joshua Rowley, Daniel Sherer

Critics Katherine Davies, Andrei Harwell, Adam Hopfner, Joyce Hsiang, Bimal Mendis, Thomas Zook

Application to the Architecture major Yale College students must apply to enter the major during the spring term of their sophomore year, after taking ARCH 150, 154, and 249. An application to the major must be submitted to the office of the director of undergraduate studies no later than 4 p.m. on March 28, 2013, in Room 328 RDH (third floor). All applications are reviewed by a faculty committee. Applications must include the following information: name, address, telephone number, courses related to architecture already taken, a statement of purpose, and a writing sample from Yale College. Portfolios representative of course work for ARCH 150, 154, and 249 must also be submitted for review as part of the application process by May 1, 2013. Applicants must stipulate their first, second, and third choices for the three concentrations in the major. The concentrations, described below, are design; history, theory, and criticism; and urban studies. Although qualified students and students who have fulfilled the prerequisites may be admitted into the Architecture major, they will not necessarily be admitted to their first-choice concentration. Applicants will be notified in writing regarding acceptance to the major by May 31, 2013. The major is usually limited to twenty students in the junior year and twenty students in the senior year, with a maximum of sixteen students in the design concentration for each year. Students have an opportunity to petition the director of undergraduate studies at the end of either the fall or spring term of their junior year if they wish to change concentrations. The director of undergraduate studies will notify students of the result of such a petition.

Introduction to architecture Introductory courses are ARCH 150, 154, and 249. They are open to all Yale College students except freshmen, and are required for those interested in the Architecture major prior to application. Freshmen may consider courses such as a freshman seminar, ARCH 260, 261, or STCY 176.

The standard major The purpose of the undergraduate major is to include the study of architecture within a comprehensive liberal arts education, drawing from the broader academic and professional environment of the Yale School of Architecture. The curriculum includes work in design, in history, theory, and criticism of architecture, and in urban studies, and leads to a bachelor of arts degree.

The *design concentration* introduces complex processes involved in solving spatial and programmatic problems. Creative work is grounded in the study of history and culture, and in the analysis of social conditions influencing architecture. Teaching formats include lectures, studio workshops, and individual presentations that culminate in a senior project design studio. The *history, theory, and criticism concentration* is intended to establish a broad historical and intellectual framework for the study of architecture. An interdisciplinary approach is encouraged through additional courses taken in various fields of humanities and social sciences. Normally these interdisciplinary courses address subjects closely linked to architectural history, theory, and criticism. Such courses may include archaeology, history of religion, aesthetics, philosophy, or visual culture. Permission of the director of undergraduate studies is required if the courses fall outside the specified course of studies. During their senior year students complete a written senior essay on a topic approved by the faculty. History, theory, and criticism majors are also urged to study a foreign language. The *urban studies concentration* encourages a broad, interdisciplinary investigation of the complex forces that shape the urban physical environment. The sequence of courses culminates in a senior essay that builds on course work, and either develops analysis and planning proposals for a specific site or furthers an individual research agenda.

Requirements of the major Students majoring in Architecture are required to take fifteen course credits. Majors are expected to take three prerequisites in their sophomore year, complete a core of five course credits by their junior year, and base their studies in one of three areas of concentration: (1) design, (2) history, theory, and criticism, or (3) urban studies.

The courses for all concentrations include three prerequisites: ARCH 150, 154, and 249. The core of five course credits required for all three concentrations include the studio courses ARCH 250 and 251 (to be taken during the junior year after the student is accepted into the major) and the history of architecture surveys ARCH 260 and 261 (to be completed by the end of the junior year). The electives are categorized under four broad subject areas: history and theory of architecture, urbanism and landscape, materials and technology, and structures and computation.

For the design concentration, the following additional courses are required:

1. ARCH 450, Senior Studio
2. ARCH 494 (the senior requirement)
3. One elective in history and theory of architecture chosen from the following: ARCH 341, 431, or other relevant course in History of Art approved by the director of undergraduate studies
4. One elective in urbanism and landscape chosen from the following: ARCH 340, 344, 345, 351; STCY 176; or other relevant course in American Studies, Ethics, Politics, and Economics, Environmental Studies, or Political Science approved by the director of undergraduate studies

5. One elective in materials and technology chosen from the following: ARCH 163, or other relevant course in Environmental Studies approved by the director of undergraduate studies
6. One elective in structures and computation chosen from the following: ARCH 161, an approved calculus or physics course, or other relevant course approved by the director of undergraduate studies. Elementary calculus is strongly recommended as preparation for graduate studies in Architecture

For the history, theory, and criticism concentration, the following additional courses are required:

1. ARCH 490 and 491 (the senior requirement)
2. Four electives in history and theory of architecture, chosen from the following: ARCH 341, 431, or other relevant courses in History of Art approved by the director of undergraduate studies
3. One elective in urbanism and landscape chosen from the following: ARCH 340, 344, 345, 351; STCY 176; or other relevant course in American Studies, Ethics, Politics, and Economics, Environmental Studies, or Political Science approved by the director of undergraduate studies

For the urban studies concentration, the following additional courses are required:

1. ARCH 495 and 491 (the senior requirement)
2. Four electives in urbanism and landscape chosen from the following: ARCH 340, 344, 345, 351; STCY 176; or other relevant courses approved by the director of undergraduate studies in American Studies, Ethics, Politics, and Economics, Environmental Studies, or Political Science
3. One elective in history and theory of architecture chosen from the following: ARCH 341, 431, or other relevant course in History of Art approved by the director of undergraduate studies

Digital media orientation All Architecture students are required to complete orientation sessions in digital media workshop and materials laboratory. Students enrolled in ARCH 249 are required to complete these sessions at the beginning of the spring term of the sophomore year. Access to digital media equipment will not be allowed until the required orientation sessions have been completed. Questions should be addressed to the director of undergraduate studies or the director of digital media, John Eberhart (432-9655, john.eberhart@yale.edu).

Library orientation The Architecture program requires all students to complete a ninety-minute introductory library research session. Students enrolled in ARCH 249 must take this session at the beginning of the spring term of the sophomore year. Failure to complete the required orientation will preclude completion of the major. Students may offer no substitutions for this orientation. Students should register with the Haas Family Arts Library Public Services Librarian, Lindsay King (436-8052, lindsay.king@yale.edu). Questions should be addressed to the director of undergraduate studies.

Shop orientation The Architecture program requires all majors to complete a three-hour woodshop and materials lab orientation session. Students enrolled in ARCH 249 must take

this session during the first week of the spring term of the sophomore year. Access to the woodshop and materials lab will not be allowed until the orientation has been completed. Questions should be addressed to the director of undergraduate studies or to the shop coordinator, Josh Rowley (432-7234, josh.rowley@yale.edu).

Senior requirement Seniors in the design track take the senior project design studio (ARCH 494). Seniors in the history, theory, and criticism track take ARCH 490, the senior research colloquium, and 491, the senior project. Seniors in the urban studies track take ARCH 495, the senior research colloquium in urban studies, and 491, the senior project. Proposals for senior projects and essays are submitted in the fall term for review and approval by the senior project coordinator, and then distributed to faculty members for review before the faculty members agree to become senior advisers. Senior essays and projects (ARCH 491) are due to the office of the director of undergraduate studies by Friday, April 19, 2013. In the spring term, all seniors must submit a portfolio of their work to the office of the director of undergraduate studies by Wednesday, May 1, 2013. For all majors, this portfolio must be representative of the student's design work including prerequisites and the senior project. History, theory, and criticism majors and urban studies majors must also include a copy of the senior essay and other appropriate texts.

REQUIREMENTS OF THE MAJOR

Prerequisites ARCH 150, 154, 249

Number of courses 15 course credits (incl prereqs and senior req)

Specific courses required *All concentrations* – ARCH 250, 251, 260, 261; *Design* – ARCH 450

Distribution of courses *Design* – 1 elective in history and theory of architecture, 1 elective in urbanism and landscape, 1 elective in materials and technology, 1 elective in structures and computation, all approved by DUS; *History, theory, and criticism* – 4 electives in history and theory of architecture, 1 elective in urbanism and landscape, all approved by DUS; *Urban studies* – 4 electives in urbanism and landscape, 1 elective in history and theory of architecture, all approved by DUS

Other Orientation sessions in digital media, library, and shop

Senior requirement *All concentrations* – portfolio representative of design work, including prerequisites and the senior requirement; *Design* – ARCH 494; *History, theory, and criticism* – ARCH 490 and 491; *Urban studies* – ARCH 495 and 491

[ARCH 001b, Architecture and Utopia]

***ARCH 150a, Introduction to Architecture** Alexander Purves

Lectures and readings in the language of architecture. Architectural vocabulary, elements, functions, and ideals. Notebooks and projects required. Not open to freshmen. Required for all Architecture majors. HU

***ARCH 154b, Drawing Architecture** Victor Agran

Introduction to the visual and analytical skills necessary to communicate architectural ideas. Observation and documentation of architectural space on the Yale campus. Drawing exercises introduce the conventions of architectural representation: plan, section, elevation, and isometric drawings, as well as freehand perceptual drawings of architectural space. Not open to freshmen. Required for all Architecture majors.

***ARCH 161b, Introduction to Structures** Kyoung Sun Moon

Basic principles governing the behavior of building structures. Developments in structural form combined with the study of force systems, laws of statics, and mechanics of materials and members and their application to a variety of structural systems. Prerequisites: trigonometry and some knowledge of calculus. Enrollment limited to 20. QR, SC

***ARCH 162a, Materials in Architecture** Joshua Rowley, Bennett Taylor Dansby

Science and technology of basic building materials studied together with historic and current design applications. Skills and processes required to create, shape, and connect materials experienced through hands-on projects. Technical notebooks, drawings, design and build exercises, and projects required. Enrollment limited to 20.

ARCH 163b, Environment, Energy, Building D. Michelle Addington

An introduction to energy and environmental issues faced by the discipline of architecture. Global environmental issues, basic principles of energy generation and energy use, and fundamental climatic precursors and patterns. The complexity of developing solutions that address a wide range of local and global concerns. Recommended preparation: college-level physics.

ARCH 230a/STCY 176a, Introduction to the Study of the City Alexander Garvin

For description see under Study of the City.

***ARCH 249b, The Analytic Model** Emmanuel Petit

Introduction to the history and practice of architectural analysis. Students produce drawings, models, and diagrams of significant architectural works in order to facilitate a comprehensive understanding of specific architects, buildings, and contexts. Description of a variety of approaches and the reciprocal relationship between analysis and design. Required for all Architecture majors.

***ARCH 250a, Methods and Form in Architecture I** Bimal Mendis, Katherine Davies

Analysis of architectural design of specific places and structures. Analysis is governed by principles of form in landscape, program, ornament, and space, and includes design methods and techniques. Readings and studio exercises required. Enrollment limited to 25. Open only to Architecture majors. 1½ Course cr

***ARCH 251b, Methods and Form in Architecture II** Staff

Continuation of ARCH 250. 1½ Course cr

ARCH 260a, History of Architecture I: Antiquity to the Baroque Daniel Sherer

The first half of a two-term sequence in the history of architecture. Architecture and urbanism from Greek and Roman antiquity through the late Renaissance. The formal expression—organizational, structural, and ornamental—and social context of specific buildings and urban areas. Architecture as a form of social expression that builds on its own stylistic development and as a response to changes in history and culture. Emphasis on Western locations, with selections from other parts of the world. HU

[ARCH 261b/HSAR 325b, History of Architecture II: The Eighteenth Century to the Millennium]**ARCH 340a⁶/AMST 207a, American Cultural Landscapes: An Introduction to the History of the Built Environment** Dolores Hayden

For description see under American Studies.

***ARCH 341a^G/LAST 318a, Globalization Space** Keller Easterling

Infrastructure space as a primary medium of change in global polity. Networks of trade, energy, communication, transportation, spatial products, finance, management, and labor, as well as new strains of political opportunity that reside within their spatial disposition. Case studies include free zones and automated ports around the world, satellite urbanism in South Asia, high-speed rail in Japan and the Middle East, agripoles in southern Spain, fiber optic submarine cable in East Africa, spatial products of tourism in North Korea, and management platforms of ISO. HU

***ARCH 344a, Urban Life and Landscape** Elihu Rubin

The built environment as a text tool for constructing narratives of human activity, aspiration, and struggle. Methods of viewing the ordinary landscape of the twentieth-century American city: pulling apart its historical layers, examining social meanings, and observing its function today. Modes of inquiry include video, public presentations, field trips, photography, and writing. HU

ARCH 345b, Civic Art: Introduction to Urban Design Alan Plattus and staff

Introduction to the history, analysis, and design of the urban landscape. Principles, processes, and contemporary theories of urban design; relationships between individual buildings, groups of buildings, and their larger physical and cultural contexts. Case studies from New Haven and other world cities. HU

***ARCH 347a/PLSC 250a, Infrastructure: Politics and Design** Elihu Rubin

For description see under Political Science.

***ARCH 351a/AMST 381a, Poets' Landscapes** Dolores Hayden

For description see under American Studies.

ARCH 385a/HIST 152a/PLSC 279a/SOCY 149a, New Haven and the American City

Alan Plattus, Elihu Rubin

For description see under Political Science.

ARCH 431b, Religion and Modern Architecture Karla Britton

The historical evolution of sacred building in the twentieth and twenty-first centuries. Relations between a building, its cultural environment, and its cult. The influence of religion in contemporary civic life as manifest in the design and construction of prominent religious buildings. Examination of mosques, synagogues, temples, and churches. Perspectives from philosophy, comparative religion, liturgical studies, and architectural theory and practice. WR, HU

***ARCH 450a, Senior Studio** Turner Brooks, Adam Hopfner

Advanced problems with emphasis on architectural implications of contemporary cultural issues. The complex relationship among space, materials, and program. Emphasis on the development of representations—drawings and models—that effectively communicate architectural ideas. To be taken before ARCH 491 or 494. Enrollment limited to Architecture majors. 1½ Course cr

***ARCH 471a or b, Individual Tutorial** Bimal Mendis

Special courses may be established with individual members of the department only. The following conditions apply: (1) a prospectus describing the nature of the studio program and the readings to be covered must be approved by both the instructor and the director of

undergraduate studies; (2) regular meetings must take place between student and instructor; (3) midterm and final reviews are required.

***ARCH 472La or Lb, Individual Tutorial Laboratory** Bimal Mendis

An independent tutorial focusing on methods and techniques of representation in architecture, including the synthesis of studio work using a variety of visual media. Concurrently with ARCH 471 or after a spring term abroad. RP ½ Course cr

***ARCH 490a, Senior Research Colloquium** Karla Britton

Examination of the skills, topics, and preparation required for the research that students in the history, theory, and criticism track undertake for their senior project. Under the guidance of the instructor and members of the Architecture faculty and visitors, students present and define their proposals, complete basic readings, and seek criticism of individual research agendas.

***ARCH 491b, Senior Project** Elihu Rubin

An essay or project in the student's area of concentration. Students in the history, theory, and criticism track or in the urban studies track pursue independent research with an adviser. This project must terminate in a senior essay.

***ARCH 494b, Senior Project Design Studio** Staff

Individual design investigations, focusing on independence and precision in the deployment of design ideas. Reliance on visual and nonverbal presentations. Development of a three-dimensional component, such as large-scale mock details, or other visual means of presentation, which might include photography, film, video, or interactive media. Examination of the skills, topics, and preparation to support design research. 1½ Course cr

***ARCH 495a, Senior Research Colloquium for Urban Studies** Karla Britton

Development of frameworks and urban strategies for senior projects and/or papers through identification and elaboration of a research topic that synthesizes the interdisciplinary course work of the urban studies curriculum with individual interests. Requirements include proposal drafts, case study research, analyses, and graphic illustrations.

COURSES IN THE SCHOOL OF ARCHITECTURE

Unless otherwise indicated in the course descriptions, all courses in the School of Architecture are open to majors and nonmajors with permission of the instructor and the graduate registrar. They are not open to the Credit/D/Fail option. Students are admitted on the basis of their previous course work and previous performance.

Art

(DRAWING, FILMMAKING, GRAPHIC DESIGN, PAINTING,
PHOTOGRAPHY, PRINTMAKING, AND SCULPTURE)

Director of undergraduate studies: Clint Jukkala, 122 GRN, 432-2600, art.dus@yale.edu

MEMBERS OF THE SCHOOL OF ART TEACHING IN YALE COLLEGE

Professors Samuel Messer (*Adjunct*), Robert Reed, Jr., Michael Roemer (*Adjunct*), Robert Storr

Associate Professors Anoka Faruqee, Clint Jukkala

Assistant Professors Marie Lorenz, Michael Queenland

Senior Critics John Gambell, Jessica Helfand, Pamela Hovland, Christopher Pullman, Henk van Assen

Critics Siobhan Liddell, Sandra Luckow, Sarah Oppenheimer

Lecturers Jonathan Andrews, Mark Aronson, Anna Betbeze, Julian Bittiner, Sandra Burns, Johannes DeYoung, Benjamin Donaldson, Dru Donovan, Julian Gilbert-Davis, Brent Howard, Lisa Kereszi, Joseph Maida, Dan Michaelson, Carolyn Salas, Victoria Sambunaris, Scott Stowell, William Villalongo, Anahita Vossoughi, Natalie Westbrook-DeYoung

The program in Art offers courses in a variety of media that provide a background in visual arts as part of a liberal education and as preparation for graduate study and professional work.

Courses in Art are open to all undergraduate students. In cases where student demand for entry into a course is greater than can be accommodated, priority will be given to School of Art students and declared Art majors. The director of undergraduate studies and members of the Art faculty will be present for counseling on Tuesday, August 28, adjacent to the School of Art Gallery at Holcombe T. Green, Jr., Hall, 1156 Chapel Street, from 10:30 a.m. to 1:30 p.m. Students seeking advice about course selection or the program in Art should come at that time. Others wishing to elect Art courses should go to the first meeting of the class, when each instructor will determine the class enrollment. Classes begin on Wednesday, August 29. For courses beginning in the spring term, counseling will be held on Monday, January 14, 2013, adjacent to the School of Art Gallery, from 12 to 1:30 p.m.; Art classes begin on Tuesday, January 15, 2013. All Art majors are required to register with the director of undergraduate studies at the beginning of each term at the time and place listed above in order to be enrolled or to continue in the major.

The prerequisites for acceptance into the major are a sophomore review, which is an evaluation of work from studio courses taken at the Yale School of Art, and five introductory (100-level) term courses. Four of the introductory courses must have been completed at the time of the sophomore review. Visual Thinking (ART 111) and Basic Drawing (ART 114) are mandatory. At the time of the review, the student should be enrolled in the fifth 100-level prerequisite course. In exceptional cases, arrangements for a special review during the junior year may be made with the director of undergraduate studies.

Requirements of the major The Art major requires fourteen term courses, including the following: (1) five prerequisite courses at the 100 level (including Basic Drawing and Visual Thinking); (2) five courses at the 200 level or above; (3) the Junior Seminar (ART 395) or Critical Theory in the Studio (ART 201); (4) the Senior Project (ART 495); and (5) two term courses in the history of art. Suggested program guidelines and specific requirements for the various areas of concentration are available from the director of undergraduate studies.

Art majors are eligible for the Ellen Battell Stoeckel Fellowship for study at the Yale University Summer School of Music and Art at Norfolk, Connecticut. Applicants for the

program must be officially classified as junior Art majors and be returning to Yale for two terms of their senior year. The program awards up to four course credits for work successfully completed. These credits cannot be used toward the requirements of the Art major; however, they may be counted toward the 36-course-credit graduation requirement.

Some Art courses may be repeated for credit, with permission of both the instructor and the director of undergraduate studies. Course credits in studio art earned at other institutions may be applied toward the requirements of the major, at the discretion of the director of undergraduate studies and subject to a faculty review process.

All Art majors are charged a facilities access and user fee of \$200 per term. Additional materials fees are levied in individual courses, as specified at the end of the course description.

REQUIREMENTS OF THE MAJOR

Prerequisites Favorable faculty review of work done in studio courses before end of sophomore year; ART 111 and 114; 3 addtl 100-level term courses

Number of courses 14 term courses (incl prereqs and senior project)

Specific course required ART 395 or 201

Distribution of courses 5 upper-level courses; 2 courses in history of art

Senior requirement Senior project (ART 495)

Unless otherwise indicated, spring-term classes in Art begin on Tuesday, January 15, 2013.

INTRODUCTORY COURSES

***ART 001a, Studies in Visual Biography** Jessica Helfand

Study of diaries, journals, and scrapbooks as authoritative examples of visual autobiography. Social history and visual methods, focusing on American and British cultural life between the world wars. Exercises in collecting, collage, and composition; methods of visually navigating space, time, and memory; discussion of the asynchronous nature of biography. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. RP Fr sem

***ART 002b, Paper** Siobhan Liddell and staff

Paper as a material for making art. How paper is made; myriad ways that it is used in the collections of Yale's galleries and libraries. Creation of paper objects to explore the formal properties of sculpture, including volume, mass, line, and structure. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. RP Fr sem

***ART 110a, Sculpture Basics** Carolyn Salas

Introduction to the concepts of space, form, weight, mass, and design in sculpture. Basic types and techniques of construction and material; concepts and approaches to the understanding and development of sculptural ideas. Shops and studio are available during days and evenings throughout the week. Materials fee: \$75. Enrollment limited to 12. Recommended to be taken before ART 120–125. RP

***ART 111a or b, Visual Thinking** Anna Betbeze [F], Anahita Vossoughi [Sp]

An introduction to the language of visual expression, using studio projects to explore the fundamental principles of visual art. Students acquire a working knowledge of visual syntax

applicable to art and to the study of art history and popular culture. Projects address all four major concentrations (graphic design, printing/printmaking, photography, and sculpture). Materials fee: \$25. Open to all undergraduates. Required for Art majors. HU RP

***ART 114a or b, Basic Drawing** Robert Reed, Jr., and staff

An introduction to drawing, emphasizing articulation of space and pictorial syntax. Class work is based on observational study. Assigned projects address fundamental technical and conceptual problems suggested by historical and recent artistic practice. No prior drawing experience required. Materials fee: \$25. Open to all undergraduates. Required for Art majors. HU RP

***ART 116b, Color** Clint Jukkala, Anna Betbeze

Study of the interaction of color, ranging from fundamental problem solving to individually initiated expression. The collage process is used for most class assignments. Materials fee: \$25. HU RP

***ART 120a, Introductory Sculpture: Wood** Julian Gilbert-Davis

Introduction to wood technology and the use of machines and hand tools in context of the studio. The range of what sculpture might be; understanding and articulating form in space; responses to current issues in contemporary sculpture. Assignments foster hands-on appreciation of materials and craftsmanship and initiate awareness of the aesthetic and political implications of handmade objects in a digital world. Shops and studio are available during days and evenings throughout the week. Materials fee: \$75. Enrollment limited to 12. HU RP

***ART 121b, Introductory Sculpture: Metal** Brent Howard

Introduction to working with metal. The range of what sculpture might be; creative approaches to perception, creation, and critical analysis; understanding and articulating form in space; responses to current issues in contemporary sculpture. Assignments foster hands-on appreciation of materials and craftsmanship and initiate awareness of the aesthetic and political implications of handmade objects in a digital world. Shops and studio are available during days and evenings throughout the week. Materials fee: \$75. Enrollment limited to 12. HU RP

***ART 122a, Introductory Sculpture: Alternate Mediums** Sandra Burns

Ways in which digital tools can inform the production of three-dimensional objects. Digital photography, including RAW photography, video, editing, basic lighting, color correction, and inkjet printing. Introduction to basic woodworking and welding. Digital processes as they intersect with a variety of materials and subjects. Materials fee: \$150. Enrollment limited to 12. HU RP

***ART 125a, Mold Making and Casting** Carolyn Salas

Instruction in the practical aspects of mold making and casting in a variety of materials and techniques. Discussion of contemporary issues in art and culture, including the use of traditional principles in sculpture in an age of mass production. Methods include waste molds, piece molds, life casts, and flexible molds. Materials fee: \$75. HU RP

***ART 130a or b, Painting Basics** Natalie Westbrook-DeYoung [F], Anna Betbeze [Sp]

An introduction to basic painting issues, including the conventions of pictorial space and the language of color. Class assignments and individual projects explore technical,

conceptual, and historical issues central to the language of painting. Materials fee: \$75. Intended for students not majoring in Art and for Art majors outside the painting concentration. Students who intend to pursue the painting concentration or take multiple courses in painting should take ART 230 and/or 231. HU RP

***ART 132a or b, Introductory Graphic Design** Julian Bittiner, Henk van Assen

A studio introduction to visual communication, with emphasis on the visual organization of design elements as a means to transmit meaning and values. Topics include shape, color, visual hierarchy, word-image relationships, and typography. Development of a verbal and visual vocabulary to discuss and critique the designed world. Materials fee: \$150. HU RP

***ART 136a or b, Introductory Black-and-White Photography** Lisa Kereszi and staff

An introductory course in black-and-white photography concentrating on the use of 35mm cameras. Topics include the lensless techniques of photograms and pinhole photography; fundamental printing procedures; and the principles of film exposure and development. Assignments encourage the variety of picture-forms that 35mm cameras can uniquely generate. Student work is discussed in regular critiques. Readings examine the invention of photography and the flâneur tradition of small-camera photography as exemplified in the work of artists such as Henri Cartier-Bresson, Helen Levitt, Robert Frank, and Garry Winogrand. Materials fee: \$150. HU RP

***ART 138a or b, Digital Photography** Dru Donovan

An introductory exploration of the transition of photographic processes and techniques into digital formats. Students produce original work using a digital camera. Introduction to a range of tools including color correction, layers, making selections, and inkjet printing. Assignments include weekly critiques and a final project. Materials fee: \$150. HU RP

***ART 141a and 142b, The Language of Film Workshop** Michael Roemer

Problems and aesthetics of film studied in practice as well as in theory. In addition to exploring movement, image, montage, point of view, and narrative structure, students photograph and edit their own short videotapes. The fall term emphasizes the writing and production of short dramatic scenes. Materials fee: \$150. Priority to majors in Art and in Film Studies. Prerequisite for Film Studies majors: FILM 150. RP

***ART 145a or b, Introduction to Digital Video** Johannes DeYoung and staff

Introduction to the basic tools of digital video production. DV camera operation, sound, and Mac-based editing with Final Cut Pro software. Individual and collaborative assignments explore the visual language and production challenges of DV. Emphasis on the spatial and visual aspects of the medium rather than the narrative. Screenings of experimental film, video art, and DV feature films. Materials fee: \$150. Enrollment limited to 12. RP

INTERMEDIATE COURSES

[ART 201b, Critical Theory in the Studio]

***ART 210b, Sculpture as Object** Staff

Introduction to concepts of design and form in sculpture. The use of wood, including both modern and traditional methods of carving, lamination, assemblage, and finishing. Fundamentals of metal processes such as welding, cutting, grinding, and finishing may be explored on a limited basis. Group discussion complements the studio work. Shops and

studio are available during days and evenings throughout the week. Materials fee: \$75. Enrollment limited to 12. HU RP

***ART 223a and 224b, Figure Drawing** Samuel Messer, Robert Storr

A study of the human figure, using a range of approaches. Emphasis on observation, anatomy, and spatial structure. Historical examples from cave painting to contemporary art. Materials fee: \$75 per term. RP

***ART 230a and 231b, Introductory Painting** Robert Reed, Jr.

An introduction to concepts and techniques in painting through observational study, with emphasis on the language of color and the articulation of space. Study of pictorial syntax in historical painting; mastery of materials and techniques. Materials fee: \$75 per term. Enrollment limited to 15. Prerequisite or corequisite: ART 114. RP

***ART 237b, Intermediate Photography** Lisa Kereszi

A class in black-and-white photography extending the concerns of ART 136. Introduction to the use of medium-format cameras. Specialized topics include night photography, the use of flash, developing roll film, basic digital scanning, and grayscale printing techniques. Survey of the rich tradition of handheld photography and the production of artists such as Lartigue, Brassai, Diane Arbus, Lee Friedlander, and Robert Adams. Materials fee: \$150. Prerequisite: ART 136 or equivalent. HU RP

***ART 245a, Digital Drawing** Sarah Oppenheimer and staff

Digital techniques and concepts as they expand the possibilities of traditional drawing. The structure of the digital image; print, video, and projected media; creative and critical explorations of digital imaging technologies. Historical contexts for contemporary artworks and practices utilizing digital technologies. Group critiques of directed projects. The second half of the course is focused on individual development and exploration. Materials fee: \$150. Enrollment limited. Prerequisite: ART 111 or 114 or permission of instructor. RP

***ART 264a, Typography in Graphic Design I** Julian Bittiner, John Gambell

An intermediate course on the fundamentals of typography, with emphasis on the way typographic form and visual arrangement create and support content. Focus on designing and making books, employing handwork and computer technology. Typographic history and theory discussed in relation to course projects. Materials fee: \$150. Prerequisite: ART 132. RP

***ART 265b, Typography in Graphic Design II** Henk van Assen

Continued studies in typography, incorporating more advanced and complex problems. Exploration of grid structures, sequentiality, and typographic translation, particularly in the design of contemporary books, and screen-based kinetic typography. Relevant issues of design history and theory discussed in conjunction with studio assignments. Materials fee: \$150. Prerequisite: ART 264. RP

***ART 285b, Digital Animation** Johannes DeYoung

Introduction to the principles, history, and practice of animation in visual art and film. Historical and theoretical developments in twentieth- and twenty-first-century animation used as a framework for making digital animation. Production focuses on digital stop-motion and compositing, as well as 2-D and 3-D computer-generated animation.

Workshops in relevant software. Materials fee: \$150. Prerequisites: ART 111, 114, or 145, and familiarity with Macintosh-based platforms. RP

***ART 324b, Painting Materials and Methods** Mark Aronson

An introduction to historical materials and methods of painting. Students examine masterworks in the Yale Art Gallery and the Center for British Art, and explore observed techniques in their own painting. Techniques include quick-drying indirect tempera, slow-drying and layered oil painting, and the modernist direct application of paint; supports include wood, canvas, paper, and metal. Prerequisite: ART 114 or 130 or permission of instructor. RP

***ART 330a and 331b, Intermediate Painting** Samuel Messer and staff

Further exploration of concepts and techniques in painting, emphasizing the individuation of students' pictorial language. Various approaches to representational and abstract painting. Studio work is complemented by in-depth discussion of issues in historical and contemporary painting. Materials fee: \$150 per term. Prerequisite: ART 230 or 231. RP

***ART 338a, Intermediate Digital Photography** Joseph Maida

Exploration of both the technical and conceptual aspects of digital photography. Range of tools includes advanced film scanning, working with RAW files, masks, compositing and grayscale, and color inkjet printing. Students produce original work, with special attention to ways in which their technical decisions can clarify their artistic intentions. Prerequisite: ART 138. RP

***ART 341a or b, Intermediate Fiction Film Workshop** Michael Roemer [F],
Jonathan Andrews [Sp]

In the first half of the term, students write, stage, and edit three dramatic scenes, each four to five minutes long. During the second half they create somewhat longer projects. Focus on writing short dramatic scenes with a concrete understanding of the way they will be acted, directed, and photographed. Materials fee: \$150. Enrollment limited to 8. Priority to majors in Art and in Film Studies. Prerequisites: ART 141 or 142, and FILM 150. RP

***ART 342b, Intermediate Documentary Film Workshop** Sandra Luckow

The storytelling potential of the film medium explored through the making of documentary art. Focus on finding and capturing intriguing, complex scenarios in the world and then adapting them to the film form. Questions of truth, objectivity, style, and the filmmaker's ethics considered using examples of students' work. Limited enrollment. Priority to majors in Art and in Film Studies. Prerequisites: ART 141 or 142, and FILM 150. HU RP

***ART 345a and 346b, Intermediate Sculpture** Brent Howard and staff

Further investigation into the history of sculpture and questions pertinent to contemporary art. Exploration of new techniques and materials along with refinement of familiar skills. Focus on helping students become self-directed in their work. Individual and group discussion and visits to museums and galleries. Materials fee: \$75 per term. Enrollment limited to 12. Prerequisite: ART 120, 121, or 122, or equivalent; or with permission of instructor. RP

***ART 355b, Silkscreen Printing** Marie Lorenz

Presentation of a range of techniques in silkscreen and photo-silkscreen, from hand-cut stencils to prints using four-color separation. Students create individual projects in a workshop environment. Materials fee: \$150. Prerequisite: ART 114 or equivalent. HU RP

***ART 356a, Printmaking I** Marie Lorenz

Instruction in a diverse range of printmaking media. Students develop work in linocut, woodcut, collograph, drypoint, and etching. Methods in both color and black and white. Materials fee: \$150. Prerequisite: ART 114 or equivalent. RP

***ART 359b, Lithography** Marie Lorenz and staff

Basic techniques of stone and plate lithography. Students create prints utilizing drawing and/or photo-based imagery. Materials fee: \$150. Prerequisite: ART 114 or equivalent. Recommended preparation: basic knowledge of Adobe Photoshop. RP

***ART 367b and 368a, Intermediate Graphic Design** Laurel Schwulst, Pamela Hovland

Various ways that design functions; how visual communication takes form and is recognized by an audience. Core issues inherent in design: word and image, structure and sequence, social network and motion forms of interactive design. Analysis and refinement of an individual design methodology. Attention to systematic procedures, techniques, and modes of inquiry that lead to a particular result. Materials fee: \$150 per term. Prerequisite: ART 132. RP

***ART 370a, Motion Design** Christopher Pullman

A studio class that explores how the graphic designer's conventions of print typography and the dynamics of word-image relationship change with the introduction of time, motion, and sound. Projects focus on the controlled interaction of words and images to express an idea or tell a story. The extra dimensions of time-based communications; choreography of aural and visual images through selection, editing, and juxtaposition. Materials fee: \$150. Prerequisite: ART 265; ART 367 recommended. RP

***ART 379b, Photographic Techniques** Benjamin Donaldson

An opportunity for experienced photography students to become involved with the technical aspects of the medium. Concentrated study of view camera operations; techniques in added lighting and advanced printing; scanning and printing of negatives; discussion of historic photographic traditions. Student work is discussed in regular critiques. Previous digital training may be employed, but focus is primarily analog. Materials fee: \$150. Prerequisite: ART 237 or permission of instructor. RP

***ART 395a, Junior Seminar** Anoka Faruqee

Ongoing visual projects addressed in relation to historical and contemporary issues. Readings, slide presentations, critiques by School of Art faculty, and gallery and museum visits. Critiques address all four areas of study in the Art major. Prerequisite: at least four courses in Art. RP

ADVANCED COURSES***ART 401a, Advanced Photography** Lisa Kereszi

An exploration of the practice of photography, either analog or digital. Student work is discussed in regular critiques, and lectures are framed around the aesthetic concerns that the work provokes. Materials fee: \$150. Prerequisites: ART 379 and, for those working digitally, ART 138. Required for Art majors concentrating in photography. RP

***ART 430a and 431b, Painting Studio** Clint Jukkala

Development of individual themes through independent studio practice and projects. Studio work and discussion of pertinent topics in historical and contemporary painting. May be taken more than once. Materials fee: \$75. Prerequisites: ART 330, 331. RP

***ART 442a and 443b/FILM 483a and 484b, Advanced Fiction Film Workshop**

Jonathan Andrews

A yearlong workshop designed primarily for Art and Film Studies majors making senior projects. Each student writes and directs a short fiction film. The first term focuses on the screenplay, production schedule, storyboards, casting, budget, and locations. In the second term students rehearse, shoot, edit, and screen the film. Materials fee: \$150. Enrollment limited to 8. Priority to majors in Art and in Film Studies. Prerequisite: ART 341.

***ART 445a and 446b, Advanced Sculpture** Michael Queenland and staff

Self-directed work in sculpture. Group discussion of student projects, with readings, slides, and videos that address current art practices. Regular individual and group critiques. Materials fee: \$75 per term. Enrollment limited to 12. Prerequisite: ART 345 or 346 or equivalent, or permission of instructor. RP

***ART 468a and 469b, Advanced Graphic Design** Julian Bittiner, Henk van Assen

A probe into questions such as how an artist can be present as an idiosyncratic individual in his or her work, and how that work can still communicate on its own to a broad audience. Concentration on making graffiti, i.e., the design of a set of outdoor marks and tours for New Haven. A technological component is included, both in the metaphor of designing outdoor interaction as a way to learn about screen-based interaction, and in the final project to design an interface for a handheld computer. Materials fee: \$150 per term. Prerequisites: ART 264 or 265, and 367 or 368, or permission of instructor. RP

***ART 471a and 472b, Independent Projects** Clint Jukkala

Independent work that would not ordinarily be accomplished within existing courses, designed by the student in conjunction with a School of Art faculty member. A course proposal must be submitted on the appropriate form for approval by the director of undergraduate studies and the faculty adviser. Expectations of the course include regular meetings, end-of-term critiques, and a graded evaluation. RP

***ART 495b, Senior Project** Clint Jukkala, Lisa Kereszi

A project of creative work formulated and executed by the student under the supervision of an adviser designated in accordance with the direction of the student's interest. Proposals for senior projects are submitted on the appropriate form to the School of Art Undergraduate Studies Committee (USC) for review and approval at the end of the term preceding the last resident term. Projects are reviewed and graded by an interdisciplinary faculty committee made up of members of the School of Art faculty. An exhibition of selected work done in the project is expected of each student. RP

Art History

(See under History of Art.)

Astronomy

Director of undergraduate studies: Debra Fischer, 259 JWG, 432-1613,
astro.dus@yale.edu

FACULTY OF THE DEPARTMENT OF ASTRONOMY

Professors Charles Bailyn, †Charles Baltay, Sarbani Basu, Paolo Coppi, Pierre Demarque (*Emeritus*), Debra Fischer, Jeffrey Kenney, Richard Larson (*Emeritus*), Priyamvada Natarajan, †Peter Parker, Sabatino Sofia (*Emeritus*), †C. Megan Urry, William van Altena (*Emeritus*), Pieter van Dokkum (*Chair*), Robert Zinn

Associate Professor †Richard Easther

Assistant Professors Hector Arce, Marla Geha, †Daisuke Nagai, †Nikhil Padmanabhan, Frank van den Bosch

Lecturers Michael Faison, Eilat Glikman

†A joint appointment with primary affiliation in another department.

The Department of Astronomy offers courses both for the nonscientist interested in learning about modern astronomy and for the student wishing to prepare for graduate work in astronomy or a related science. The department offers two degree programs: the B.A. degree program in Astronomy and the B.S. degree program in Astronomy and Physics.

The department offers a variety of courses without prerequisites that provide an introduction to astronomy with particular attention to recent discoveries and theories. Courses numbered below 150, including ASTR 110, 120, and 130, are intended for students who do not plan to major in the sciences but who desire a broad, nontechnical introduction to astronomy. These courses have no prerequisites, and a student may elect any or all of them and take them in any order. Courses with numbers between 150 and 199, including ASTR 155, 160, and 170, are also intended for students who do not plan to major in the sciences, but they provide a more in-depth treatment and assume a somewhat stronger high school science background. ASTR 155 provides a hands-on introduction to astronomical observing, while ASTR 160 and 170 provide an introduction to topics in modern astrophysics and cosmology. For students with good preparation in high school mathematics and physics, ASTR 210 and 220 provide a more intensive introduction to astronomy with emphasis on topics of current interest, and ASTR 255 provides a more quantitative introduction to astronomical research techniques. These courses may be taken independently of each other.

Courses numbered 300 and above are open to students at the sophomore and higher levels who already have an elementary acquaintance with astronomy, and mathematics and physics as described in the course prerequisites. For advice about astronomy courses, students should consult the director of undergraduate studies.

In addition to the normal undergraduate courses, graduate courses in astronomy are open to qualified undergraduates who already have strong preparation in mathematics, physics, and astronomy. Students wishing to take a graduate course must first obtain the permission of the instructor and of the director of graduate studies.

B.A. degree program in Astronomy The B.A. degree program is designed for students who may not intend to do graduate work in astronomy but who are interested in the subject as a basis for a liberal education or as a background for a career in medicine, teaching, journalism, business, law, or government. It allows greater flexibility in course selection than the B.S. program because the emphasis is on breadth of knowledge rather than on specialization. The prerequisites for the B.A. program are: either PHYS 170 and 171, or 180 and 181, or 200 and 201; and MATH 112 and 115. Ten term courses are required beyond these prerequisites, including the senior requirement. Five courses in astronomy must be completed, four of which must be numbered 200 or above, including ASTR 255 or 355; ASTR 310, or both ASTR 210 and 220 (ASTR 170 may substitute for 220 in the latter case); and a senior project or essay (ASTR 490 or 491). Also required are MATH 120 or ENAS 151 and four additional courses in the natural or applied or mathematical sciences, at least two of which must have college-level prerequisites; these may include additional astronomy courses. The senior requirement consists of a senior essay or independent research project carried out for one term under the supervision of a faculty member (ASTR 490 or 491).

Before entering the junior year, the student should consult the director of undergraduate studies.

B.S. degree program in Astronomy and Physics This program is designed to provide a strong background in astronomy and in the relevant physics for students interested in graduate study or a career in astronomy, physics, or a related science.

Prerequisite to the B.S. degree program is work in fundamental physics and mathematics. A student planning to major in Astronomy and Physics should complete this work by the end of the sophomore year. The prerequisites for the B.S. program are: one of the introductory physics sequences (180, 181, or 200, 201, or 260, 261); one of the physics laboratory sequences (PHYS 165L, 166L, or 205L, 206L); and the mathematics sequence MATH 112, 115, and either MATH 120 or ENAS 151. ASTR 155 may be substituted for one term of the physics laboratory sequence.

Beyond the prerequisites, twelve term courses are required in astronomy, physics, and mathematics. In astronomy, the student should complete at least six courses including ASTR 255 or 355; ASTR 310; ASTR 320 or a more advanced astrophysics course with the permission of the director of undergraduate studies; a two-term senior project (ASTR 490 and 491); and one additional astronomy course numbered 200 or above. In physics, the student should complete at least four courses numbered 400 or above, normally PHYS 410, 420, 430, and either 439 or 440; the sequence PHYS 401, 402, 440, and 441 may also fulfill this requirement. With the permission of the director of undergraduate studies, ASTR 440 may be substituted for PHYS 430. In mathematics, the student should complete one course in mathematics numbered 200 or above, or PHYS 301 or ENAS 194; and either an additional course in mathematics numbered 200 or above or a course in statistics or computing. The senior requirement consists of an independent research project in astronomy carried out for two terms under the supervision of a faculty member (ASTR 490 and 491).

Before entering the junior year, the student should arrange a specific program of study in consultation with the director of undergraduate studies in Astronomy, whose approval of the program is needed, and should then also consult the director of undergraduate studies in Physics.

REQUIREMENTS OF THE MAJOR

ASTRONOMY, B.A.

Prerequisites PHYS 170, 171, or 180, 181, or 200, 201; MATH 112, 115

Number of courses 10 term courses beyond prereqs, incl senior req

Distribution of courses 5 term courses in astronomy, 4 of them numbered 200 or above; 4 electives in science or math, at least 2 with college-level prereqs (may include addtl astronomy courses)

Specific courses required ASTR 255 or 355; ASTR 310, or both 210 and 220; MATH 120 or ENAS 151

Substitution permitted ASTR 170 for 220

Senior requirement Senior essay or senior research project (ASTR 490 or 491)

ASTRONOMY AND PHYSICS, B.S.

Prerequisites PHYS 180, 181, or 200, 201, or 260, 261; PHYS 165L, 166L, or 205L, 206L; MATH 112, 115; MATH 120 or ENAS 151

Number of courses 12 term courses beyond prereqs, incl senior req

Distribution of courses 6 term courses in astronomy numbered 200 or above; 4 courses in physics numbered 400 or above, as specified; 2 courses in math or mathematical methods in science, as specified

Specific courses required ASTR 255 or 355; ASTR 310, 320

Substitution permitted ASTR 155 for 1 term of prereq physics lab; a more advanced astrophysics course for ASTR 320, with DUS permission

Senior requirement Senior independent research project (ASTR 490 and 491)

*ASTR 030a, Search for Extraterrestrial Life Hector Arce

Introduction to the search for extraterrestrial life. Review of current knowledge on the origins and evolution of life on Earth; applications to the search for life elsewhere in the universe. Discussion of what makes a planet habitable, how common these worlds are in the universe, and how we might search for them. Survey of past, current, and future searches for extraterrestrial intelligence. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SC Fr sem

ASTR 110a or b, Planets and Stars Staff

An introduction to stars and planetary systems. Topics include the solar system and extra-solar planets, planet and stellar formation, and the evolution of stars from birth to death. No prerequisite other than a working knowledge of elementary algebra. QR, SC

ASTR 120b, Galaxies and the Universe Jeffrey Kenney

An introduction to stars and stellar evolution; the structure and evolution of the Milky Way galaxy and other galaxies; quasars, active galactic nuclei, and supermassive black holes; cosmology and the expanding universe. No prerequisite other than a working knowledge of elementary algebra. QR, SC

ASTR 130a, Life in the Universe Debra Fischer

An introduction to the astronomical and physical conditions that were conducive to life on Earth and the searches for similar conditions and for intelligent life elsewhere in the universe. Detailed survey of the objects making up the solar system as determined from

astronomical observations and in situ planetary probes. No prerequisite other than a working knowledge of elementary algebra. SC

ASTR 135b, Archaeoastronomy Michael Faison

An introduction to how celestial patterns and events were observed and interpreted up to the Copernican revolution. Ancient observatories, calendar systems, records of astronomical events, and the role of astronomical knowledge in culture. Exercises in naked-eye observation of the sky. No prerequisites. SC

ASTR 155b, Introduction to Astronomical Observing Staff

A hands-on introduction to the techniques of astronomical observing. Observations of planets, stars, and galaxies using on-campus facilities and remote observing with Yale's research telescopes. Use of electronic detectors and computer-aided data processing. Evening laboratory hours required. One previous college-level science laboratory or astronomy course recommended. SC ½ Course cr

ASTR 160b, Frontiers and Controversies in Astrophysics Marla Geha and staff

A detailed study of three fundamental areas in astrophysics that are currently subjects of intense research and debate: (1) planetary systems around stars other than the sun; (2) pulsars, black holes, and the relativistic effects associated with them; (3) the age and ultimate fate of the universe. No prerequisite other than a working knowledge of elementary algebra. QR, SC

ASTR 170a, Introduction to Cosmology Priyamvada Natarajan

An introduction to modern cosmological theories and observations. Topics include aspects of special and general relativity; curved space-time; the Big Bang; inflation; primordial element synthesis; the cosmic microwave background; the formation of galaxies; and large-scale structure. Prerequisite: a strong background in high school mathematics and physics. QR, SC

ASTR 210b, Stars and Their Evolution Sarbani Basu

An intensive introduction to stars. Nuclear processes and element production, stellar evolution, stellar deaths and supernova explosions, and stellar remnants including white dwarfs, neutron stars, and black holes. A close look at our nearest star, the sun. Prerequisite: a strong background in high school mathematics and physics. QR, SC

ASTR 220a, Galaxies and Cosmology Staff

An intensive introduction to extragalactic astronomy. The structure and contents of galaxies, evolution of galaxies, observational cosmology, and the history of the universe. Prerequisite: a strong background in high school mathematics and physics. QR, SC

ASTR 255a/PHYS 295a, Research Methods in Astrophysics Marla Geha

The acquisition and analysis of astrophysical data, including the design and use of ground- and space-based telescopes, computational manipulation of digitized images and spectra, and confrontation of data with theoretical models. Examples taken from current research at Yale and elsewhere. QR, SC RP

ASTR 310a, Galactic and Extragalactic Astronomy Robert Zinn

Basic properties of stars and their distribution in space; stellar populations and the structure of our galaxy; external galaxies and their structure and distribution in the universe;

evolution of galaxies; galaxy interactions and active galactic nuclei; introduction to cosmology. Prerequisites: MATH 115 and PHYS 201 or equivalents. QR, SC

ASTR 320b, Physical Processes in Astronomy Frank van den Bosch

Introduction to the physics required for understanding current astronomical problems. Topics include basic equations of stellar structure, stellar and cosmic nucleosynthesis, radiative transfer, gas dynamics, and stellar dynamics. Numerical methods for solving these equations. Prerequisites: MATH 120 and PHYS 201 or equivalents, or permission of instructor. Previous experience with computer programming recommended. Taught in alternate years. QR, SC

ASTR 343b/PHYS 343b, Gravity, Astrophysics, and Cosmology Nikhil Padmanabhan

For description see under Physics.

ASTR 355a^G, Observational Astronomy Pieter van Dokkum

Optics for astronomers. Design and use of optical telescopes, photometers, spectrographs, and detectors for astronomical observations. Introduction to error analysis, concepts of signal-to-noise, and the reduction and analysis of photometric and spectroscopic observations. Prerequisite: one astronomy course numbered above 200, or permission of instructor. Previous experience with computer programming recommended. QR, SC RP

[ASTR 360b^G, Interstellar Matter and Star Formation]

[ASTR 375b^G, Exoplanets]

ASTR 380b^G, Stellar Populations Robert Zinn

The stellar populations of our galaxy and galaxies of the Local Group. Topics include the properties of stars and star clusters, stellar evolution, and the structure and evolution of our galaxy. Prerequisites: PHYS 201 and MATH 120, and one astronomy course numbered above 200. Taught in alternate years. QR, SC RP

ASTR 385b^G, Introduction to Radio Astronomy Hector Arce

Introduction to the theory and techniques of radio astronomy, including radio emission mechanisms, propagation effects, antenna theory, interferometry, and spectroscopy. Discussion of specific sources such as Jupiter, radio stars, molecular clouds, radio galaxies, ETI, and the microwave background. Includes observational exercises with a small radio telescope. Prerequisites: MATH 120 and PHYS 201 or equivalents. QR, SC

[ASTR 418b^G, Stellar Dynamics]

ASTR 420a^G, Computational Methods for Astrophysics Paolo Coppi

The analytic, numerical, and computational tools necessary for effective research in astrophysics and related disciplines. Topics include numerical solutions to differential equations, spectral methods, and Monte Carlo simulations. Applications to common astrophysical problems including fluids and N-body simulations. Prerequisites: ASTR 320, MATH 120, 222 or 225, and 246. QR RP

ASTR 430a^G, Galaxies Jeffrey Kenney

A survey of the contents, structure, kinematics, dynamics, and evolution of galaxies; galaxy interactions and the environments of galaxies; properties of active galactic nuclei. Prerequisites: PHYS 201 and MATH 120, and one astronomy course numbered above 200. Taught in alternate years. QR, SC RP

ASTR 440b^c, Radiative Transfer in Stellar Atmospheres Debra Fischer

Applications to astrophysics and geophysics of the theory of radiation fields. Specific examples from stellar physics; stellar and planetary atmospheres; other astrophysical and geophysical processes. Prerequisites: MATH 120 and PHYS 201. Taught in alternate years. QR, SC RP

ASTR 450a^c, Stellar Astrophysics Sarbani Basu

The physics of stellar atmospheres and interiors. Topics include the basic equations of stellar structure, nuclear processes, stellar evolution, white dwarfs, and neutron stars. Prerequisites: PHYS 201 and MATH 120. Taught in alternate years. QR, SC

[ASTR 465a^c, The Evolving Universe]***ASTR 490a and 491b, Independent Project in Astronomy** Debra Fischer

Independent project supervised by a member of the department with whom the student meets regularly. The project must be approved by the instructor and by the director of undergraduate studies; the student is required to submit a complete written report on the project at the end of the term.

Bengali

(See under South Asian Studies.)

Biochemistry

(See under Biology and under Molecular Biophysics and Biochemistry.)

Biology

Yale offers three different biological sciences majors, including Ecology and Evolutionary Biology (EEB), Molecular Biophysics and Biochemistry (MB&B), and Molecular, Cellular, and Developmental Biology (MCDB). The distinctions between these majors reflect the types of biological systems analysis each represents: the analysis of whole organisms, populations, and ecosystems (EEB); use of the tools of chemistry and physics to study life at the molecular level (MB&B); and molecular, cellular, and developmental biology, genetics, and neurobiology (MCDB). These approaches cover the vast breadth of disciplines in the biological sciences.

The courses listed below, BIOL 101–104, are designed as entry points to all three programs in the biological sciences. The prerequisites for the three majors are similar, so students need not commit to a specific major in the freshman year.

For information on the major requirements, course offerings, and departmental faculty of Ecology and Evolutionary Biology, Molecular Biophysics and Biochemistry, and Molecular, Cellular, and Developmental Biology, see under those headings in this chapter.

Students in the class of 2015 and previous classes may fulfill the requirements of the combined Biology major that were in place when they entered the major, as described in previous editions of this bulletin. Alternatively, they may fulfill the requirements of the major in Ecology and Evolutionary Biology, in Molecular Biophysics and Biochemistry,

or in Molecular, Cellular, and Developmental Biology, as described under those headings in this bulletin.

BIOL 101a, Biochemistry and Biophysics Michael Koelle

Introduction to the study of life at the molecular level. Topics include the three-dimensional structures and function of large biological molecules, the human genome, and the design of antiviral drugs to treat HIV/AIDS. The first of four modules in a yearlong introductory biology sequence; meets for the first half of the fall term. SC ½ Course cr

BIOL 102a, Principles of Cell Biology and Membrane Physiology Mark Mooseker

Introduction to the study of cell biology and membrane physiology. Topics include organization and functional properties of biological membranes, membrane physiology and signaling, rough endoplasmic reticulum and synthesis of membrane/secretory membrane proteins, endocytosis, the cytoskeleton, and cell division. The second of four modules in a yearlong introductory biology sequence; meets for the second half of the fall term. SC ½ Course cr

BIOL 103b, Genes and Development Frank Slack

Introduction to genes, genetics, and developmental biology. How genes control development and disease; Mendel's rules; examples of organ physiology. The third of four modules in a yearlong introductory biology sequence; meets for the first half of the spring term. SC ½ Course cr

BIOL 104b, Principles of Ecology and Evolutionary Biology Leo Buss

Introduction to ecology, evolutionary biology, animal behavior, and the history of life. Evolutionary transitions and natural selection. Adaptation at genic, chromosomal, cellular, organismal, and supra-organismal levels. Distributional and social consequences of particular suites of organismal adaptations. The fourth of four modules in a yearlong introductory biology sequence; meets for the second half of the spring term. SC ½ Course cr

Biomedical Engineering

Director of undergraduate studies: Lawrence Staib, N309 B TAC, 785-5958, lawrence.staib@yale.edu [F]; James Duncan, N309 D TAC, 785-2427, 313 MEC, 432-9917, james.duncan@yale.edu [Sp]; www.seas.yale.edu/departments-biomedical.php

FACULTY OF THE DEPARTMENT OF BIOMEDICAL ENGINEERING

Professors †Richard Carson, †R. Todd Constable, †James Duncan, Jay Humphrey, †Fahmeed Hyder, †Laura Niklason, †Douglas Rothman, †Mark Saltzman, †Frederick Sigworth, †Steven Zucker

Associate Professors †Robin de Graaf, †Tarek Fahmy, †Themis Kyriakides, Michael Levene, †Evan Morris, †Xenophon Papademetris, †Lawrence Staib, †Hemant Tagare

Assistant Professors †Joerg Bewersdorf, Rong Fan, Anjelica Gonzalez, Kathryn Miller-Jensen, †Smita Sampath, †Erik Shapiro

Lecturers †Liqiong Gui, †Jing Zhou

†A joint appointment with primary affiliation in another department or school.

Engineering methods and strategies are used to address important biomedical problems ranging from studies of physiological function using images to the development of artificial organs and new biomaterials. The major in Biomedical Engineering is designed to provide students with an understanding of the common methodologies that underlie many of these problems as well as the ability to develop quantitative approaches to understanding one of three biomedical engineering fields in more detail.

The flexible course structure of the major permits students to understand and bridge basic concepts in the life sciences and at least one of the traditional engineering disciplines offered at Yale, while also gaining a comprehensive understanding of biomedical engineering as a field of study.

Requirements of the major for the Class of 2013 The B.S. degree program in Biomedical Engineering offers three tracks: the bioimaging track, the biomechanics track, and the molecular engineering track.

During the freshman year, students study basic mathematics, chemistry, and biology. By the end of the sophomore year, they have taken physics, ENAS 194, and BENG 350, Physiological Systems. In the junior year, students obtain a comprehensive grounding in the field through taking BENG 351, Biotransport and Kinetics, 352, Biomedical Signals and Images, 355L, Physiological Systems Laboratory, and 356L, Biomedical Engineering Laboratory. They also take an elective in one of the three areas of concentration in order to prepare for more advanced work. During the remainder of the junior and senior years, students acquire depth in one of the three areas of concentration. A senior seminar and a senior project permit students to gain practical, detailed information about their chosen area of concentration.

The following courses are prerequisite to the major for students in all tracks: MCDB <120>; CHEM 112, 114, or 118; ENAS 194; MATH 115; MATH 120 or ENAS 151; PHYS 180, 181, 205L, and 206L (or 165L and 166L, with permission of the director of undergraduate studies).

Students must complete ten term courses, totaling at least nine course credits, beyond the prerequisites, including at least three required courses in the chosen track, two terms of a biomedical engineering laboratory (BENG 355L, 356L), and the two-term senior requirement.

Students in all tracks are required to take the following five term courses: BENG 350, 351, 352, 355L, and 356L. Students in the *bioimaging track* must also take three courses chosen from EENG 310, BENG 410, 421, 436, 445, 449, or 475. Students in the *biomechanics track* must also take three courses chosen from MENG 185, 280, 361, BENG 410, 434, or 457. Students in the *molecular engineering track* must also take three courses chosen from BENG 410, 434, 435, 464, MENG 361, or MB&B 300. Any relevant course may be substituted with the permission of the director of undergraduate studies. By the end of senior year, two courses in the life sciences must have been included among the prerequisite and required courses for the major.

Requirements of the major for the Class of 2014 and subsequent classes The B.S. degree program in Biomedical Engineering offers three tracks: the bioimaging track, the biomechanics track, and the molecular engineering track.

During the freshman year, students study basic mathematics, chemistry, and biology. By the end of the sophomore year, they have taken physics, ENAS 194, BENG 249, Introduction to Biomedical Computation, and BENG 350, Physiological Systems. In the junior year, students obtain a comprehensive grounding in the field through taking BENG 351, Biotransport and Kinetics, 352, Biomedical Signals and Images, 353, Introduction to Biomechanics, 355L, Physiological Systems Laboratory, and 356L, Biomedical Engineering Laboratory. They also take an elective in one of the three areas of concentration in order to prepare for more advanced work. During the remainder of the junior and senior years, students acquire depth in one of the three areas of concentration. A senior seminar and a senior project permit students to gain practical, detailed information about their chosen area of concentration.

The following courses are prerequisite to the major for students in all tracks: MCDB <120>, or BIOL 101 and 102; CHEM 112, 114, or 118; ENAS 194; MATH 115; MATH 120 or ENAS 151; PHYS 180, 181, 205L, and 206L (or 165L and 166L, with permission of the director of undergraduate studies).

Students must complete twelve term courses, totaling at least eleven course credits, beyond the prerequisites, including at least three required courses in the chosen track, two terms of a biomedical engineering laboratory (BENG 355L, 356L), and the two-term senior requirement.

Students in all tracks are required to take the following seven term courses: BENG 249, 350, 351, 352, 353, 355L, and 356L. Students in the *bioimaging track* must also take three courses chosen from EENG 310, BENG 410, 421, 436, 445, 449, or 475. Students in the *biomechanics track* must also take three courses chosen from MENG 185, 280, 361, BENG 410, 434, or 457. Students in the *molecular engineering track* must also take three courses chosen from BENG 410, 434, 435, 464, MENG 361, or MB&B 300. Any relevant course may be substituted with the permission of the director of undergraduate studies. By the end of senior year, two courses in the life sciences must have been included among the prerequisite and required courses for the major.

Senior requirement In their senior year, all students must complete a one-term senior project in their final term of enrollment (BENG 471 or 472) and the senior seminar (BENG 480).

Credit/D/Fail option No course taken Credit/D/Fail may count toward the major, including prerequisites.

Preparation for graduate study The Biomedical Engineering curriculum is excellent preparation for graduate study in engineering, science, and medicine. In some cases, organic chemistry and/or certain biology courses may be substituted for courses in any one of the tracks after consultation with the director of undergraduate studies.

REQUIREMENTS OF THE MAJOR

Prerequisites MCDB <120>, or BIOL 101 and 102; CHEM 112, 114, or 118; ENAS 194; MATH 115; MATH 120 or ENAS 151; PHYS 180, 181, and 205L, 206L (or 165L, 166L with DUS permission)

Number of courses *Class of 2013*—10 term courses, totaling at least 9 course credits, beyond prereqs (incl senior req); *Class of 2014 and subsequent classes*—12 term courses, totaling at least 11 course credits, beyond prereqs (incl senior req)

Distribution of courses 2 courses in life sciences among prereq and req courses

Specific courses required *Class of 2013*—All tracks—BENG 350, 351, 352, 355L, 356L; *Class of 2014 and subsequent classes*—All tracks—BENG 249, 350, 351, 352, 353, 355L, 356L; *All classes*—*Bioimaging track*—3 from EENG 310, BENG 410, 421, 436, 445, 449, or 475; *Biomechanics track*—3 from MENG 185, 280, 361, BENG 410, 434, or 457; *Molecular engineering track*—3 from BENG 410, 434, 435, 464, MENG 361, or MB&B 300

Substitution permitted Relevant course with DUS permission

Senior requirement Senior project in final term (BENG 471 or 472) and senior sem (BENG 480)

BENG 100b, Frontiers of Biomedical Engineering Mark Saltzman

The basic concepts of biomedical engineering and their connection with the spectrum of human activity. Introduction to the fundamental science and engineering on which biomedical engineering is based. Case studies of drugs and medical products illustrate the product development–product testing cycle, patent protection, and FDA approval. Designed for science and non–science majors. SC

BENG 249b, Introduction to Biomedical Computation Richard Carson

Computational and mathematical tools used in biomedical engineering for the simulation of biological systems and the analysis of biomedical data. Basics of computational programming in MATLAB; applications to modeling, design, and statistical and data analysis. Prerequisite: MATH 120 or ENAS 151. QR

***BENG 350a^C/MCDB 310a^C, Physiological Systems** Mark Saltzman and staff

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. Prerequisites: CHEM 113 or 115, or PHYS 180 and 181; MCDB <120>, or BIOL 101 and 102. SC

BENG 351a^C/CENG 351a^C, Biotransport and Kinetics Kathryn Miller-Jensen

Creation and critical analysis of models of biological transport and reaction processes. Topics include mass and heat transport, biochemical interactions and reactions, and thermodynamics. Examples from diverse applications, including drug delivery, biomedical imaging, and tissue engineering. Prerequisites: PHYS 180, 181, MATH 115, ENAS 194; MCDB <120>, or BIOL 101 and 102; CHEM 112, 114, or 118. QR

BENG 352b, Biomedical Signals and Images James Duncan, Lawrence Staib

Principles and methods used to represent, model, and process signals and images arising from biomedical sources. Topics include continuous and discrete linear systems analysis, Fourier analysis and frequency response, metrics for signal similarity, and noise filtering. Biomedical examples range from one-dimensional electrical signals in nerves and muscles to two-dimensional images of organs and cells. Prerequisite: MATH 120 or ENAS 151. BENG 249, 350, and ENAS 194 strongly recommended. QR

BENG 353a^G, Introduction to Biomechanics Jay Humphrey

An introduction to the biomechanics used in biosolid mechanics, biofluid mechanics, biotermomechanics, and biochemomechanics. Diverse aspects of biomedical engineering, from basic mechanobiology to the design of novel biomaterials, medical devices, and surgical interventions. Prerequisites: PHYS 180, 181, MATH 115, and ENAS 194. QR

***BENG 355La, Physiological Systems Laboratory** Lawrence Staib, Themis Kyriakides

Introduction to laboratory techniques and tools used in biomedical engineering for physiological measurement. Topics include bioelectric measurement, signal processing, and dialysis. Enrollment limited to majors in Biomedical Engineering, except by permission of the director of undergraduate studies. SC ½ Course cr

***BENG 356Lb, Biomedical Engineering Laboratory** Lawrence Staib, Michael Levene

Continuation of BENG 355L, introducing laboratory techniques and tools used in biomedical engineering. Topics include image processing, ultrasound, and microscopy. Enrollment limited. SC ½ Course cr

***BENG 405b^G/EVST 415b, Biotechnology and the Developing World**

Anjelica Gonzalez

Study of technological advances that have global health applications. Ways in which biotechnology has enhanced quality of life in the developing world. The challenges of implementing relevant technologies in resource-limited environments, including technical, practical, social, and ethical aspects. Prerequisite: MCDB <120>, or BIOL 101 and 102.

***BENG 410a^G, Physical and Chemical Basis of Bioimaging and Biosensing**

Douglas Rothman and staff

Basic principles and technologies for sensing the chemical, electrical, and structural properties of living tissues and of biological macromolecules. Topics include magnetic resonance spectroscopy, microelectrodes, fluorescent probes, chip-based biosensors, X-ray and electron tomography, and MRI. Prerequisites: BENG 351 and 352 or permission of instructor. QR, SC

BENG 411b^G, Biomedical Microtechnology and Nanotechnology Rong Fan

Principles and applications of micro- and nanotechnologies for biomedicine. Approaches to fabricating micro- and nanostructures. Fluid mechanics, electrokinetics, and molecular transport in microfluidic systems. Integrated biosensors and microTAS for laboratory medicine and point-of-care uses. High-content technologies, including DNA, protein microarrays, and cell-based assays for differential diagnosis and disease stratification. Emerging nanobiotechnology for systems medicine. Prerequisites: CHEM 112, 114, or 118, and ENAS 194. SC

***BENG 421b^G, Fundamentals of Medical Imaging** R. Todd Constable

The physics of image formation, with special emphasis on techniques with medical applications. Emphasis on concepts common to different types of imaging, along with understanding how information is limited by physical phenomena. Topics include mathematical concepts of image analysis, formation of images by ionizing radiation, ultrasound, NMR and other energy forms, and methods of evaluating image quality. Prerequisites: ENAS 194, and PHYS 180, 181, or 200, 201, or permission of instructor. QR, SC

BENG 434a, Biomaterials Anjelica Gonzalez

Introduction to the major classes of biomedical materials: ceramics, metals, and polymers. Their structure, properties, and fabrication connected to biological applications, from implants to tissue-engineered devices and drug delivery systems. Prerequisite: CHEM 113 or 115; organic chemistry recommended. SC

***BENG 435b⁶, Biomaterial-Tissue Interactions** Themis Kyriakides

Study of the interactions between tissues and biomaterials, with an emphasis on the importance of molecular- and cellular-level events in dictating the performance and longevity of clinically relevant devices. Attention to specific areas such as biomaterials for tissue engineering and the importance of stem/progenitor cells, as well as biomaterial-mediated gene and drug delivery. Prerequisites: CHEM 112, 114, or 118; MCDB <120>, or BIOL 101 and 102; or equivalents. SC

***BENG 436a⁶, Biophotonics and Optical Microscopy** Michael Levene

A review of linear and nonlinear optical microscopies and other biophotonics applications. Topics include wide-field techniques, linear and nonlinear laser scanning microscopy, fundamentals of geometrical and physical optics, optical image formation, laser physics, single molecule techniques, fluorescence correlation spectroscopy, and light scattering. Discussion of fluorescence and the underlying physics of light-matter interactions that provide biologically relevant signals.

[BENG 445a⁶/EENG 445a⁶, Biomedical Image Processing and Analysis]**[BENG 449b⁶, Biomedical Data Analysis]****[BENG 453b, Continuum Biomechanics]****BENG 455b, Vascular Mechanics** Jay Humphrey and staff

Methods of continuum biomechanics used to study diverse vascular conditions and treatments from an engineering perspective. Topics include hypertension, atherosclerosis, aneurysms, vein grafts, and tissue engineered constructs. Emphasis on mechanics driven by advances in vascular mechanobiology. Prerequisite: BENG 353. QR

BENG 457b⁶/MENG 457b, Musculoskeletal Biomechanics Jing Zhou

Application of mechanical engineering principles to biological materials and systems. Topics include ligament, tendon, bone, muscle; joints, gait analysis; exercise physiology. The basic concepts are directed toward an understanding of the science of orthopedic surgery and sports medicine. Prerequisites: MENG 280 and 383 or permission of instructor. QR, SC RP

BENG 463a/CENG 320a, Immunoengineering Tarek Fahmy

Introduction to immunoengineering, a field combining immunology with the physical sciences and engineering. Focus on biophysical principles and biomaterial applications for understanding and engineering immunity. SC

BENG 464b, Tissue Engineering Laura Niklason, Liqiong Gui

Introduction to the major aspects of tissue engineering, including materials selection, scaffold fabrication, cell sources, cell seeding, bioreactor design, and tissue characterization. Class sessions include lectures and hands-on laboratory work. Prerequisite: CHEM 112, 114, or 118. Recommended preparation: organic chemistry, cell biology, and physiology. SC 1/2 Course cr

***BENG 471a and 472b, Special Projects** James Duncan

Faculty-supervised individual or small-group projects with emphasis on research (laboratory or theory), engineering design, or tutorial study. Students are expected to consult the director of undergraduate studies and appropriate faculty members about ideas and suggestions for suitable topics. This course is usually taken during the spring term of the senior year but with permission of the director of undergraduate studies can be taken any time during a student's career, and may be taken more than once. Permission of both the instructor and the director of undergraduate studies is required.

BENG 475a^c/CPSC 475a^c, Computational Vision and Biological Perception

Steven Zucker

For description see under Computer Science.

***BENG 480a^c, Seminar in Biomedical Engineering** Xenophon Papademetris

Oral presentations and written reports by students analyzing papers from scientific journals on topics of interest in biomedical engineering, including discussions and advanced seminars from faculty on selected subjects.

***BENG 485a^c, Fundamentals of Neuroimaging** Fahmeed Hyder and staff

The neuroenergetic and neurochemical basis of several dominant neuroimaging methods, including fMRI. Technical aspects of different methods, interpretation of results, and controversies or challenges regarding the application of fMRI and related methods in medicine. SC

Biophysics

(See under Biology and under Molecular Biophysics and Biochemistry.)

British Studies

(COURSES AT THE PAUL MELLON CENTRE IN LONDON)

During the spring term, the Yale-in-London program at the Paul Mellon Centre for Studies in British Art, located in central London, offers four courses in British studies covering British history, history of art or architecture, literature, and drama. Courses taught at the Paul Mellon Centre must be taken for a letter grade. Further information and application forms are available at britishart.yale.edu/education/yale-college-students/yale-in-london. Inquiries may also be directed to yaleinlondon@yale.edu. The application deadline for spring term 2013 is Friday, October 12, 2012. Students will be notified of acceptance within one month of the application deadline. Inquiries about the summer program, described in chapter I, should be directed to the same address. Applications for summer 2013 are due Friday, February 1, 2013.

***BRST 177b, British Art and Landscape** Martin Postle

The role of visual art in articulating cultural, literary, political, and environmental approaches to the landscape of the British Isles in the period from 1660 to 1860. Artists include Jan Siberechts, George Lambert, Thomas Gainsborough, Richard Wilson, J. M. W. Turner, and John Constable. HU

***BRST 182b, The Tudors and the English Renaissance, 1509–1603** John Guy

English history between the accession of Henry VIII in 1509 and the death of Elizabeth I in 1603. Political culture and the Reformation; personalities, political and religious structures, and ideas as disseminated in print, literature, and art; the conceptualization of politics, including its expression in public ceremonial and the image of the ruler; the political significance of royal buildings, ceremonies, and iconography. HU

***BRST 184b, London in the Literary Imagination** Barry McCrea

Literary representations of the British capital from the seventeenth century to the present. How the changing social and geographical map of the city has changed the way the novel approaches character, physical space, psychology, desire, and even the representation of time. HU

***BRST 478b, Modern British Drama** Barry McCrea

A detailed study of representative works of modern British drama, based on current productions on the London stage. Theatrical conventions developed by playwrights and actors in the theater of postwar Britain, both on the fringe and in the mainstream of the West End. Attention to social issues addressed by the plays. HU

Chemical Engineering

Director of undergraduate studies: Gary Haller, 305 ML, 432-4378, gary.haller@yale.edu

FACULTY OF THE DEPARTMENT OF CHEMICAL AND ENVIRONMENTAL ENGINEERING

Professors Eric Altman, †Michelle Bell, †Gaboury Benoit, †Stephen Edberg, Menachem Elimelech, Abbas Firoozabadi (*Adjunct*), †Thomas Graedel, Gary Haller, †Edward Kaplan, Yehia Khalil (*Adjunct*), Michael Loewenberg, Robert McGraw (*Adjunct*), Lisa Pfefferle, Joseph Pignatello (*Adjunct*), Daniel Rosner, †James Saiers, †Mark Saltzman, †Udo Schwarz, T. Kyle Vanderlick, Paul Van Tassel, †Kurt Zilm

Associate Professors †Eric Dufresne, †Tarek Fahmy, William Mitch, Jordan Peccia, †Julie Zimmerman

Assistant Professors Chinedum Osuji, André Taylor, Corey Wilson

†A joint appointment with primary affiliation in another department or school.

Energy, the environment, and health care are key challenges facing humanity in the twenty-first century. Chemical engineering is a discipline well placed to confront these challenges. Chemical engineering is rooted in the basic sciences of mathematics, chemistry, physics, and biology; a traditional engineering science core of thermodynamics, transport phenomena, and chemical kinetics; a rigorous design component; and an expanding focus on emerging topics in materials, nanotechnology, and life sciences. The discipline has grown from its petrochemical origins to become central to state-of-the-art technologies in microelectronics, alternative energy, biomedicine, and pharmaceuticals.

The Chemical Engineering program is principally focused on basic and engineering sciences and on problem solving. Additional emphasis is on communication, analysis of experiments, and chemical process design. A special feature of the program is the

accessibility of laboratory research—most Chemical Engineering majors participate in faculty-led research projects, often resulting in publication and/or presentation at national meetings.

Chemical Engineering graduates find a wide range of professional opportunities in academia, industry, government, business, and the nonprofit sector. Many majors go on to graduate programs in chemical, biomedical, or environmental engineering, or to medical, law, or business schools.

The educational objectives of the Chemical Engineering program are the following. Graduating students will achieve positions of leadership within academia, industry, and government; excel in top graduate programs in chemical, biomedical, environmental, and related engineering fields; excel in top professional schools in fields such as law, medicine, or management; join and rise in the ranks of large and small corporations; become successful entrepreneurs; practice engineering toward the benefit of humankind.

Students considering a chemical engineering major are encouraged to take two terms of chemistry and mathematics during the freshman year, and to contact the director of undergraduate studies.

Requirements of the major Two degree programs are offered: a B.S. in Chemical Engineering accredited by the Engineering Accreditation Commission of ABET, Inc., and a B.S. in Engineering Sciences (Chemical).

Prerequisites Students in both degree programs take the following prerequisite courses: MATH 112, 115, and ENAS 151 or equivalent; PHYS 180, 181; CHEM 114, 115, and 116L, or CHEM 118; ENAS 130. Students with advanced high school preparation may reduce the number of prerequisites.

B.S. degree program in Chemical Engineering The curriculum for the ABET-accredited B.S. degree in Chemical Engineering includes the following required courses beyond the prerequisites:

1. Mathematics: ENAS 194 or equivalent
2. Chemistry: CHEM 220, <221> or 230, 332, 333, and 330L
3. Engineering science: MENG 361 and three term courses chosen from engineering electives
4. Chemical engineering: CENG 210, 300, 301, 315, 411, 412, 480

Senior requirement In their senior year students must pass CENG 416, Chemical Engineering Process Design.

B.S. degree program in Engineering Sciences (Chemical) The B.S. degree in Engineering Sciences (Chemical) requires ten term courses beyond the prerequisites, chosen in consultation with the director of undergraduate studies. The standard program includes the following courses:

1. Mathematics: ENAS 194 or equivalent
2. Chemistry: CHEM 220, and <221> or 230; or 332, 333
3. Engineering science: MENG 361
4. Chemical engineering: CENG 210, 300, 301, 315, 411

Senior requirement In their senior year students must complete a senior research project in CENG 490.

REQUIREMENTS OF THE MAJOR

CHEMICAL ENGINEERING, B.S.

Prerequisites MATH 112, 115, ENAS 151 or equivalent; CHEM 114, 115, and 116L, or CHEM 118; PHYS 180, 181; ENAS 130

Number of courses 18 term courses beyond prereqs (incl senior req)

Specific courses required ENAS 194 or equivalent; CHEM 220, <221> or 230, 332, 333, and 330L; MENG 361; CENG 210, 300, 301, 315, 411, 412, 480

Distribution of courses 3 addtl electives in engineering

Senior requirement CENG 416b

ENGINEERING SCIENCES (CHEMICAL), B.S.

Prerequisites MATH 112, 115, ENAS 151 or equivalent; CHEM 114, 115, and 116L, or CHEM 118; PHYS 180, 181; ENAS 130

Number of courses 10 term courses beyond prereqs (incl senior req)

Specific courses required ENAS 194 or equivalent; CHEM 220, and <221> or 230, or CHEM 332, 333; MENG 361; CENG 210, 300, 301, 315, 411

Senior requirement CENG 490

*CENG 120b/ENAS 120b/ENVE 120b, **Introduction to Environmental Engineering**

Jordan Peccia

For description see under Environmental Engineering.

CENG 210a/ENVE 210a, **Principles of Chemical Engineering and Process Modeling**

Gary Haller

Analysis of the transport and reactions of chemical species as applied to problems in chemical, biochemical, and environmental systems. Emphasis on the interpretation of laboratory experiments, mathematical modeling, and dimensional analysis. Lectures include classroom demonstrations. Prerequisite: MATH 120 or permission of instructor. QR, SC RP

CENG 300a, **Chemical Engineering Thermodynamics** Chinedum Osuji

Analysis of equilibrium systems. Topics include energy conservation, entropy, heat engines, Legendre transforms, derived thermodynamic potentials and equilibrium criteria, multicomponent systems, chemical reaction and phase equilibria, systematic derivation of thermodynamic identities, criteria for thermodynamic stability, and introduction to statistical thermodynamics. Prerequisite: MATH 120 or ENAS 151 or permission of instructor. QR, SC RP

CENG 301b, **Chemical Kinetics and Chemical Reactors** Lisa Pfefferle

Physical-chemical principles and mathematical modeling of chemical reactors. Topics include homogeneous and heterogeneous reaction kinetics, catalytic reactions, systems of coupled reactions, selectivity and yield, chemical reactions with coupled mass transport, nonisothermal systems, and reactor design. Applications from problems in environmental, biomedical, and materials engineering. Prerequisite: ENAS 194 or permission of instructor. QR, SC RP

CENG 315b/ENVE 315b, **Transport Phenomena** Chinedum Osuji, André Taylor

Unified treatment of momentum, energy, and chemical species transport including conservation laws, flux relations, and boundary conditions. Topics include convective and

diffusive transport, transport with homogeneous and heterogeneous chemical reactions and/or phase change, and interfacial transport phenomena. Emphasis on problem analysis and mathematical modeling, including problem formulation, scaling arguments, analytical methods, approximation techniques, and numerical solutions. Prerequisite: ENAS 194 or permission of instructor. QR, SC RP

CENG 320a/BENG 463a, Immunoengineering Tarek Fahmy
For description see under Biomedical Engineering.

CENG 351a^c/BENG 351a^c, Biotransport and Kinetics Kathryn Miller-Jensen
For description see under Biomedical Engineering.

CENG 373a/ENVE 373a, Air Pollution Control Yehia Khalil
For description see under Environmental Engineering.

***CENG 377b/ENVE 377b, Water Quality Control** William Mitch
For description see under Environmental Engineering.

CENG 411a, Separation and Purification Processes Daniel Rosner,
Michael Loewenberg

Theory and design of separation processes for multicomponent and/or multiphase mixtures via equilibrium and rate phenomena. Topics include single-stage and cascaded absorption, adsorption, extraction, distillation, partial condensation, filtration, and crystallization processes. Applications to environmental engineering (air and water pollution control), biomedical-chemical engineering (artificial organs, drug purification), food processing, and semiconductor processing. Prerequisite: CENG 300 or 315 or permission of instructor. QR, SC RP

CENG 412b, Chemical Engineering Laboratory and Design Corey Wilson and staff
An introduction to design as practiced by chemical and environmental engineers. Engineering fundamentals, laboratory experiments, and design principles are applied toward a contemporary chemical process challenge. Sustainability and economic considerations are emphasized. SC

CENG 416b/ENVE 416b, Chemical Engineering Process Design Gary Haller and staff
Study of the techniques for and the design of chemical processes and plants, applying the principles of chemical engineering and economics. Emphasis on flowsheet development and equipment selection, cost estimation and economic analysis, design strategy and optimization, safety and hazards analysis, and environmental and ethical considerations. Prerequisites: CENG 301 and 411. QR, SC RP

CENG 471a or b, Independent Research Paul Van Tassel
Faculty-supervised individual student research and design projects. Emphasis on the integration of mathematics with basic and engineering sciences in the solution of a theoretical, experimental, and/or design problem. May be taken more than once for credit.

CENG 480a, Chemical Engineering Process Control Yehia Khalil
Transient regime modeling and simulations of chemical processes. Conventional and state-space methods of analysis and control design. Applications of modern control methods in chemical engineering. Course work includes a design project. Prerequisite: ENAS 194 or permission of instructor. QR, SC RP

★**CENG 490a or b, Senior Research Project** Michael Loewenberg [F],

Paul Van Tassel [Sp]

Individual research and/or design project supervised by a faculty member in Chemical Engineering, or in a related field with permission of the director of undergraduate studies.

RELATED COURSE THAT COUNTS TOWARD THE MAJOR

MENG 361a, Mechanical Engineering II: Fluid Mechanics Nicholas Ouellette

Chemistry

Director of undergraduate studies: Kurt Zilm, 249 SCL, 432-3956, kurt.zilm@yale.edu [F]; Patrick Vaccaro, 240 SCL, 432-3975, patrick.vaccaro@yale.edu [Sp]; www.chem.yale.edu

FACULTY OF THE DEPARTMENT OF CHEMISTRY

Professors †Sidney Altman, Victor Batista, Gary Brudvig, Robert Crabtree, †Craig Crews, R. James Cross, Jr. (*Emeritus*), Jonathan Ellman, John Faller (*Emeritus*), †Gary Haller, †Francesco Iachello, Mark Johnson, William Jorgensen, J. Patrick Loria, J. Michael McBride, Scott Miller, Peter Moore (*Emeritus*), Andrew Phillips, †Lynne Regan, †James Rothman, Martin Saunders, Alanna Schepartz, Charles Schmuttenmaer, †Dieter Söll, †Thomas Steitz, †Scott Strobel, John Tully, Patrick Vaccaro, Frederick Ziegler (*Emeritus*), Kurt Zilm

Assistant Professors Richard Baxter, Nilay Hazari, Seth Herzon, David Spiegel, Elsa Yan

Lecturers Paul Anastas, Christine DiMeglio, N. Ganapathi, Jonathan Parr

†A joint appointment with primary affiliation in another department.

The wide range of courses offered by the Department of Chemistry reflects the position of chemistry as the foundation of all the molecular sciences. In addition to graduate work in chemistry, biochemistry, or health-related disciplines, the department's graduates find their broad scientific training useful in fields such as technology policy, business management, and law. Chemistry is an especially appropriate major for students interested in energy research or policy and the environment.

Courses for nonmajors without prerequisites Two one-term courses with no prerequisites are offered for non-science majors: CHEM 101, Chemistry in the Modern World, and CHEM 103, Chemistry, Energy, and the Environment. They do not satisfy medical school requirements or the general chemistry requirement for any science major.

Introductory courses and placement The majority of students begin with a general chemistry sequence: either CHEM 112 and 113, Chemistry with Problem Solving I and II; CHEM 114 and 115, Comprehensive General Chemistry I and II; or CHEM 118, Quantitative

Foundations of General Chemistry. Any of these courses fulfills the prerequisite for general chemistry in the Chemistry major. A typical student in CHEM 112 may have taken a year of high school chemistry, but has not been exposed to the problem-solving approach used in many university-level science courses. Students in CHEM 114 may have taken one or possibly two years of chemistry in high school and have had some exposure to quantitative problem-solving scientific methods. A little more than half of the students in CHEM 114 last took chemistry as sophomores in high school. Students who have done well in an advanced placement chemistry course or shown other evidence of high achievement in science and mathematics may start in CHEM 115 or 118. For instance, students with a Chemistry Advanced Placement test score of 5 may elect either CHEM 115 or 118.

Students with a sufficiently strong background in chemistry may initiate their studies with courses in organic or physical chemistry after demonstrating proficiency on the department's placement examination. CHEM 124 and 125, Freshman Organic Chemistry I and II, are offered expressly for freshmen. Other courses in organic chemistry, CHEM 220 and 230, are also available to qualified freshmen. Students with a strong background in physics and calculus may be eligible for the physical chemistry courses CHEM 332 and 333.

Placement procedures The Chemistry department reviews the admission records of all freshmen prior to the beginning of the fall term. Using test scores and information supplied by students in preregistration, the department determines the appropriate general chemistry course for every entering freshman, either CHEM 112, 114, 115, or 118. Students will be able to view their initial placement in late August by following links provided at chem.yale.edu/undergrad.

Freshmen wishing to take CHEM 124, 220, or 332, or those wishing to take a higher-level course than their initially assigned placement, are required to take a placement examination on the first day of registration week in the fall term. Students who feel they have been placed incorrectly at too high a level may discuss changing their placement with a chemistry placement adviser and do not need to take the examination. Students uncertain about their placement are encouraged to sit for the examination, as it provides the best measure of a student's readiness to enter the wide variety of courses offered to freshmen.

Students with placement questions, or those wishing to change their course preference indicated during preregistration, should attend the department's orientation meeting prior to the placement examination. Additional sessions with placement advisers are scheduled throughout the first week of the fall term in 1 SCL at times listed in the *Calendar for the Opening Days of College*. Students wishing to change their placement should consult an adviser as soon as possible.

Students are advised to review general chemistry before taking the placement examination. Use of an electronic calculator is permitted. Times and places for the examination are published in the *Calendar for the Opening Days of College*. After the examination, final placements are posted at chem.yale.edu/undergrad. For further information about placement and the examination, consult the *Calendar for the Opening Days of College*, the Freshman Web site (yalecollege.yale.edu/content/chemistry-1), and chem.yale.edu/undergrad.

Permission keys Enrollment in any introductory chemistry course requires an electronic permission key. Keys are automatically issued by the department for entering freshmen and are displayed as green key-shaped icons next to the appropriate courses on the online

registration page. Students are blocked from enrolling in any chemistry course for which they do not possess a permission key. Students experiencing problems with permission keys should inquire in person at the department office, 1 SCL.

Section registration in laboratory and lecture courses Information about online registration for laboratory and discussion sections can be found in the description for each laboratory or lecture course at www.yale.edu/oci. Due to the nature of laboratory exercises, it is impractical to preview laboratory courses during the course selection period.

Placement information for upperclassmen Upperclassmen wishing to take CHEM 114, 115, or 118 should confirm their placement on line at chem.yale.edu/undergrad and, if needed, obtain permission keys by inquiring at the department office, 1 SCL. Because CHEM 112 and 113 are restricted to freshmen, upperclassmen are placed into either CHEM 114, 115, or 118. Upperclassmen wishing to enroll in CHEM 220 may do so as long as they have satisfied the general chemistry prerequisite.

Information for premedical students Medical schools currently require one year of organic chemistry and laboratory as well as one year of general chemistry and laboratory. The general chemistry requirement may be satisfied by CHEM 112 and 113, or 114 and 115, or CHEM 328 or 332 followed by 333. Students with advanced placement taking only CHEM 115 or 118 may complete this requirement by taking a course in biochemistry with laboratory. CHEM 252, Introductory Inorganic Chemistry, with laboratory may be substituted for the biochemistry course, but biochemistry is the preferred option. Students should consult with Undergraduate Career Services for the most up-to-date premedical course advice.

Major degree programs Four degree programs are offered: a B.S., an intensive major leading to a B.S., a B.A., and a combined B.S./M.S. The B.S. degree is intended to prepare students for graduate study while permitting extensive exploration of other disciplines. The B.S. degree with an intensive major provides more focused preparation for a career in chemical research, and requires greater breadth in laboratory courses and electives. Students electing this major program can also satisfy the requirements for a certified degree in chemistry as set forth by the American Chemical Society. The B.A. is intended for students who want solid training in the chemical sciences and who also intend to study other subjects in which chemical training would be an asset, such as technology policy, economics, the environment, or medicine. The combined B.S./M.S. is designed for students whose advanced preparation qualifies them for graduate-level work in their third and fourth years of college.

Degree requirements common to all Chemistry degree programs Two terms of general chemistry and laboratory, or the equivalent in advanced placement, are prerequisite to all four degree programs. In addition, all degrees require two terms of organic chemistry (CHEM 124 or 220, and 125, <221>, or 230) and laboratory (CHEM <126L> or 222L, and <127L> or 223L), one term of physical chemistry (CHEM 332 or 328), one term of physical chemistry laboratory (CHEM 330L), and one term of inorganic chemistry (CHEM 252 or higher). No chemistry courses taken Credit/D/Fail may be counted toward the major (including substitutions for advanced courses).

Prerequisites outside the Chemistry department Each degree program requires a course in physical chemistry. Single-variable calculus and college-level physics are prerequisites for the physical chemistry courses. Students are also encouraged to complete a course in multivariable calculus.

B.S. degree In addition to the prerequisites and common degree requirements, the B.S. requires completion of a second term of physical chemistry (CHEM 333), an additional half-credit chemistry laboratory elective, and four additional course credits of advanced chemistry lecture or laboratory courses. At least one of the advanced courses must be a lecture course in the Chemistry department. One term of CHEM 490 involving original research may be applied toward the advanced-course requirement.

B.S. degree, intensive major The requirements for the B.S. degree with an intensive major are the same as those for the regular B.S., except that the laboratory elective requirement is increased to one full course credit, and five, rather than four, credits in advanced chemistry courses are required. The five credits in advanced courses must include two terms of the independent research course CHEM 490.

B.A. degree The B.A. degree requires completion of the prerequisites, the common degree requirements, and three course credits of advanced chemistry lecture or laboratory courses, one of which may be CHEM 490. At least one of the advanced courses must be a lecture course in the Chemistry department. CHEM 333 can be counted toward this requirement, although not as the sole advanced chemistry lecture course offered.

Combined B.S./M.S. degree program in Chemistry Exceptionally well-prepared students may complete a course of study leading to the simultaneous award of the B.S. and M.S. degrees after eight terms of enrollment. Formal application for admission to this program must be made by the first day of classes in the sixth term of enrollment. Acceptance into the program requires two-thirds A or A- grades within the major and one-half A or A- grades overall after five terms. Two terms of CHEM 490 must be taken in the fifth and sixth terms with grades of A or A- earned to continue in the program. Subsequent grades are irrelevant as long as normal progress is maintained. The B.S./M.S. degree program requires completion of the intensive major requirements, a physics course at the level of 200 or higher, and eight graduate courses in chemistry (four of which count toward the B.S.). Four terms of research are required, including two terms of research taken in CHEM 990.

Advanced courses For the purposes of degree requirements, all Chemistry courses numbered 410 or higher count as advanced lecture or laboratory courses, as do CHEM 226L, 251L, and 331L. Most advanced courses are either offered in fall term or have a fall-term course as a prerequisite, so students should not plan to take an isolated spring-term advanced course in any given year.

Substitutions for required courses Up to two terms of advanced science courses outside Chemistry may be counted as electives, with the written approval of the director of undergraduate studies. Students without advanced placement who complete CHEM 116L and 117L may count one-half course credit of physics laboratory toward the laboratory requirement, with approval of the director of undergraduate studies. CHEM 490 may not

in any circumstances be substituted for any of the laboratory requirements. The graduate courses CHEM 562, 564, and 565 may not be counted toward any requirement of the major.

Senior requirement Senior B.S. candidates and intensive majors prepare a written report and give an oral presentation on their independent project in CHEM 490. Research papers are expected to be fifteen to twenty-five pages in length (double-spaced, twelve-point font, exclusive of figures and bibliography). Students pursuing the B.A. typically do not pursue independent research, but instead attend the senior seminar CHEM 400 or write a senior essay under the guidance of a faculty member as arranged by the instructor of CHEM 490. The senior seminar or essay options may also be elected by B.S. students. The requirements of the senior essay are the same as those for research papers. Students electing the senior essay must secure a faculty sponsor by the middle of the fall term of senior year.

Sequence of courses Majors are encouraged to begin their programs in the freshman year to provide the greatest flexibility in scheduling. It is possible, however, to complete the B.S. in as little as six terms if a student has advanced placement. One sample B.S. program follows, but many others are possible:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CHEM 115, 117L, math prereq	CHEM 220, 230, 252, 222L, 223L, physics prereq	CHEM 332, 333, 330L, 251L, 1 elective	CHEM 490, 2 electives

Programs of study with special emphasis The flexibility of the degree requirements makes it possible for a student's program of study to emphasize a particular area of specialization in chemistry. For example, a program specializing in chemical biology includes CHEM 421, Chemical Biology, and two biochemistry electives chosen from MCDB 300, MB&B 300, 301, or selected graduate courses. An inorganic chemistry specialization requires CHEM 450, Physical Methods in Inorganic Chemistry, CHEM 452, Organometallic Chemistry, and CHEM 457, Modern Coordination Chemistry. A program with emphasis in physical chemistry and chemical physics requires three electives chosen from CHEM 430, Statistical Mechanics and Thermodynamics, CHEM 440, Molecules and Radiation I, CHEM 442, Molecules and Radiation II, CHEM 470, Introductory Quantum Chemistry, or a graduate course in quantum mechanics. Students interested in synthetic organic chemistry complete three electives chosen from CHEM 418, Advanced Organic Chemistry I, CHEM 423, Synthetic Methods in Organic Chemistry, CHEM 425, Spectroscopic Methods of Structure Determination, or selected graduate courses. An emphasis in biophysical chemistry includes a course in either chemical biology or biochemistry, as well as two electives chosen from graduate courses in biophysics or biochemistry. Students may design programs with other areas of emphasis in consultation with the director of undergraduate studies. For a list of graduate courses appropriate for a particular specialization, consult the director of undergraduate studies.

Approval of major programs of study All Chemistry majors in the sophomore, junior, and senior years must have their programs approved by the director of undergraduate studies. A program tailored to each major's goals is created and recorded on a Chemistry

Course of Study form kept in the student's file in the department office. Majors who have a current course of study form on file may have their schedules signed by the director of undergraduate studies or any of the advisers to the major. A current list of advisers to the major may be obtained in the department office, 1 SCL.

Special restrictions on lecture courses Completion of the first term of the general, organic, or physical chemistry sequences CHEM 112 and 113, 124 and 125, 220 and 230, and 332 and 333 with a passing grade is a prerequisite for registration in the subsequent term. Completion of CHEM 114 with a passing grade is a prerequisite for registration in CHEM 115 unless the student's assigned placement is in 115.

Students receive credit for only one chemistry sequence of any given type. For example, a student who has completed CHEM 112 and 113 may not subsequently enroll in CHEM 114 or 118; a student who has completed CHEM 124 and 125 may not subsequently enroll in CHEM 220 or 230. Similarly, students may not enroll in a course that is a prerequisite to a course they have already taken. Thus, for example, a student who has completed an organic chemistry laboratory cannot subsequently enroll in a general chemistry laboratory.

Special restrictions on laboratory courses Chemistry courses may be taken without the accompanying laboratory, although the department does not recommend it. However, the appropriate lecture course is a prerequisite or corequisite for each laboratory course. This restriction can be waived only by the director of undergraduate studies.

Year or Term Abroad Participation in the Year or Term Abroad program is available for qualified majors at Sussex University (U.K.). Interested students should consult the Chemistry Year Abroad coordinator, Robert Crabtree. In most instances, Chemistry majors find their course of study easier to schedule if they choose to study abroad in a spring term. For general information about the Year or Term Abroad, see chapter II of this bulletin.

REQUIREMENTS OF THE MAJOR

Prerequisites CHEM 112 and 113, or 114 and 115, or 118; CHEM 116L and 117L, or 119L; MATH 112, 115 (MATH 120 or ENAS 151 suggested); PHYS 180 and 181, or 200 and 201 (170, 171 acceptable); or equivalents in advanced placement

Number of courses *B.A.* – at least 10 term courses, totaling 9 course credits; *B.S.* – at least 13 term courses, totaling 11½ course credits; *B.S., intensive major* – at least 14 term courses, totaling 13 course credits

Specific courses required *All degrees* – 2 terms of organic chem (CHEM 124 or 220, and CHEM 125, <221>, or 230); 2 terms of organic chem lab (CHEM <126L> or 222L, and <127L> or 223L); physical chem I (CHEM 332 or 328); 1 term of inorganic chem (CHEM 252, 450, 452, or 457); physical chem lab I (CHEM 330L); *B.S.* – CHEM 333; *B.S., intensive major* – CHEM 333, two terms of CHEM 490

Distribution of courses *B.A.* – 3 course credits in advanced lectures or labs; *B.S.* – addtl lab for ½ course credit; 4 course credits in advanced lectures or labs; *B.S., intensive major* – addtl labs for 1 course credit; 5 course credits in advanced lectures or labs

Substitution permitted Up to 2 relevant advanced science courses in other depts for advanced chem courses with DUS permission

Senior requirement CHEM 490, 400, or senior essay

COURSES FOR NONMAJORS WITHOUT PREREQUISITES

[CHEM 101a, Chemistry in the Modern World]

CHEM 103a, Chemistry, Energy, and the Environment John Tully

Introduction to principles that govern chemical processes in everyday life, with emphasis on the production and use of energy. Exploration of constraints imposed by the laws of thermodynamics and the underlying nature of chemical reactions, as well as associated direct and environmental costs. Intended for non–science majors with a basic high school background in chemistry and physics, as well as high school algebra. Does not satisfy premedical chemistry requirements or requirements for the Chemistry major. Not open to students who have completed another chemistry course at Yale. SC

INTRODUCTORY COURSES

Freshmen planning to take an introductory Chemistry course during their first term are required to preregister over the summer. Those planning to elect CHEM 124, 220, or 332 must also register in person and take a placement examination as described in the text above and on the Freshman Web site (yalecollege.yale.edu/content/chemistry-1). Placement in other introductory Chemistry courses is made on the basis of test scores and other admissions data, as discussed in the text above. Time and place for the orientation meeting, registration, and placement examination are listed in the *Calendar for the Opening Days of College*. For further information on placement see the Freshman Web site.

*CHEM 112a, Chemistry with Problem Solving I N. Ganapathi

A systematic introduction to chemistry. Topics include atomic/molecular structure, stoichiometry, thermochemistry, chemical periodicity/bonding, and reactions in aqueous solutions. For beginning students in chemistry or for those whose exposure to the subject has been moderate. Special emphasis on scientific problem-solving skills through an additional discussion section devoted to quantitative reasoning. Attendance at one discussion section and one problem-solving section required. Enrollment limited to freshmen, by placement only. QR, SC RP

*CHEM 113b, Chemistry with Problem Solving II N. Ganapathi

Continuation of CHEM 112. Phase-dependent properties of matter, solutions and their behavior, chemical equilibrium, chemical kinetics, and the chemistry of the elements. Attendance at one discussion section and one problem-solving section required. After CHEM 112. Enrollment limited to freshmen, by placement only. QR, SC RP

*CHEM 114a, Comprehensive General Chemistry I Jonathan Parr

A comprehensive survey of modern descriptive, inorganic, and physical chemistry. Atomic theory, stoichiometry, thermochemistry, chemical periodicity, concepts in chemical bonding, and the shapes of molecules. For students with a good secondary school exposure to general chemistry. Attendance at a weekly discussion section required. Normally accompanied by CHEM 116L. Enrollment by placement only. QR, SC RP

*CHEM 115a or b, Comprehensive General Chemistry II J. Patrick Loria [F],

Charles Schmuttenmaer [Sp]

Kinetics, chemical equilibrium, acid-base chemistry, free energy and entropy, electrochemistry, nuclear chemistry, and descriptive chemistry of the elements. Attendance

at a weekly discussion section required. Prerequisite: CHEM 114 or the equivalent in advanced placement. Normally accompanied by CHEM 117L. Enrollment by placement only. QR, SC RP

CHEM 116La, General Chemistry Laboratory I N. Ganapathi

An introduction to basic chemistry laboratory methods. Techniques required for quantitative analysis of thermodynamic processes and the properties of gases. To accompany or follow CHEM 112 or 114. May not be taken after a higher-numbered laboratory course. SC RP ½ Course cr

CHEM 117La or Lb, General Chemistry Laboratory II N. Ganapathi

Introduction to rate and equilibrium measurements, acid-base chemistry, synthesis of inorganic compounds, and qualitative/quantitative analysis. After CHEM 116L or the equivalent in advanced placement. To accompany or follow CHEM 113 or 115. May not be taken after a higher-numbered laboratory course. SC RP ½ Course cr

***CHEM 118a, Quantitative Foundations of General Chemistry** Mark Johnson

An advanced course emphasizing conceptual aspects and physical principles in general chemistry. Fulfills the general chemistry prerequisite for organic chemistry. Attendance at a weekly discussion section required. Must be taken concurrently with CHEM 119L. Enrollment by placement only. QR, SC

CHEM 119La, Laboratory for Comprehensive General Chemistry Jonathan Parr

Introductory laboratory for students with advanced standing. Emphasis on the fundamental quantitative and physical principles of general chemistry together with quantitative and data analysis. Accompanies CHEM 118. Also suggested for freshmen enrolled in CHEM 332. SC ½ Course cr

***CHEM 124a, Freshman Organic Chemistry I** Jonathan Ellman and staff

An introductory course focused on current theories of structure and mechanism in organic chemistry, their development, and their basis in experimental observation. Open to freshmen with excellent preparation in chemistry, mathematics, and physics who have taken the department's advanced chemistry placement examination. Attendance at a weekly discussion section required. Normally accompanied by CHEM 222L. Enrollment by placement only. SC RP

***CHEM 125b, Freshman Organic Chemistry II** Scott Miller

Continuation of CHEM 124. Survey of simple and complex reaction mechanisms, spectroscopy, organic synthesis, and the molecules of nature. Attendance at a weekly discussion section required. After CHEM 124. Normally accompanied by CHEM 223L. Enrollment by placement only. SC RP

INTERMEDIATE COURSES

***CHEM 220a or b, Organic Chemistry** Seth Herzon [F], Frederick Ziegler [Sp]

An introductory course covering the fundamental principles of organic chemistry. The laboratory for this course is CHEM 222L. After college-level general chemistry. Students who have earned a grade lower than C in general chemistry are cautioned that they may not be sufficiently prepared for this course. Usually followed by CHEM 230. SC RP

CHEM 222La or Lb, Laboratory for Organic Chemistry I Christine DiMeglio

First term of an introductory laboratory sequence covering basic synthetic and analytic techniques in organic chemistry. Prerequisite: CHEM 117L or equivalent. After or concurrently with CHEM 124 or 220. SC ½ Course cr

CHEM 223La or Lb, Laboratory for Organic Chemistry II Christine DiMeglio

Second term of an introductory laboratory sequence covering basic synthetic and analytic techniques in organic chemistry. Prerequisite: CHEM 222L. After or concurrently with CHEM 125, <221>, or 230. SC ½ Course cr

CHEM 226Lb, Intensive Advanced Chemistry Laboratory Christine DiMeglio,

Jonathan Parr

An intensive course in advanced organic chemistry laboratory technique intended to bring the student closer to independent research. Included are an independent laboratory project and presentation, introduction to library research, and training in the use of various analytical techniques. Offered subject to available laboratory space and sufficient enrollment. After CHEM <127L> or 223L. For enrollment procedures, contact the instructors. WR, SC RP

***CHEM 230a or b, Organic Chemistry of Biological Pathways** Staff

Chemical principles that underpin living systems explored through organic chemistry. Examples drawn from chemistry, medicine, biotechnology, and the emergent field of chemical biology. Key conceptual frameworks such as structure, function, and mechanism and their relations to the chemistry of proteins, nucleic acids, selected drugs, and other topics in the life sciences. Mechanistic principles used to examine enzymatic processes and the role of cofactors in the context of primary metabolism and natural products biosynthesis. After CHEM 220. SC

CHEM 251Lb, Inorganic Chemistry Laboratory Jonathan Parr

Introductory laboratory course covering synthetic and physical characterization techniques in inorganic chemistry. Prerequisite: CHEM 119L, <126L>, or 222L; concurrently with or after CHEM 252. SC ½ Course cr

CHEM 252b, Introductory Inorganic Chemistry Jonathan Parr

The “vigor and diversity” of modern inorganic chemistry are presented; an introduction to the fundamental concepts of solid-state chemistry, coordination chemistry, and organometallic chemistry. Prerequisite: college-level general chemistry. After or concurrently with CHEM 220 or by permission of instructor. May not be taken after CHEM 450, 452, or 457. SC RP

CHEM 328a, Physical Chemistry with Applications in the Biological Sciences

Elsa Yan

Physical chemical principles and their application to the chemical and life sciences. Thermodynamics, chemical and biochemical kinetics, solution physical chemistry, electrochemistry, and membrane equilibria. CHEM 332 is preferred for Chemistry majors. Prerequisites: introductory physics, college-level general chemistry, and single-variable calculus, or permission of instructor; MATH 120 or ENAS 151 suggested. May not be taken after CHEM 332. QR, SC RP

CHEM 330La, Laboratory for Physical Chemistry I Patrick Vaccaro, N. Ganapathi
Introduction to the tools and techniques of modern experimental physical chemistry, including analog/digital electronics, quantitative measurements of basic thermodynamic properties, and nuclear magnetic resonance spectrometry. After or concurrently with CHEM 328 or 332. Meets on Wednesday, Thursday, and Friday from 1:30 to 2:20 for the first week of the term. SC RP

[CHEM 331Lb, Laboratory for Physical Chemistry II]

***CHEM 332a, Physical Chemistry with Applications in the Physical Sciences I**

R. James Cross, Jr.

A comprehensive survey of modern physical and theoretical chemistry, including topics drawn from thermodynamics, chemical equilibrium, electrochemistry, and kinetics. Prerequisites: introductory physics, college-level general chemistry, and single-variable calculus, or permission of instructor; MATH 120 or ENAS 151 suggested. May not be taken after CHEM 328. QR, SC RP

***CHEM 332b, Physical Chemistry with Applications in the Physical Sciences II**

Patrick Vaccaro

Continuation of CHEM 332, including topics drawn from quantum mechanics, atomic/molecular structure, spectroscopy, and statistical thermodynamics. Prerequisite: CHEM 328 or 332, or permission of instructor. Recommended preparation: familiarity with differential equations. QR, SC RP

ADVANCED COURSES

***CHEM 400a, Current Chemistry Seminar** Jonathan Parr, Christine DiMeglio

A seminar-based discussion of current avenues in chemical research. Oral presentations by invited external speakers.

***CHEM 418a^G, Advanced Organic Chemistry I** William Jorgensen

Concise overview of structure, properties, thermodynamics, kinetics, reactions, and intermolecular interactions for organic molecular systems. Prerequisites: two terms of organic chemistry, CHEM 328 or 332, and CHEM 333. SC RP

CHEM 421a^G, Chemical Biology David Spiegel and staff

A one-term introduction to the origins and emerging frontiers of chemical biology. Discussion of the key molecular building blocks of biological systems and the history of macromolecular research in chemistry. Prerequisites: two terms of organic chemistry, and MCDB 120 or equivalent. SC RP

CHEM 423b^G, Synthetic Methods in Organic Chemistry Jonathan Ellman

A discussion of modern methods. Functional group manipulation, synthesis and functionalization of stereodefined double bonds, carbonyl addition chemistry, and synthetic designs. Normally taken only by students with a special interest in organic synthesis; for others, CHEM 418 is more appropriate. Prerequisite: two terms of organic chemistry or permission of instructor. SC RP

CHEM 425b⁶, Spectroscopic Methods of Structure Determination Martin Saunders
Applications of NMR, ESR, infrared, UV, visible, and mass spectroscopy to chemical problems concerning structures and reactions. X-ray crystallography. Computer simulation of NMR spectra. Prerequisites: two terms of organic chemistry and CHEM 333. SC RP

CHEM 430b⁶, Statistical Mechanics and Thermodynamics Victor Batista
The fundamentals of statistical mechanics 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; and Monte Carlo and molecular dynamics simulations. Prerequisites: CHEM 328 or 332, and CHEM 333, or permission of instructor. QR, SC RP

CHEM 437a, Chemistry of Isotopes Martin Saunders
Advanced applications of isotopes to chemical problems and the theory associated with them, including kinetic and equilibrium isotope effects, tracer applications, and dating. RP

CHEM 440a⁶, Molecules and Radiation I Kurt Zilm
An integrated treatment of quantum mechanics and modern spectroscopy. Basic wave and matrix mechanics, perturbation theory, angular momentum, group theory, time-dependent quantum mechanics, selection rules, coherent evolution in two-level systems, line shapes, Bloch equations, and NMR spectroscopy. Prerequisite: CHEM 333 or permission of instructor. QR, SC RP

CHEM 442b⁶, Molecules and Radiation II Mark Johnson
An extension of the material covered in CHEM 440 to atomic and molecular spectroscopy, including rotational, vibrational, and electronic spectroscopy, as well as an introduction to laser spectroscopy. Prerequisite: CHEM 440 or permission of instructor. QR, SC RP

[CHEM 450b⁶, Physical Methods in Inorganic Chemistry]

CHEM 452a⁶, Organometallic Chemistry Robert Crabtree
A survey of the organometallic chemistry of the transition elements and of homogeneous catalysis. May be taken independently of CHEM 450. Prerequisites: two terms of organic chemistry and CHEM 252. SC RP

CHEM 457a⁶, Modern Coordination Chemistry John Faller
The principles of modern inorganic chemistry. Main group and transition element chemistry: reactions, bonding, structure, and spectra. Prerequisite: CHEM 252 or permission of instructor. SC RP

CHEM 470a⁶, Introductory Quantum Chemistry Victor Batista
The elements of quantum mechanics developed and illustrated with applications in chemistry and chemical physics. Prerequisites: CHEM 333, and MATH 120 or ENAS 151. QR, SC RP

***CHEM 490a or b, Independent Research in Chemistry** Jonathan Parr
After consulting with the director of undergraduate studies no later than midterm of the preceding term, students choose to work on individual laboratory or theoretical research problems under the direction of a faculty member in Chemistry or a closely related field.

Students can familiarize themselves with ongoing research in the department by reviewing the departmental Web site (chem.yale.edu) and by attending an evening seminar series presented during the first weeks of the fall term. Specific dates and times of the evening seminars may be obtained in the department office, 1 SCL. Independent work may also encompass research in chemical education. Occasional required seminars address laboratory safety, literature searching, research methods, and scientific ethics. Students present their research results in a formal seminar series late in the spring term. At least ten hours of research weekly. May be taken multiple times for credit. Enrollment limited to junior and senior Chemistry majors except with permission of the course instructor.

To enroll, the student must complete a CHEM 490 registration form each term (available in the department office, 1 SCL), have it signed by both the intended faculty adviser and the course instructor, and submit it to the department office for approval by the director of undergraduate studies prior to the date on which the student's schedule is due. All students taking CHEM 490 must also consult with the director of undergraduate studies for approval of their projects by midterm of the term preceding enrollment in CHEM 490. RP

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Graduate courses in chemistry that may be of particular interest to undergraduates are listed in the online bulletin of the Graduate School. Information about them is available in the office of the director of undergraduate studies. Enrollment requires permission of both the director of graduate studies and the instructor.

Child Study Center

The Child Study Center is a department of the School of Medicine that works to further understanding of the problems of children and families. Among the disciplines involved in this work are child psychiatry, pediatrics, genetics, neurobiology, epidemiology, psychology, nursing, social work, and social policy. The mission of the Center is to understand child development, social, behavioral, and emotional adjustment, and psychiatric disorders, and to help children and families in need of care. More information is available on the Web at medicine.yale.edu/childstudy/index.aspx.

***CHLD 125b/EDST 125b/PSYC 125b, Child Development** Nancy Close,
Carla Horwitz

The reading of selected material with supervised participant-observer experience in infant programs, a day-care and kindergarten center, or a family day-care program. Regularly scheduled seminar discussions emphasize both theory and practice. An assumption of the course is that it is not possible to understand children – their behavior and development – without understanding their parents and the relationship between child and parents. The focus is on infancy as well as early childhood. Enrollment limited to juniors and seniors. WR, SO

***CHLD 126a or b/EDST 191a or b, Clinical Child Development and Assessment of Young Children** Nancy Close

For description see under Education Studies.

***CHLD 127a/EDST 127a/PSYC 127a, Early Childhood Education: Implications of Curriculum and Policy** Carla Horwitz

Development of curricula for preschool children—infants, toddlers, three-, four-, and five-year-olds—in light of current research and child development theory. WR, SO RP

***CHLD 128b/EDST 128b/PSYC 128b, Language, Literacy, and Play** Nancy Close, Carla Horwitz

The complicated role of play in the development of language and literacy skills among preschool-aged children. Topics include social-emotional, cross-cultural, cognitive, and communicative aspects of play. WR, SO RP

***CHLD 350a or b/PSYC 350a or b, Autism and Related Disorders** James McPartland, Fred Volkmar

Weekly seminar focusing on autism and related disorders of socialization. A series of lectures on topics in etiology, diagnosis and assessment, treatment and advocacy, and social neuroscience methods; topics cover infancy through adulthood. Supervised experience in the form of placement in a school, residence, or treatment setting for individuals with autism spectrum disorders. Details about admission to the course are explained at the first course meeting. Prerequisite: an introductory psychology course. SO

Chinese

(See under East Asian Languages and Literatures and under Peking University–Yale University Joint Undergraduate Program.)

Chinese Studies

(See under East Asian Studies and under Peking University–Yale University Joint Undergraduate Program.)

Classics

Director of undergraduate studies: Emily Greenwood, Mo4 PH, 432-9457, emily.greenwood@yale.edu; www.yale.edu/classics

FACULTY OF THE DEPARTMENT OF CLASSICS

Professors Egbert Bakker, Victor Bers, Susanne Bobzien, Kirk Freudenburg (*Chair*), Emily Greenwood, Verity Harte, Donald Kagan, Diana Kleiner, Christina Kraus, Joseph Manning, John Matthews, William Metcalf (*Adjunct*)

Associate Professor Millette Gaifman

Assistant Professors Joshua Billings, John Fisher, Pauline LeVen, Irene Peirano, Barbara Sattler

Lecturers Ann Ellis Hanson, Susan Matheson, Timothy Robinson, Joseph Solodow

The Department of Classics offers a major in Classics, a major in Classical Civilization, and (in conjunction with the Hellenic Studies program) a major in Ancient and Modern Greek. The diversity of subject matter covered by these majors makes classics an excellent partner in interdepartmental major programs.

THE MAJOR IN CLASSICS

The major in Classics is primarily a liberal arts major. It provides an excellent general education in a comprehensive humanistic discipline; it can also give the background necessary for those who wish to do professional graduate work. Students develop a mastery of the classical languages, become acquainted with important periods and major authors in Greek and Roman literature, and develop powers of critical analysis, appreciation of literary values, and understanding of the ancient cultural traditions that constitute the foundation of Western civilization. Courses in other literatures, in history, and in philosophy are strongly recommended for students enrolled in the Classics major.

The candidate for the Classics major may elect either the standard or the intensive major. In both these majors the department recognizes two kinds of concentration, one aiming at knowledge of both ancient literatures, the other concentrating on either Greek or Latin literature. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

The standard major A standard major in both literatures requires no fewer than ten term courses. These include six term courses in Greek and Latin at the level of 390 or above, surveys of the history of Greek and Latin literature in translation (CLCV 254 and 255), and two additional courses in related areas of history and art. The language courses must include GREK 390 or LATN 390 and five term courses at the level of 400 or above. One of the additional courses in a related field must be a term course in ancient history, and the other must be a term course in ancient history, classical art and archaeology, or classical civilization.

Students majoring in one literature (Greek or Latin) are required to take no fewer than ten term courses. These include six term courses in that literature at the level of 390 or above, surveys of the history of Greek and Latin literature in translation (CLCV 254 and 255), a term course in ancient history related to the chosen literature, and an additional term course in ancient history, classical art and archaeology, or classical civilization. The language courses must include GREK 390 or LATN 390 and at least five term courses at the level of 400 or above. Students are encouraged to do some work in the second language and may substitute two terms at the intermediate level (131 and 141) in the second language for two 400-level courses in the major literature.

Senior requirement At the end of the senior year the student majoring in both literatures takes a comprehensive examination in the history of Greek and Latin literature and in translation of both languages; the student majoring in one literature takes a senior departmental examination in the history of the literature of the major and in translation of that literature.

The intensive major Students who desire a larger measure of independence than the standard major offers may elect the intensive major. In addition to fulfilling the requirements of the standard major (in both literatures, in Greek, or in Latin), students in the

intensive major devote two terms in the senior year to writing an essay (CLSS 490 and 491) under the regular guidance of a faculty adviser. A brief prospectus of the essay must be submitted preferably at the end of the junior year and in no case later than October 15 of the senior year. The candidate must submit two copies of the senior essay to the director of undergraduate studies no later than April 1 of the senior year.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 10 term courses

Specific courses required GREK 390 or LATN 390; CLCV 254 and 255

Distribution of courses *Two literatures*—6 courses in both langs at level 390 or above, with at least 5 at 400 level or above; 1 course in ancient hist; 1 addtl course in ancient hist, classical art and archaeology, or classical civ; *One literature*—6 courses in lit at level 390 or above, with at least 5 at 400 level or above; 1 course in ancient hist related to lit of major; 1 addtl course in ancient hist, classical art and archaeology, or classical civ

Substitution permitted *One literature*—2 courses in the other lit numbered 131 or higher for 2 courses in major lit at 400 level

Senior requirement Senior dept exam in hist and translation of Greek and Latin lit (*two lits*) or major lit (*one lit*)

Intensive major Senior essay (CLSS 490, 491) in addition to above

THE MAJOR IN CLASSICAL CIVILIZATION

The major in Classical Civilization is designed to offer students an opportunity to study an entire Western civilization in its many diverse but related aspects. The literature, history, philosophy, religion, art, archaeology, and other aspects of Greek and Roman antiquity from the earliest beginnings in Greece to the Middle Ages are studied for their intrinsic artistic value, their historical significance, and their power to illuminate problems confronting members of contemporary society. Ancient texts are studied primarily in translation, though under the guidance of instructors who know ancient literature in the original languages.

Candidates for the major complete at least twelve term courses (including the senior seminar) in Classics and related departments. Of these, two must be in ancient history and/or classical art and archaeology; and two must be in Greek or Latin, or both, numbered 131 or higher (the latter courses should be completed by the end of the junior year). Students must also take two survey courses, CLCV 254 and 255. It is strongly recommended that candidates elect one course each in the general areas of ancient epic, drama, philosophy, and Roman civilization. Candidates for the major are encouraged to take related courses in other departments. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Senior requirement Students devote both terms of the senior year to a significant project of original research, usually an essay, under the guidance of a faculty adviser (CLCV 450, 451). A brief prospectus of the project must be submitted to the director of undergraduate studies preferably at the end of the junior year and in no case later than October 15 of the

senior year. The completed project must be submitted to the department no later than April 1 of the senior year. If the student has written an essay, two copies are required.

Programs for all majors must be approved by the director of undergraduate studies.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl two-term senior sem)

Specific courses required CLCV 254, 255

Distribution of courses 2 courses in ancient hist and/or classical art and archaeology;
2 courses in Greek or Latin (or both) numbered 131 or higher

Senior requirement Senior project (CLCV 450, 451)

THE MAJOR IN ANCIENT AND MODERN GREEK

The major in Ancient and Modern Greek offers students an opportunity to integrate the study of postclassical Greek language, history, and culture with the departmental program in ancient Greek and classical civilization. The major covers Hellenic civilization from the Bronze Age to the modern day, and traces the development of the language and the culture across traditionally drawn boundaries. The study of both ancient and modern Greek allows the student to appreciate how familiarity with one enriches understanding of the other, and to chart the development of a language which has one of the oldest continuous written traditions in the world. The literature, history, philosophy, religion, and art of the ancient Greek and Greco-Roman worlds are studied both as ends in themselves and also as a foundation for appreciating later (medieval, Ottoman, and modern) developments in these areas. Students are encouraged to develop a sense of the continuity of Greek language and culture, and an understanding of how Byzantine and modern forms relate to their ancient forebears.

The standard major The major in Ancient and Modern Greek requires at least ten term courses. These include four term courses at the level of 390 or above in ancient Greek, surveys of the history of Greek and Latin literature in translation (CLCV 254 and 255), and one term course in ancient Greek history. The language courses should include GREK 390. Candidates are encouraged to take a wide range of courses in the areas of ancient philosophy, religion, art, and architecture. In addition, no fewer than two term courses in modern Greek must be elected at the intermediate level (MGRK 130, 140) or above, as well as at least one additional term course in the history, art history, literature, or culture of the Greek-speaking Balkans or the Hellenic diaspora in the medieval, Ottoman, or modern period. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Senior requirement At the end of the senior year the student takes a comprehensive examination in the history of Greek literature.

The intensive major Students who desire a larger measure of independence than the standard major offers may elect the intensive major. In addition to fulfilling the requirements of the standard major, students in the intensive major devote two terms in the senior year

to writing an essay (CLSS 490 and 491) under the regular guidance of a faculty member. A brief prospectus of the essay must be submitted preferably at the end of the junior year and in no case later than October 15 of the senior year. The candidate must submit two copies of the senior essay to the director of undergraduate studies no later than April 1 of the senior year.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 10 term courses

Specific courses required GREK 390, CLCV 254, 255

Distribution of courses 4 term courses in ancient Greek numbered 390 or higher; 1 term course in ancient Greek hist; 2 term courses in modern Greek numbered 130 or higher; 1 term course in postclassical Greek hist or culture

Senior requirement Senior dept exam

Intensive major Senior essay (CLSS 490, 491) in addition to above

PLACEMENT POLICY

Students are encouraged to take courses as advanced as they can handle with profit and pleasure. The department, recognizing the great variety of preparation in ancient languages, wishes to accommodate incoming students in as flexible a manner as possible. Students who plan either to begin or to continue the study of Greek or Latin should consult members of the departmental faculty as soon as practicable.

Students who have had the equivalent of two years of college-level instruction may try a 400-level course. It is possible to take GREK 141 or LATN 141 after a 400-level course, or to be admitted to a 400-level course after completion of GREK 131 or LATN 131. Freshmen are encouraged to take advantage of the initial course selection period before course schedules are due to find the most appropriate course.

GREEK

GREK 110a, Beginning Greek: The Elements of Greek Grammar Timothy Robinson and staff

Introduction to ancient Greek. Emphasis on morphology and syntax within a structured program of readings and exercises. Prepares for GREK 120. No prior knowledge of Greek assumed. L1 RP 1½ Course cr

GREK 120b, Beginning Greek: Review of Grammar and Selected Readings

Timothy Robinson and staff

Continuation of GREK 110. Emphasis on consolidating grammar and on readings from Greek authors. The sequence GREK 110, 120 prepares for 131 or 141. Prerequisite: GREK 110 or equivalent. L2 RP 1½ Course cr

GREK 131a, Greek Prose: An Introduction Staff

Close reading of selections from classical Greek prose with review of grammar. Counts as L4 if taken after GREK 141 or equivalent. L3

GREK 141b, Homer: An Introduction Pauline LeVen

A first approach to reading Homeric poetry in Greek. Selected books of the *Iliad* or the *Odyssey*. Counts as L4 if taken after GREK 131 or equivalent. L3

GREK 390a^c, Greek Syntax and Stylistics Victor Bers

A review of accidence and syntax, elementary composition, and analysis of Greek prose styles of the fifth and fourth centuries B.C., including a comparison of “prosaic” and “poetic” syntax. Prerequisite: previous familiarity with some Greek prose beyond the elementary level, or permission of instructor. L5, HU

***GREK 405b^c, Daily Life in the Papyri** Joseph Manning

Introduction to the language and content of Greek papyri from Egypt. Discussion of forms, readership, and purposes of the texts. Introduction to scripts and to specialist, legal, and colloquial versions of ancient Greek. L5

GREK 407a, Plato’s *Phaedrus* Joshua Billings

Close reading and discussion of Plato’s *Phaedrus*, with attention to style, rhetoric, and dialogic form. A bridge course between L4 and other L5 courses. L5

GREK 414b, Hesiod and the Homeric Hymns Pauline LeVen

Translation and study of selections from Hesiod’s *Theogony* and *Works and Days* and from the Homeric hymns, with attention to poetics, myths, and connections with Homeric epic. L5, HU

***GREK 460a, Greek Lyric Poetry: Pindar and Bacchylides** Egbert Bakker

Close reading of the lyric poetry of Pindar and Bacchylides. Focus on victory odes (*epinicians*), with additional readings from paeans and dithyrambs. Discussion of composition, themes, and poetics, as well as issues of genre and performance. The poems’ relations to contemporary religious and social practices. Introduction to a range of modern critical approaches. L5, HU

***GREK 494a or b, Independent Tutorial in Greek Language and Literature**

Emily Greenwood

For students with advanced Greek language skills who wish to engage in concentrated reading and research on material not otherwise offered in courses. The work should result in a term paper or examination. A limited number of these courses may be offered toward the major.

LATIN**LATN 110a, Beginning Latin: The Elements of Latin Grammar** Timothy Robinson and staff

Introduction to Latin. Emphasis on morphology and syntax within a structured program of readings and exercises. Prepares for LATN 120. No prior knowledge of Latin assumed. Preregistration, which is required, takes place at the Academic Fair. See the *Calendar for the Opening Days* or the departmental Web site for details about preregistration. L1 RP 1½ Course cr

LATN 120b, Beginning Latin: Review of Grammar and Selected Readings

Timothy Robinson and staff

Continuation of LATN 110. Emphasis on consolidating grammar and on readings from Latin authors. The sequence LATN 110, 120 prepares for 131 or 141. Prerequisite: LATN 110 or equivalent. L2 RP 1½ Course cr

***LATN 125b, Intensive Beginning Latin** Timothy Robinson

An introduction to Latin for students with no prior knowledge of the language. Readings from Latin authors supplement intensive instruction in grammar and vocabulary. Prepares for LATN 131 or 141. Not open to students who have taken LATN 110, 120. L1–L2 RP 2 Course cr

LATN 131a, Latin Prose: An Introduction Staff

Close reading of a major work of classical prose; review of grammar as needed. Counts as L4 if taken after LATN 141 or equivalent. L3

LATN 141b, Latin Poetry: An Introduction Staff

The course is devoted to Vergil. Counts as L4 if taken after LATN 131 or equivalent. L3

LATN 390b^c, Latin Syntax and Stylistics Joseph Solodow

A systematic review of syntax and an introduction to Latin style. Selections from Latin prose authors are read and analyzed, and students compose short pieces of Latin prose. For students with some experience reading Latin literature who desire a better foundation in forms, syntax, idiom, and style. L5, HU

LATN 412a, Roman Myth and Pastoral Joseph Solodow

A perspective on the lengthy period of civil war during the last years of the Roman Republic, with emphasis on literary responses rather than the historical events themselves. On the one hand, a turn to Rome's earliest legendary history (Livy, *History*, Book I); on the other, a flight to the imaginary realm of pastoral (Virgil, *Ecloques*). A bridge course between L4 and other L5 courses. L5

LATN 421a, Vergil's *Aeneid Irene Peirano

An in-depth study of Vergil's *Aeneid* within its political context. L5

***LATN 455b, Martial** Irene Peirano

A study of Martial's epigrams. Topics include poetics and the book, sex and gender, the city of Rome, and Martial's role in the history of the epigrammatic genre. L5, HU

LATN 460b^c, Petronius Kirk Freudenburg

Close reading and discussion of the Latin text of Petronius's *Satyricon*, with attention to grammar, syntax, and style, as well as to larger issues of literature and culture in Neronian Rome. L5, HU

***LATN 494a or b, Independent Tutorial in Latin Language and Literature**

Emily Greenwood

For students with advanced Latin language skills who wish to engage in concentrated reading and research on material not otherwise offered in courses. The work should result in a term paper or examination. A limited number of these courses may be offered toward the major.

CLASSICS

***CLSS 404a^G/PHIL 401a^G, Plato's *Laws*, Book X** Verity Harte, Raphael Woolf
For description see under Philosophy.

***CLSS 444a^G/HIST 201Ja, Documents of Roman History** William Metcalf
An introduction to principal documents, preserved primarily on stone or in metal, that bear on Roman history from the fifth century B.C. to the fourth century A.D. Selected documents are either themselves important (e.g., the Twelve Tables) or are paradigmatic for occurrences that are extensive in time and space (e.g., imperial rescripts, city and colonial charters). Documents are in either Latin or Greek, and are accompanied by English translations. HU

***CLSS 445a or b/HIST 202Ja or Jb, Numismatics** William Metcalf
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. Prerequisite: proficiency in Greek and Latin. HU

***CLSS 490a and 491b, Senior Essay for the Intensive Major in Classics**
Emily Greenwood

Qualified students may write a senior essay in ancient literature or classical archaeology under the guidance of a faculty adviser. A written statement of purpose must be submitted to the director of undergraduate studies.

CLASSICAL CIVILIZATION

***CLCV 002a/HUMS 095a, The Romans: A Cultural Introduction** Kirk Freudenburg
An introduction to ancient Roman culture, with special focus on the lives of common citizens, non-elites, foreigners, freedmen, and slaves. Topics include family life, the ideology of empire, religious life, spectacles of power, dining, entertainments, bathing, travel, satire, and the law. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

***CLCV 108b/HUMS 260b, Death in Greek Tragedy** Joshua Billings
Greek tragedy and its reflections in drama and philosophy, focusing on deaths represented in tragedy and the question of the death of tragedy. Definitions of "the tragic" and applications to modernity. Close study of extant Greek texts alongside adaptations (Seneca, Racine, Goethe, Brecht, Anne Carson) and theoretical texts (Aristotle, Hegel, Nietzsche, George Steiner, Peter Szondi). HU

***CLCV 113b/HUMS 434b/NELC 230b, Mesopotamia's Literary Legacy**
Kathryn Slanski

For description see under Humanities.

CLCV 115a/HUMS 232a, Classical Mythologies Timothy Robinson and staff
An introduction to myths and their cultural context, with emphasis on Greek mythology. The wider application of myth to human concerns such as creation, gender, identity, and death. Methods of modern myth analysis applied to ancient, medieval, and modern mythology. HU

CLCV 125a/PHIL 125a, Introduction to Ancient Philosophy Verity Harte

For description see under Philosophy.

CLCV 160b/ARCG 243b/HSAR 243b, Greek Art and Architecture Milette Gaifman

For description see under History of Art.

CLCV 170a/ARCG 170a/HSAR 250a, Roman Art: Empire, Identity, and Society

Diana Kleiner

For description see under History of Art.

CLCV 205a/HIST 205a, Introduction to Ancient Greek History Donald Kagan

An introductory course in Greek history tracing the development of Greek civilization as manifested in political, intellectual, and creative achievements from the Bronze Age to the end of the classical period. Students read original sources in translation as well as the works of modern scholars. HU

CLCV 206a/HIST 217a, Introduction to Roman History: The Republic

William Metcalf and staff

The development of Rome from a small village in the Archaic period to the head of an empire by the death of Caesar in 44 B.C. Readings from primary sources with emphasis on how the ancients perceived and wrote history, as well as engagement with epigraphic and archaeological material. HU

CLCV 207b/HIST 218b, The Roman Empire John Matthews

The history of the Roman Empire from its establishment by Augustus to the reign of Justinian. Attention to social, intellectual, and religious changes, as well as to the framework of historical events within which these changes took place, and to the processes by which the Roman Empire was replaced by the institutions of the Western Middle Ages and the Byzantine Empire. HU

***CLCV 210a/HUMS 273a/LITR 150a/MGRK 217a, Reception of Odysseus in Literature and Drama** George Syrimis

For description see under Hellenic Studies.

***CLCV 214b/HUMS 278b/LITR 225b/MGRK 202b/WGSS 337b, The Poetry of C. P. Cavafy** George Syrimis

For description see under Hellenic Studies.

***CLCV 238b/HUMS 269b/LITR 155b, Classics in Africa and the Black Diaspora**
Emily Greenwood

The reception and appropriation of Greco-Roman classics in Africa and the black diaspora during the twentieth century. The same classical canon that had been used to furnish arguments for colonialism, imperialism, and racism read by black writers and artists in ways that subverted those arguments. Works include drama from Nigeria and South Africa, Caribbean poetry and autobiography, novels by Ralph Ellison and Toni Morrison, and the Odysseus collages of Romare Bearden. HU

CLCV 254a/LITR 158a, Introduction to Greek Literature Victor Bers

Survey of the literature of ancient Greece from the Archaic period to the Second Sophistic. Readings and discussion in English. HU Tr

CLCV 255b/LITR 159b, Introduction to Latin Literature Christina Kraus

A cultural and intellectual history of classical Rome through readings of its surviving literature, in translation. Topics include the self-invention of Roman literature and its negotiation with literary competitors; the relationship between literature and power in the late Republic; women and writing; imperial expansion and the struggles with traditional values; theatrical spectacle, games, and the image of the barbarian. HU Tr

***CLCV 265a/HUMS 465a/LITR 153a, Contemporary Reception of Greek and Roman Classics** Emily Greenwood

For description see under Humanities.

***CLCV 266a/HSAR 443a/HUMS 466a, Classicism and Modernity** Milette Gaifman, Tim Barringer

For description see under Humanities.

***CLCV 309a, Ancient Law** Joseph Manning, James Whitman

Ancient law and society from the Bronze Age to the early Middle Ages, including material from the ancient Near East, Egypt, Greece, Rome, Islam, and early medieval Germanic systems. Perspectives are primarily anthropological and sociological. Enrollment limited to juniors and seniors, or with permission of instructor. SO

***CLCV 406a/HIST 200Ja^c, Athenian Imperial Democracy** Donald Kagan

A history of Greece in the years between the Persian invasion and the Peloponnesian War, with emphasis on Athens. Prerequisite: CLCV 205 or equivalent. HU

***CLCV 407b/HIST 207Jb, Thucydides and the Peloponnesian War** Donald Kagan

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. Prerequisite: CLCV 205 or equivalent. HU

***CLCV 450a and 451b, Senior Project for the Major in Classical Civilization**

Emily Greenwood

An appropriate instructor is assigned to each student by the director of undergraduate studies in consultation with the student. In the first term, selected readings compensate for individual deficiencies and help the student achieve a balanced overview. In the second term, each student explores in depth a subject of personal interest in literature, archaeology, art, philosophy, or history.

***CLCV 494a or b, Independent Tutorial in Classical Civilization** Emily Greenwood

For students who wish to pursue a specialized subject in classical civilization not otherwise covered in courses. Students are expected to provide a detailed reading list and a clear outline of their project early in the term. The work should result in a term paper or examination. A limited number of these courses may be offered toward the major. Readings in translation.

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Various graduate seminars are open to juniors and seniors with the qualifications expected of graduate students, i.e., proficiency in the pertinent ancient and modern languages.

Descriptions of the courses are available from the director of undergraduate studies. Permission is required of the instructor, the director of undergraduate studies, and the director of graduate studies.

Cognitive Science

Director of undergraduate studies: to be announced; www.yale.edu/cogsci

FACULTY ASSOCIATED WITH THE PROGRAM IN COGNITIVE SCIENCE

Professors Woo-kyoung Ahn (*Psychology*), Stephen Anderson (*Linguistics*), Amy Arnsten (*School of Medicine*), John Bargh (*Psychology*), Paul Bloom (*Psychology*), Hal Blumenfeld (*School of Medicine*), Marvin Chun (*Psychology*), Michael Della Rocca (*Philosophy*), Ravi Dhar (*School of Management*), Julie Dorsey (*Computer Science*), Carol Fowler (*Adjunct*) (*Psychology*), Robert Frank (*Linguistics*), David Gelernter (*Computer Science*), Tamar Gendler (*Philosophy*), Laurence Horn (*Linguistics*), Marcia Johnson (*Psychology*), Dan Kahan (*Law School*), Frank Keil (*Psychology, Linguistics*), Lawrence Marks (*Psychology*), Gregory McCarthy (*Psychology*), Drew McDermott (*Computer Science*), Nathan Novemsky (*School of Management*), Rhea Paul (*School of Medicine*), Kenneth Pugh (*School of Medicine*), Ian Quinn (*Music*), Holly Rushmeier (*Computer Science*), Brian Scholl (*Psychology*), Sun-Joo Shin (*Philosophy*), Zoltán Szabó (*Philosophy*), Fred Volkmar (*School of Medicine*), Xiao-Jing Wang (*School of Medicine*), David Watts (*Anthropology*), Bruce Wexler (*School of Medicine*), Karen Wynn (*Psychology*), Raffaella Zanuttini (*Linguistics*), Steven Zucker (*Computer Science*)

Associate Professors Keith Chen (*School of Management*), Jeremy Gray (*Psychology*), Joshua Knobe (*Philosophy*), Daeyeol Lee (*School of Medicine*), James Mazer (*School of Medicine*), Kevin Pelphey (*School of Medicine*), Maria Piñango (*Linguistics*), Laurie Santos (*Psychology*), Brian Scassellati (*Computer Science*)

Assistant Professors Daylian Cain (*School of Management*), June Gruber (*Psychology*), Gaja Jarosz (*Linguistics*), Hedy Kober (*School of Medicine*), John Morrell (*Mechanical Engineering*), George Newman (*School of Management*), Kristina Olson (*Psychology*), Ève Poudrier (*Music*), Joseph Simmons (*School of Management*)

Lecturer Eric Mandelbaum (*Philosophy*)

Cognitive science explores the nature of cognitive processes such as perception, reasoning, memory, attention, language, decision making, imagery, motor control, and problem solving. The goal of cognitive science, stated simply, is to understand how the mind works. Cognitive science is an inherently interdisciplinary endeavor, drawing on tools and ideas from fields such as psychology, computer science, linguistics, philosophy, and neuroscience. Approaches include empirical studies of the ontogenetic and phylogenetic development of cognitive abilities, experimental work on cognitive processing in adults, attempts to understand perception and cognition based on patterns of breakdown in pathology, computational and robotic research that strives to simulate aspects of cognition

and behavior, neuroscientific investigations of the neural bases of cognition using neural recording and brain scanning, and the development of philosophical theories of the nature of mind.

Introductory courses An introductory survey course, CGSC 110, is normally taken by the end of the fall term of the sophomore year and prior to admission to the major. An introductory survey course in psychology, linguistics, computer science, neuroscience, or philosophy should also be taken by the end of the fall term of the sophomore year.

Requirements of the major Fifteen course credits are required for the major, including the two introductory courses and the senior colloquium and project. The remaining twelve term courses are chosen from an approved list that includes courses in psychology, linguistics, computer science, neuroscience, and philosophy bearing on the study of the mind and its relation to the brain. Beyond these core areas, the program also draws on relevant courses in anthropology, art, biology, economics, and music. Majors take four courses in one core field, three in another, two in a third, and one in a fourth, with the remaining two courses selected (with the approval of the director of undergraduate studies) from courses relevant to the student's program in Cognitive Science. The particular selection of courses must be approved by the director of undergraduate studies in order to assure overall coherence and breadth. Courses taken Credit/D/Fail may not be counted toward the requirements of the major, except with permission of the director of undergraduate studies.

Specific programs will vary considerably depending on the student's choice of areas of concentration, as well as the offerings of participating departments from year to year. Themes that have structured course work in the major in recent years include irrationality, visual neuroscience, the self and moral cognition, language, cognition and the arts, and connecting the brain and behavior.

Senior requirement In the senior year, majors take the senior colloquium and project, CGSC 490 and 491. In the fall term students begin researching and writing a senior essay under the guidance of an appropriate faculty member in an area of cognitive science. In the spring term students complete the senior essay. Throughout the senior year, students meet regularly with one another and with the faculty in the context of this course to discuss current work in cognitive science and their own developing research projects.

Application to the major Students apply to enter the major at the end of the fall term of the sophomore year. Applications must be made in writing to the director of undergraduate studies no later than Friday, December 7, in 109 K. Applications must include both an official or unofficial transcript of work at Yale that lists fall-term 2012 courses and a brief statement of purpose, which serves to indicate academic interests and expected focus within the areas of the Cognitive Science major. Application forms and answers to frequently asked questions are available on line at www.yale.edu/cogsci. Applicants will be notified of decisions concerning admission to the major in January 2013.

REQUIREMENTS OF THE MAJOR

Prerequisites CGSC 110 or equivalent; 1 intro survey course in related discipline, as specified

Number of courses 15 course credits (incl prereqs and senior req)

Distribution of courses 4 term courses from one core field, 3 from another, 2 from a third, and 1 from a fourth; 2 addtl term courses from relevant area

Senior requirement CGSC 490, 491

INTRODUCTORY COURSES

CGSC 110a/PSYC 130a, Introduction to Cognitive Science Brian Scholl

An introduction to the interdisciplinary study of how the mind works. Discussion of tools, theories, and assumptions from psychology, computer science, neuroscience, linguistics, and philosophy. SO

***CGSC 201a/PSYC 120a, Brain and Thought: An Introduction to the Human Brain**

Amy Arnsten

An introduction to human brain anatomy, physiology, and function, designed for neuroscience-related majors but accessible to nonscience majors. Focus on basic concepts of neural function and on brain mechanisms underlying perception, memory, and higher cognitive abilities, and how these are altered in neurological and neuropsychiatric disorders. SC

CGSC 216b/LING 116b, Cognitive Science of Language Robert Frank

For description see under Linguistics.

CGSC 282b/PHIL 182b/PSYC 182b, Perspectives on Human Nature Joshua Knobe

For description see under Philosophy.

ADVANCED COURSES

CGSC 304a/PSYC 304a, The Mental Lives of Babies and Animals Karen Wynn

For description see under Psychology.

CGSC 343a/MUSI 343a, Music Cognition Ian Quinn

For description see under Music.

***CGSC 358b/MUSI 358b, Cognition of Musical Rhythm** Ève Poudrier

For description see under Music.

***CGSC 390a or b, Junior Seminar in Cognitive Science** Staff

Discussion of historically important papers in cognitive science. Topics are varied and reflect student interests. Some attention to planning for the senior project. Intended for juniors in the Cognitive Science major.

***CGSC 407b/PSYC 407b, Cognitive Science of Causality** Frank Keil

For description see under Psychology.

***CGSC 413b/PSYC 413b, Mind, Brain, and Society** Marvin Chun

For description see under Psychology.

***CGSC 425b/PSYC 425b^G, Social Perception** Brian Scholl

For description see under Psychology.

***CGSC 429a/PHIL 429a^G/PSYC 426a, Philosophical Implications of Social Psychology**

Tamar Gendler

For description see under Philosophy.

***CGSC 451a/EP&E 444a/PHIL 451a^c, Violence and Human Dignity** Stephen Darwall
For description see under Philosophy.

***CGSC 471a and 472b, Directed Research in Cognitive Science** Brian Scholl
Research projects for qualified students. The student must be supervised by a member of the Cognitive Science faculty, who sets the requirements and directs the research. To register, a student must submit a written plan of study to the director of undergraduate studies and the faculty supervisor. The normal minimum requirement is a written report of the completed research, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms.

***CGSC 473a and 474b, Directed Reading in Cognitive Science** Brian Scholl
Individual study for qualified students who wish to investigate an area of cognitive science not covered in regular courses. The student must be supervised by a member of the Cognitive Science faculty, who sets the requirements and meets regularly with the student. To register, a student must submit a written plan of study to the director of undergraduate studies and the faculty supervisor. The normal minimum requirement is a term paper, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms.

***CGSC 490a and 491b, Senior Colloquium and Project** Joshua Knobe, Robert Frank
A research colloquium leading to the selection of a topic for, and the completion of, the senior essay. Students attend regular colloquium presentations by outside scholars. By the end of the fall term students choose an essay topic. During the spring term presentations become more narrowly focused on students' senior projects. ½ Course cr per term Cr/year only

RELATED COURSES THAT MAY COUNT TOWARD THE MAJOR

***CHLD 350a or b/PSYC 350a or b, Autism and Related Disorders** James McPartland, Fred Volkmar
For description see under Child Study Center.

CPSC 201a or b, Introduction to Computer Science Dana Angluin [F], Holly Rushmeier [Sp]

CPSC 202a, Mathematical Tools for Computer Science Joan Feigenbaum

CPSC 470a^c, Artificial Intelligence Brian Scassellati

CPSC 475a^c/BENG 475a^c, Computational Vision and Biological Perception
Steven Zucker

For description see under Computer Science.

ECON 159a, Game Theory Benjamin Polak

ECON 351b, Mathematical Economics: Game Theory Johannes Horner

LING 117a^c/PSYC 137a, Language and Mind Maria Piñango
For description see under Linguistics.

LING 149b/PSYC 149b, Animal Communication and Human Language
Stephen Anderson
For description see under Linguistics.

LING 212b^G, Linguistic Change Stephen Anderson

LING 220a^G/PSYC 318a, General Phonetics Jelena Krivokapić
For description see under Linguistics.

LING 227a^G/PSYC 327a, Language and Computation Gaja Jarosz
For description see under Linguistics.

***LING 230b^G, Techniques in Neurolinguistics** Einar Mencl

LING 231b^G/PSYC 331b, Neurolinguistics Maria Piñango
For description see under Linguistics.

LING 232a^G, Introduction to Phonological Analysis Gaja Jarosz

LING 253a^G, Syntax I Raffaella Zanuttini

LING 254b^G, Syntax II Robert Frank

PHIL 115a, First-Order Logic Raul Saucedo

PHIL 267b^G, Mathematical Logic Sun-Joo Shin

PSYC 170a, Fundamentals of Neuroscience Thomas Brown

PSYC 230La, Research Methods in Human Neuroscience Gregory McCarthy

***PSYC 231a^G, Research Methods in Happiness** June Gruber

***PSYC 270b, Research Methods in Behavioral Neuroscience** Nelson Donegan

***PSYC 306a, Nature, Nurture, and Human Behavior** Julia Kim-Cohen

***PSYC 454b^G, Sensory Information Processing** Lawrence Marks

College Seminars in the Residential Colleges

Residential college seminars for the fall and spring terms are described on the Web at yalecollege.yale.edu/content/residential-college-seminar-program. The online listings contain course titles, descriptions, and prerequisites. Course syllabi are available on line at classesv2.yale.edu.

Students apply to college seminars before classes begin through an online tool at yalecollege.yale.edu/content/application-information or through a link in the online course description. Students may apply to a maximum of three college seminars in a given term; choices are not ranked by order of preference. Students may enroll in no more than two college seminars per term and may enroll in no more than four total during their time at Yale. Auditing is not permitted in college seminars.

Comparative Literature

The Comparative Literature department offers undergraduate courses under the rubric “The Literature Major,” and a graduate degree in Comparative Literature. For a listing of Yale College courses, see under The Literature Major.

Computer Science

Director of undergraduate studies: Stanley Eisenstat, 208 AKW, 432-1246,
stanley.eisenstat@yale.edu

FACULTY OF THE DEPARTMENT OF COMPUTER SCIENCE

Professors Dana Angluin, James Aspnes, Julie Dorsey, Stanley Eisenstat, Joan Feigenbaum, Michael Fischer, David Gelernter, Paul Hudak, Drew McDermott, Vladimir Rokhlin, Holly Rushmeier (*Chair*), Martin Schultz (*Emeritus*), Zhong Shao, Avi Silberschatz, Daniel Spielman, Steven Zucker

Associate Professors Brian Scassellati, Yang Richard Yang

Assistant Professors Daniel Abadi, Bryan Ford

Lecturer Brad Rosen

The Department of Computer Science offers both B.S. and B.A. degree programs, as well as combined majors with the Departments of Electrical Engineering (see Electrical Engineering and Computer Science), Mathematics (see Computer Science and Mathematics), and Psychology (see Computer Science and Psychology). Each major program not only provides a solid technical education but also allows students either to take a broad range of courses in other disciplines or to complete the requirements of a second major.

The Computer Science and combined major programs share a common core of five computer science courses. The first is CPSC 201, Introduction to Computer Science, a survey that demonstrates the breadth and depth of the field to students who have taken the equivalent of an introductory programming course. The remaining core courses cover discrete mathematics; data structures; systems programming and computer architecture; and algorithm analysis and design. Together these courses include the material that every major should know.

The core courses are supplemented by electives (and, for the joint majors, core courses in the other discipline) that offer great flexibility in tailoring a program to each student's interests. The capstone is the senior project, through which students experience the challenges and rewards of original research under the guidance of a faculty mentor.

Prospective majors are encouraged to discuss their programs with the director of undergraduate studies as early as possible.

Introductory courses The department offers a broad range of introductory courses to meet the needs of students with varying backgrounds and interests. With the exception of CPSC 201, none assumes previous knowledge of computers.

1. CPSC 079b examines the methods used to define shapes, materials, and lighting in computer-generated images. Students use a modeling/rendering system to create an animated video with rich visual effects. Proficiency in high school-level mathematics is assumed.
2. CPSC 112a or b teaches students majoring in any subject area how to program a computer and solve problems using the language Java. Students with previous programming experience should consider taking CPSC 201 instead.

3. CPSC 150a explores how some of the key ideas in computer science have affected philosophy of mind, cognitivism, connectionism, and related areas. This humanities-style course has significant readings and a paper, and satisfies the writing and the humanities and arts distributional requirements.
4. CPSC 151b studies the history of the graphical user interface in an attempt to guess its future. This course also satisfies the writing distributional requirement.
5. CPSC 183a explores the myriad ways that law and technology intersect, with a special focus on the role of cyberspace. This course satisfies the social science distributional requirement.
6. CPSC 201a or b surveys the field of computer science, including systems (computers and their languages) and theory (algorithms, complexity, and computability). Students with sufficient programming experience may elect CPSC 201 without taking CPSC 112. (These courses meet at the same time so that students are easily able to change levels if necessary.)
7. CPSC 202a presents the formal methods of reasoning and the concepts of discrete mathematics and linear algebra used in computer science and related disciplines.

Requirements of the major The B.S. and the B.A. degree programs have the same required core courses: CPSC 201; CPSC 202a or MATH 244a; CPSC 223b, 323a, 365b, and 490. The B.S. degree program requires six additional intermediate or advanced courses in Computer Science, for a total of twelve; the B.A. degree program, four, for a total of ten. CPSC 480 and 490 may not be counted toward these electives. All courses in the major must be taken for a letter grade.

Students majoring in Computer Science are advised to complete CPSC 201 and 223 by the end of the sophomore year.

For students who already know how to program, typical B.S. programs starting in the freshman and sophomore years are:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CPSC 201a	CPSC 202a CPSC 323a	Two electives	CPSC 490a
CPSC 223b	CPSC 365b One elective	Two electives	One elective

and

<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CPSC 201a CPSC 202a	CPSC 323a One elective	CPSC 490a Two electives
CPSC 223b	CPSC 365b One elective	Two electives

For typical B.A. programs, two of the electives would be omitted.

Electives The Computer Science department encourages interdisciplinary study in which computer science plays a major role. Advanced courses in other departments that involve

concepts from computer science and are relevant to an individual program may, with permission of the director of undergraduate studies, be counted toward the requirements.

Students considering graduate study in computer science are advised to take CPSC 421 and 422, as well as courses covering the breadth of computer science, including programming languages and systems, artificial intelligence, scientific computing, and theoretical computer science.

Students interested in using computers to solve scientific and engineering problems are advised to take CPSC 440 as well as computational courses offered in Applied Mathematics and in Engineering and Applied Science.

The core mathematical background necessary to complete the Computer Science major is provided in CPSC 202. However, many advanced courses in graphics, computer vision, neural networks, and numerical analysis assume additional knowledge of linear algebra and calculus. Students who plan to take such courses as electives and who are unsure whether they have the appropriate mathematical background are encouraged to take MATH 222 or 225 and MATH 120.

Senior requirement In the senior year students must take CPSC 490, an independent project course in which students select an adviser to guide them in research in a subfield of computer science. With permission of the director of undergraduate studies, students may enroll in 490 more than once or before their senior year.

Schedule approval All Computer Science majors in the sophomore, junior, and senior years should have their programs approved by the director of undergraduate studies.

Combined B.S./M.S. degree program in Computer Science Exceptionally able and well-prepared students may complete a course of study leading to the simultaneous award of the B.S. and M.S. degrees after eight terms of enrollment. The requirements are as follows:

1. Candidates must satisfy the Yale College requirements for the B.S. degree in Computer Science.
2. In fulfilling these requirements, students must complete eight graduate courses from the approved list, up to two of which may, with the permission of the director of undergraduate studies and the director of graduate studies, also be applied toward completion of the B.S. degree. At most one of these eight courses may be CPSC 690, 691, or 692.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses *B.S.* – 12 term courses taken for letter grades (incl senior project);

B.A. – 10 term courses taken for letter grades (incl senior project)

Specific courses required *B.S. and B.A.* – CPSC 201; CPSC 202 or MATH 244; CPSC 223, 323, 365

Distribution of courses *B.S.* – 6 addtl intermediate or advanced Comp Sci courses;

B.A. – four addtl intermediate or advanced Comp Sci courses

Substitution permitted Advanced courses in other depts, with DUS permission

Senior requirement Senior project (CPSC 490)

INTRODUCTORY COURSES

***CPSC 079b, Digital Photorealism** Julie Dorsey

Basic methods used to define shapes, materials, and lighting when creating computer-generated images. Mathematical models for shape, texture models, and lighting techniques. Principles are applied through the use of modeling/rendering/animation software. Proficiency in high school–level mathematics is assumed. No previous programming experience necessary. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. QR Fr sem

CPSC 112a or b, Introduction to Programming Daniel Abadi [F], Yang Richard Yang [Sp]

Development on the computer of programming skills, problem-solving methods, and selected applications. No previous experience with computers necessary. QR

CPSC 150a/HUMS 407a, Computer Science and the Modern Intellectual Agenda

David Gelernter

Introduction to the basic ideas of computer science (computability, algorithm, virtual machine, symbol processing system), and of several ongoing relationships between computer science and other fields, particularly philosophy of mind. No previous experience with computers necessary. Enrollment limited to 25. WR, HU

CPSC 151b/HUMS 408b, The Graphical User Interface David Gelernter

The role of graphical user interfaces (GUIs) on standard platforms such as desktop PCs, laptops, and small-screen devices. Discussion of how and why GUIs developed as they did, why they have evolved so little since the desktop computers of the 1970s, and how changing hardware and user requirements might reshape them in the future. Enrollment limited to 25. WR

CPSC 183a, Law, Technology, and Culture Brad Rosen

An exploration of the myriad ways in which law and technology intersect, with a special focus on the role of cyberspace. Topics include digital copyright, free speech, privacy and anonymity, information security, innovation, online communities, the impact of technology on society, and emerging trends. No previous experience with computers or law necessary. SO

***CPSC 185b, Control, Privacy, and Technology** Brad Rosen

The evolution of various legal doctrines with and around technological development. Topics include criminal law, privacy, search and seizure, digital rights, and the implications of technologically permitted methods of control on the law. Special attention to case law and policy. After CPSC 183. WR, SO

CPSC 201a or b, Introduction to Computer Science Dana Angluin [F], Holly Rushmeier [Sp]

Introduction to the concepts, techniques, and applications of computer science. Topics include computer systems (the design of computers and their languages); theoretical foundations of computing (computability, complexity, algorithm design); and artificial intelligence (the organization of knowledge and its representation for efficient search). Examples stress the importance of different problem-solving methods. After CPSC 112 or equivalent. QR

CPSC 202a, Mathematical Tools for Computer Science Joan Feigenbaum

Introduction to formal methods for reasoning and to mathematical techniques basic to computer science. Topics include propositional logic, discrete mathematics, and linear algebra. Emphasis on applications to computer science: recurrences, sorting, graph traversal, Gaussian elimination. QR

CPSC 223b, Data Structures and Programming Techniques Stanley Eisenstat

Topics include programming in C; data structures (arrays, stacks, queues, lists, trees, heaps, graphs); sorting and searching; storage allocation and management; data abstraction; programming style; testing and debugging; writing efficient programs. After CPSC 201 or equivalent. QR RP

***CPSC 290a or b, Directed Research** Stanley Eisenstat

Individual research. Requires a faculty supervisor and the permission of the director of undergraduate studies. May be taken more than once for credit.

MATH 244a/AMTH 244a, Discrete Mathematics Van Vu

For description see under Mathematics.

INTERMEDIATE COURSES

CPSC 323a, Introduction to Systems Programming and Computer Organization

Stanley Eisenstat

Machine architecture and computer organization, systems programming in a high-level language, issues in operating systems, software engineering, prototyping in nonprogramming languages. After CPSC 223. QR RP

CPSC 365b, Design and Analysis of Algorithms Daniel Spielman

Paradigms for problem solving: divide and conquer, recursion, greedy algorithms, dynamic programming, randomized and probabilistic algorithms. Techniques for analyzing the efficiency of algorithms and designing efficient algorithms and data structures. Algorithms for graph theoretic problems, network flows, and numerical linear algebra. Provides algorithmic background essential to further study of computer science. After CPSC 202 and 223. QR

EENG 348a, Digital Systems Roman Kuc and staff

ADVANCED COURSES

***CPSC 421a^G, Compilers and Interpreters** Zhong Shao

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. After CPSC 323. QR

CPSC 422b^G, Operating Systems Bryan Ford

The design and implementation of operating systems. Topics include synchronization, deadlock, process management, storage management, file systems, security, protection, and networking. After CPSC 323. QR

[CPSC 424b^C, Parallel Programming Techniques]

CPSC 426a^G, Building Decentralized Systems Bryan Ford

Challenges and techniques for building decentralized computing systems, in which many networked computers need to cooperate reliably despite failures and without assuming centralized management. Topics include decentralized storage systems, mobile and remote execution, hosting untrusted code, fault tolerance, naming, capabilities, information flow control, distributed shared memory, distributed hash tables, content distribution, and practical uses of cryptography. After CPSC 323. QR

CPSC 427a^G, Object-Oriented Programming Michael Fischer

Object-oriented programming as a means to efficient, reliable, modular, reusable code. Use of classes, derivation, templates, name-hiding, exceptions, polymorphic functions, and other features of C++. After CPSC 223. QR

[CPSC 430a^G, Formal Semantics]**CPSC 431b^G, Computer Music: Algorithmic and Heuristic Composition** Paul Hudak

Study of the theoretical and practical fundamentals of computer-generated music, with a focus on high-level representations of music, algorithmic and heuristic composition, and programming languages for computer music generation. Theoretical concepts are supplemented with pragmatic issues expressed in a high-level programming language. Ability to read music is assumed. After CPSC 202 and 223. QR

[CPSC 432b^G, Computer Music: Sound Representation and Synthesis]**[CPSC 433b^G, Computer Networks]****CPSC 434a^G, Mobile Computing and Wireless Networking** Yang Richard Yang

Introduction to the principles of mobile computing and its enabling technologies. Topics include wireless systems; information management; location-independent and location-dependent computing models; disconnected and weakly-connected operation models; human-computer interactions; mobile applications and services; security; power management; and sensor networks. After CPSC 202 and 323. QR

***CPSC 436a^G/EENG 460a^G, Networked Embedded Systems and Sensor Networks**

Andreas Savvides

For description see under Electrical Engineering.

CPSC 437b^G, Introduction to Databases Avi Silberschatz

Introduction to database systems. Data modeling. The relational model and the SQL query language. Relational database design, integrity constraints, functional dependencies, and normal forms. Object-oriented databases. Database data structures: files, B-trees, hash indexes. After CPSC 202 and 223. QR

CPSC 438b^G, Database System Implementation and Architectures Daniel Abadi

A study of systems programming techniques, with a focus on database systems. In the first half of the term, students analyze the design of a traditional DBMS and build components of a DBMS prototype, e.g., a catalog-manager, a buffer-manager, and a query execution engine. In the second half, students examine nontraditional architectures such as parallel databases, data warehouses, stream databases, and Web databases. After or concurrently with CPSC 202 and 323. QR

CPSC 440b^G, Numerical Computation Vladimir Rokhlin

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. After CPSC 112 or an equivalent introductory programming course; MATH 120; and MATH 222 or 225 or CPSC 202. QR

CPSC 445a^G, Introduction to Data Mining Vladimir Rokhlin

A study of algorithms and systems that allow computers to find patterns and regularities in databases, to perform prediction and forecasting, and to improve their performance generally through interaction with data. After CPSC 202, 223, and MATH 222, or equivalents. QR

[CPSC 455a^G/ECON 425a, Economics and Computation]**[CPSC 457a^G, Sensitive Information in a Wired World]****[CPSC 465a^G, Theory of Distributed Systems]****CPSC 467b^G, Cryptography and Computer Security** Michael Fischer

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. Focus on technology, with consideration of 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. Some programming may be required. After CPSC 202 and 223. QR

CPSC 468a^G, Computational Complexity Joan Feigenbaum

Introduction to the theory of computational complexity. Basic complexity classes, including polynomial time, nondeterministic polynomial time, probabilistic polynomial time, polynomial space, logarithmic space, and nondeterministic logarithmic space. The roles of reductions, completeness, randomness, and interaction in the formal study of computation. After CPSC 365 or with permission of instructor. QR

CPSC 469b^G, Randomized Algorithms James Aspnes

A study of randomized algorithms from several areas: graph algorithms, algorithms in algebra, approximate counting, probabilistically checkable proofs, and matrix algorithms. Topics include an introduction to tools from probability theory, including some inequalities such as Chernoff bounds. After CPSC 365; a solid background in probability is desirable. QR

CPSC 470a^G, Artificial Intelligence Brian Scassellati

Introduction to artificial intelligence research, focusing on reasoning and perception. Topics include knowledge representation, predicate calculus, temporal reasoning, vision, robotics, planning, and learning. After CPSC 201 and 202. QR

***CPSC 471b^G, Advanced Topics in Artificial Intelligence** Drew McDermott

An in-depth study of one area of artificial intelligence. Topics vary from year to year. The topic for 2012–2013 is artificial intelligence and philosophy of mind. After CPSC 470 or with permission of instructor. WR

CPSC 473b^G, Intelligent Robotics Brian Scassellati

Introduction to the construction of intelligent, autonomous systems. Sensory-motor coordination and task-based perception. Implementation techniques for behavior selection and arbitration, including behavior-based design, evolutionary design, dynamical systems, and hybrid deliberative-reactive systems. Situated learning and adaptive behavior. After CPSC 202; after or concurrently with CPSC 223. QR

CPSC 475a^G/BENG 475a^G, Computational Vision and Biological Perception

Steven Zucker

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. After CPSC 112 and MATH 120, or with permission of instructor. QR, SC RP

CPSC 478b^G, Computer Graphics Julie Dorsey

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. After CPSC 202 and 223. QR

[CPSC 479a^G, Advanced Topics in Computer Graphics]***CPSC 480a or b, Directed Reading** Stanley Eisenstat

Individual study for qualified students who wish to investigate an area of computer science not covered in regular courses. A student must be sponsored by a faculty member who sets the requirements and meets regularly with the student. Requires a written plan of study approved by the faculty adviser and the director of undergraduate studies. May be taken more than once for credit.

***CPSC 490a or b, Special Projects** Stanley Eisenstat

Individual research. Requires a faculty supervisor and the permission of the director of undergraduate studies. The student must submit a written report about the results of the project. May be taken more than once for credit.

Computer Science and Electrical Engineering

(See under Electrical Engineering and Computer Science.)

Computer Science and Mathematics

Directors of undergraduate studies: Stanley Eisenstat (Computer Science), 208 AKW, 432-1246, stanley.eisenstat@yale.edu; Andrew Casson (Mathematics), 216 LOM, 432-7056, andrew.casson@yale.edu

Computer Science and Mathematics is an interdepartmental major for students who are interested in computational mathematics, the use of computers in mathematics, mathematical aspects of algorithm design and analysis, and theoretical foundations of computing.

The major requires fourteen term courses as well as a senior project. Six of the fourteen courses must be in computer science: CPSC 201, 223, 323, and 365; one from CPSC 440, 455,

462, 465, 468, or 469; and one additional advanced term course other than CPSC 480 or 490. The remaining eight courses must be in mathematics: MATH 120, either 222 or 225, 244, and five additional term courses numbered above 200 other than MATH 470. MATH 230, 231 may replace MATH 120 and 222 or 225.

The senior requirement is a project or an essay on a topic acceptable to both departments. An oral report on the mathematical aspects of the project must be presented to the Mathematics faculty.

The entire program of each student majoring in Computer Science and Mathematics must be approved by the director of undergraduate studies in each department. Courses taken Credit/D/Fail may not be counted toward the major.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 14 term courses (not incl senior req)

Specific courses required CPSC 201, 223, 323, 365; one from CPSC 440, 455, 462, 465, 468, or 469; MATH 120, 222 or 225, 244

Distribution of courses 5 addtl courses in math numbered above 200 (may not be MATH 470); 1 addtl advanced course in comp sci (may not be CPSC 480 or 490)

Substitution permitted MATH 230, 231 for MATH 120 and 222 or 225

Senior requirement Senior project or senior essay on topic acceptable to Comp Sci and Math depts; oral report to Math dept on mathematical aspects of project

Computer Science and Psychology

Directors of undergraduate studies: Stanley Eisenstat (Computer Science), 208 AKW, 432-1246, stanley.eisenstat@yale.edu; Laurie Santos (Psychology), 213 SSS, 432-4524, psychdus@yale.edu

Computer Science and Psychology is an interdepartmental major designed for students interested in integrating work in these two fields. Each area provides tools and theories that can be applied to problems in the other. Examples of this interaction include cognitive science, artificial intelligence, and biological perception.

The prerequisite for the major is PSYC 110, from which students who have scored 5 on the Advanced Placement test in Psychology are exempt. Beyond the prerequisite, the major requires fourteen term courses as well as a senior project.

Eight of the fourteen courses must be in computer science: CPSC 201, 202, 223, 323, 365, and three advanced computer science courses in artificial intelligence. MATH 244 may substitute for CPSC 202. CPSC 480 and 490 may not be counted as one of these courses.

The remaining six courses must be in psychology, including PSYC 200, at least one from PSYC 210–299, at least two courses from the social science point of view, indicated as List A under Psychology, and at least one course in cognitive psychology or cognitive science listed in Psychology. PSYC 490, 491, 492, and 493 may not be counted as one of these courses.

A second course in cognitive psychology or cognitive science may substitute for one of the courses in artificial intelligence. An additional course in psychology and an examination arranged with the instructor of PSYC 200 may substitute for PSYC 200.

Senior requirement Students must take CPSC 490 or PSYC 492 or 493, and the project must be approved by the director of undergraduate studies in each department.

The entire program of each student majoring in Computer Science and Psychology must be approved by the director of undergraduate studies in each department. No course in Computer Science taken Credit/D/Fail may be counted toward the major; a maximum of one course in Psychology taken Credit/D/Fail may be counted toward the major.

REQUIREMENTS OF THE MAJOR

Prerequisite PSYC 110

Number of courses 14 term courses beyond prereq (not incl senior project)

Specific courses required CPSC 201, 202, 223, 323, 365; PSYC 200

Distribution of courses 8 courses in Comp Sci, with 3 advanced AI courses; 6 courses in Psych, with at least 1 from PSYC 210–299, at least 2 from List A under Psych, and at least 1 in cognitive psych or cognitive science listed in Psych

Substitution permitted For CPSC 202, MATH 244; for 1 course in AI, 1 addtl course in cognitive psych or cognitive science; for PSYC 200, 1 addtl course in Psych and exam arranged with instructor

Senior requirement CPSC 490 or PSYC 492 or 493 with project approved by DUS in each dept

Computing and the Arts

Director of undergraduate studies: Stanley Eisenstat (Computer Science), 208 AKW, 432-1246, stanley.eisenstat@yale.edu

Computing and the Arts is an interdepartmental major designed for students who wish to integrate work in computing with work in one of the arts disciplines: Art, History of Art, Music, or Theater Studies.

For students with a computing perspective, issues in these disciplines present interesting and substantive problems: how musicians use computers to compose; the limitations of current software tools used by artists; the types of analyses done by art historians; challenges in designing and using virtual sets in the theater; ways that virtual worlds might help to envision new forms of artistic expression; lessons that can be learned from trying to create a robotic conductor or performer.

For students with an artistic perspective, computing methods offer a systematic approach to achieving their vision. A foundation in computer science allows artists to understand existing computing tools more comprehensively and to use them more effectively. Furthermore, it gives them insight into what fundamentally can and cannot be done with computers, so they can anticipate the future development of new tools for computing in their field.

Prerequisites The prerequisite for all students in the major is CPSC 112, which should be taken during the freshman year. Additional prerequisites for the Art track are ART 111 and 114. There are no additional prerequisites for the History of Art track. An additional prerequisite for the Music track is MUSI 210, as determined by the music theory placement test. (Students who do not place into or out of MUSI 210 may need to take a lower-level course

first.) Additional prerequisites for the Theater Studies track are THST 110 and 111. There is no required favorable review of studio work for admission to the major in any track.

The major Twelve term courses are required beyond the prerequisites, not including the two-term senior project. Six of the courses must be in Computer Science, including CPSC 201, 202, and 223. Students are advised to complete CPSC 202 and 223 by the end of the sophomore year. MATH 244 may be substituted for CPSC 202.

The six remaining courses are selected from one of the arts disciplines. Students choose a track in art, history of art, music, or theater studies. All requirements for a single track must be satisfied, as specified below.

The Art track requires the following courses in addition to the Computer Science courses listed above: (1) two 100-level courses beyond ART 111 and 114, such as ART 132, 138, or 145; (2) two courses in Art at the 200 or 300 level; (3) ART 395; (4) one course in Art at the 400 level; (5) two courses selected from CPSC 475, 478, and 479; (6) one additional intermediate or advanced Computer Science course (excluding CPSC 490).

The History of Art track requires the following courses in addition to the Computer Science courses listed above: (1) one introductory History of Art course: HSAR 112, 142, or 143; (2) two History of Art courses at the 200, 300, or 400 level (the courses must represent two different areas as defined in the History of Art program description); (3) one studio art course (students may need to take a prerequisite course in Art to prepare for the studio course); (4) HSAR 401; (5) one 400-level seminar in History of Art; (6) two courses selected from CPSC 437, 475, 478, or 479, one of which must be CPSC 478 or 479; (7) one additional intermediate or advanced Computer Science course (excluding CPSC 490).

The Music track requires the following courses in addition to the Computer Science courses listed above: (1) MUSI 325; (2) five term courses chosen from MUSI 312, 313, 343, 412, 413, 471, and 472; (3) CPSC 431; (4) CPSC 432; (5) one additional intermediate or advanced Computer Science course (excluding CPSC 490).

The Theater Studies track requires the following courses in addition to the Computer Science courses listed above: (1) THST 210; (2) three courses in dramatic literature or theater history; (3) two upper-level Theater Studies production seminars in design, directing, or playwriting; (4) CPSC 431 or 432; (5) CPSC 478 or 479; (6) one additional intermediate or advanced Computer Science course (excluding CPSC 490).

Senior requirement The senior project requires two terms: one term of CPAR 491, and one term of ART 495, HSAR 499, MUSI 490 or 491, or THST 491, depending on the track chosen. The project must be approved by the director of undergraduate studies and be acceptable to both departments. Students must submit a written report, including an electronic abstract and Web page(s).

The entire program of each student majoring in Computing and the Arts must be approved by the director of undergraduate studies. Courses taken Credit/D/Fail may not be counted toward the major.

REQUIREMENTS OF THE MAJOR

Prerequisites *All tracks*—CPSC 112; *Art track*—ART 111, 114; *Music track*—MUSI 210; *Theater Studies track*—THST 110, 111

Number of courses 12 term courses beyond prereqs (not incl senior project)

Specific courses required *All tracks*—CPSC 201, 202, 223; *Art track*—ART 395, 2 from CPSC 475, 478, 479; *History of Art track*—2 from CPSC 437, 475, 478, 479, including 1 of CPSC 478, 479; 1 from HSAR 112, 142, 143; HSAR 401; *Music track*—CPSC 431, 432; MUSI 325; *Theater Studies track*—CPSC 431 or 432; CPSC 478 or 479; THST 210

Distribution of courses *All tracks*—6 courses in Comp Sci, incl 1 addtl intermediate or advanced course beyond specific reqs (excluding CPSC 490); *Art track*—2 courses in Art at 100 level (excluding prereqs), 2 at 200 or 300 level, and 1 at 400 level (in addition to senior req); *History of Art track*—2 courses in different areas of History of Art at 200, 300, or 400 level; one 400-level sem in History of Art; 1 studio art course; *Music track*—5 term courses from MUSI 312, 313, 343, 412, 413, 471, 472; *Theater Studies track*—3 courses in dramatic lit or theater history; 2 production sems, as specified

Substitution permitted MATH 244 for CPSC 202

Senior requirement *All tracks*—Two-term senior project approved by DUS; *Art track*—Senior project completed in CPAR 491 and ART 495; *History of Art track*—Senior project completed in CPAR 491 and HSAR 499; *Music track*—Senior project completed in CPAR 491 and MUSI 490 or 491; *Theater Studies track*—Senior project completed in CPAR 491 and THST 491

***CPAR 291a or b, Special Projects** Stanley Eisenstat

Individual research project in computing and the arts. Requires a faculty supervisor and permission of the director of undergraduate studies. May be taken more than once for credit.

***CPAR 491a or b, Senior Project in Computing and the Arts** Stanley Eisenstat

Individual research project for majors in Computing and the Arts. Requires two faculty supervisors, one from Computer Science and one from the department in the chosen track. Requires permission of the director of undergraduate studies. The student must present both a verbal and a written report describing the results of the project. May be taken more than once for credit.

Czech

(See under Slavic Languages and Literatures.)

DeVane Lecture Course

DEVN 195b/ENGL 213b, Style, Purpose, and Persuasion in Literature

David Bromwich

The uses of rhetoric in imaginative literature, politics, and moral argument. Examples drawn from Shakespeare, Emerson, Burke, Lincoln, Henry James, Kipling, and others.

HU

Directed Studies

Director of undergraduate studies: Jane Levin, 53 Wall St., 432-1314, jane.levin@yale.edu; chair of Humanities: R. Howard Bloch, 53 Wall St., 432-1313, howard.bloch@yale.edu; *directedstudies.yale.edu*

Directed Studies, a selective program for freshmen, is an interdisciplinary study of Western civilization. One hundred twenty-five students are accepted each year.

Each course meets weekly for one lecture and two seminars; seminars have eighteen students and one faculty member. The regular lectures and seminars are complemented by a series of colloquia. Distinguished members of the faculty are invited to speak on major issues arising from the work in the program, on related disciplines not included in the program, and on the relationship between Western civilization and the non-Western world. Colloquium topics in recent years have included the use of the humanities, the Christian reception of Aristotle, and ancient art and property rights. Directed Studies fulfills the following distributional requirements: two course credits in the humanities and arts, two course credits in the social sciences, and two course credits in writing. The program serves as a strong foundation for all majors in Yale College, including those in the sciences.

***DRST 001a and 002b, Directed Studies: Literature** Jane Levin, Mark Bauer, Edwin Duval, Paul Grimstad, Jan Hagens, Peter Hawkins, Virginia Jewiss, Pauline LeVen, Christopher Wood, Ruth Yeazell

An examination of major literary works with an aim of understanding how a tradition develops. In the fall term, works and authors include Homer, Aeschylus, Sophocles, Virgil, the Bible, and Dante. In the spring term, authors vary somewhat from year to year and include Petrarch, Cervantes, Shakespeare, Milton, Wordsworth, Goethe, Tolstoy, Proust, and Eliot. WR, HU

***DRST 003a and 004b, Directed Studies: Philosophy** Barbara Sattler, Stephen Darwall, Michael Della Rocca, Scott Edgar, Sonny Elizondo, Tamar Gendler, Anthony Kronman, Paul North, Raul Saucedo, Bruno Whittle

An examination of major figures in the history of Western philosophy with an aim of discerning characteristic philosophical problems and their interconnections. Emphasis on Plato and Aristotle in the fall term. In the spring term, modern philosophers include Descartes, Berkeley, Hume, Kant, and Nietzsche. WR, HU

***DRST 005a and 006b, Directed Studies: Historical and Political Thought** Kathryn Slanski, Bryan Garsten, Charles Hill, Camille Lizarribar, Dale Martin, Danilo Petranovich, Stuart Semmel, Steven Smith

A study of works of primary importance to political thought and intellectual history. Focus on the role of ideas in shaping events, institutions, and the fate of the individual. In the fall term, Herodotus, Thucydides, Plato, Aristotle, Augustine, and Aquinas. In the spring term, Machiavelli, Hobbes, Locke, Rousseau, Burke, Tocqueville, Emerson, Marx, Nietzsche, and Arendt. SO

Drama

(See under Theater Studies.)

Dutch

(See under Germanic Languages and Literatures.)

East Asian Languages and Literatures

Director of undergraduate studies: Tina Lu, 305 HGS, 432-2867, tina.lu@yale.edu;
associate director of undergraduate studies and language director: Seungja Choi,
Rm. 101, 432-434 Temple St., 432-2866, seungja.choi@yale.edu; eall.yale.edu

FACULTY OF THE DEPARTMENT OF EAST ASIAN LANGUAGES AND LITERATURES

Professors Kang-i Sun Chang, Aaron Gerow, Edward Kamens (*Chair*), Tina Lu, John
Treat, Jing Tsu

Assistant Professors William Fleming, Michael Hunter, Chloe Starr

Senior Lecturers Pauline Lin, Koichi Shinohara

Senior Lecturer II Seungja Choi

Senior Lectors Hsiu-hsien Chan, Min Chen, Koichi Hiroe, Angela Lee-Smith,
Rongzhen Li, Ninghui Liang, Fan Liu, Yoshiko Maruyama, Ling Mu, Michiaki Murata,
Hiroyo Nishimura, Masahiko Seto, Jianhua Shen, Mari Stever, Wei Su, Haiwen Wang,
Yu-lin Wang-Saussy, Peisong Xu, William Zhou

Lectors Yukie Mammoto, Chuanmei Sun, Shucheng Zhang

The Department of East Asian Languages and Literatures offers majors in Chinese and Japanese. These are liberal arts majors intended to give the student a general knowledge of Chinese or Japanese literature and the techniques of literary analysis, and advanced oral and written skills in one of these languages. The department also offers language courses in Korean and courses in East Asian humanities. Courses in Indonesian and Vietnamese are listed under Southeast Asia Studies.

Because the study of an East Asian language presents special challenges, all students interested in these languages are encouraged to begin their studies as early as possible in their careers at Yale. Students must begin language study no later than the sophomore year in order to complete the requirements of either major in the department. Students considering a major in East Asian Languages and Literatures should consult the director of undergraduate studies. The Richard U. Light Fellowship, administered by the Office of Fellowship Programs, provides opportunities for qualified Yale students to study East Asian languages in East Asia. Numerous other fellowships are also available. Language requirements may be met in part by taking accelerated language courses elsewhere, but

students wishing to receive credit for language study completed at another university must take a placement examination to determine their level of proficiency. It is a departmental policy that Yale College students may not audit language courses.

Course numbering Courses with numbers up to 099 are freshman seminars on East Asian literature, film, and humanities. Language courses are numbered from 100 to 199. Courses with numbers from 200 to 399 address literature, film, and the humanities: introductory courses in premodern periods are numbered from 200 to 249; introductory courses in the modern period are numbered from 250 to 299; more advanced courses in premodern periods are numbered from 300 to 349; and more advanced courses in the modern period are numbered from 350 to 399.

Placement examination Students who are enrolling in the department's language classes for the first time but who have studied Chinese, Japanese, or Korean elsewhere, and students who have skills in one of these languages because of family background, must take a placement examination at the beginning of the academic year. The times and places of the examinations are listed on the departmental Web site (eall.yale.edu/undergraduate-program) in late August. The Chinese and Japanese examinations have online components accessed through the same site. Students of Japanese, Chinese, and Korean returning from programs abroad must take a placement examination unless the coursework was completed at an institution preapproved by the Light Fellowship program with a grade of B or higher. For questions, consult with the associate director of undergraduate studies.

THE MAJOR IN CHINESE

The major in Chinese is designed to give the student a broad understanding of the chief forms and themes of Chinese literature through reading in the original language. By the senior year, the student majoring in Chinese can acquire advanced skills in speaking and reading Chinese and in interpreting Chinese literature.

Prerequisite to the major is CHNS 140 or the equivalent. The major consists of at least eleven other courses, which fall into the following seven categories: (1) Chinese literature in translation: two term courses at the 200 or 300 level, of which one must be in premodern literature; (2) third-year Chinese: CHNS 150 and 151 or equivalents; (3) two terms of literary Chinese: CHNS 170 and 171 or equivalents; (4) one general literature course, such as ENGL 129, 130, LITR 120, or 300, or a course on Japanese literature at the 200 level; (5) one course conducted in English that gives an overview of Chinese culture, such as HIST 316; (6) Chinese literature in the original language: two term courses that involve the study of literary texts (premodern or modern vernacular) to be chosen from the fourth-year Chinese language courses in which literary texts are used (such as CHNS 164 or 165), CHNS 190, or other courses at the discretion of the director of undergraduate studies; (7) the senior essay. A maximum of one course taken Credit/D/Fail may be counted toward the requirements of the major with permission of the director of undergraduate studies.

In order to acquaint themselves with the breadth of the field, students majoring in Chinese should take one or more courses in Chinese literature in translation as early as possible in their careers at Yale. Graduate courses in Chinese may count toward the major; enrollment in them requires permission of the instructor and of the director of graduate studies.

Senior requirement Students prepare a senior essay in CHNS 491 or in CHNS 492, 493.

REQUIREMENTS OF THE MAJOR

Prerequisite CHNS 140 or equivalent

Number of courses 11 term courses beyond prereq (incl one-term senior essay) or 12 term courses (incl two-term senior essay)

Specific courses required CHNS 150, 151 and 170, 171 or equivalents

Distribution of courses 2 courses in Chinese lit in translation, incl 1 in premodern lit; 1 general lit course; 1 overview of Chinese culture in English; 2 courses in Chinese lit in Chinese

Senior requirement Senior essay (CHNS 491, or 492 and 493)

THE MAJOR IN JAPANESE

The Japanese major immerses the student in the breadth and depth of the Japanese literary tradition, premodern through modern. By the senior year, the student majoring in Japanese can acquire advanced skills in speaking and reading Japanese and in interpreting Japanese literature.

Prerequisite to the major is JAPN 140 or the equivalent. The major consists of at least eleven other courses, which fall into the following seven categories: (1) Japanese literature in translation or Japanese film: three term courses at the 200 or 300 level, of which one must be in premodern literature and one in modern literature; (2) advanced modern Japanese: JAPN 150 and 151 or equivalents; (3) literary Japanese: JAPN 170; (4) one general literature or film course, such as ENGL 129, 130, LITR 120, 300, FILM 150, or a course on Chinese literature at the 200 level; (5) one course in English that gives an overview of Japanese culture, such as HIST 303; (6) Japanese literature in the original language: two term courses that involve the study of literary or other types of texts, premodern or modern, such as JAPN 156, 157, 171, or other courses as approved by the director of undergraduate studies; (7) the senior essay. A maximum of one course taken Credit/D/Fail may be counted toward the requirements of the major with permission of the director of undergraduate studies.

In order to acquaint themselves with the breadth of the field, students majoring in Japanese should take one or more courses in Japanese literature in translation as early as possible in their careers at Yale. Graduate courses in Japanese may count toward the major; enrollment in them requires permission of the instructor and of the director of graduate studies.

Senior requirement Students prepare a senior essay in JAPN 491 or in JAPN 492, 493.

REQUIREMENTS OF THE MAJOR

Prerequisite JAPN 140 or equivalent

Number of courses 11 term courses beyond prereq (incl one-term senior essay) or 12 term courses (incl two-term senior essay)

Specific courses required JAPN 150, 151 or equivalent; JAPN 170

Distribution of courses 3 courses in Japanese lit in translation or Japanese film, incl 1 in premodern lit and 1 in modern lit; 1 general lit or film course; 1 overview of Japanese culture in English; 2 courses in Japanese lit in Japanese

Senior requirement Senior essay (JAPN 491, or 492 and 493)

EAST ASIAN HUMANITIES

EALL 200b/RLST 134b, Buddhism in China and Japan Koichi Shinohara

For description see under Religious Studies.

***EALL 202a/HUMS 418a/RLST 130a/SAST 367a, Traditional Literature of India, China, and Japan** Koichi Shinohara, Phyllis Granoff

For description see under Humanities.

CHINESE

***CHNS 110a, Elementary Modern Chinese I** Jianhua Shen and staff

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 reading and writing Chinese characters. Credit only on completion of CHNS 120. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. L1 RP 1½ Course cr

***CHNS 120b, Elementary Modern Chinese II** Jianhua Shen and staff

Continuation of CHNS 110. After CHNS 110 or equivalent. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. L2 RP 1½ Course cr

***CHNS 130a, Intermediate Modern Chinese I** Ling Mu and staff

An intermediate course that continues intensive training in listening, speaking, reading, and writing and consolidates achievements from the first year of study. Students improve oral fluency, study more complex grammatical structures, and enlarge both reading and writing vocabulary. After CHNS 120 or equivalent. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. L3 RP 1½ Course cr

***CHNS 132a, Elementary Modern Chinese for Advanced Learners I** Fan Liu

First level of the advanced learner sequence, intended for students with some aural proficiency but limited ability in reading and writing Chinese. Training in listening and speaking, with emphasis on reading and writing. Placement confirmed by placement test and by instructor. L3 RP 1½ Course cr

***CHNS 140b, Intermediate Modern Chinese II** Ling Mu and staff

Continuation of CHNS 130. To be followed by CHNS 150. After CHNS 130 or equivalent. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. L4 RP 1½ Course cr

***CHNS 142b, Elementary Modern Chinese for Advanced Learners II** Fan Liu

Continuation of CHNS 132. After CHNS 132 or equivalent. L4 RP 1½ Course cr

***CHNS 150a, Advanced Modern Chinese I** Haiwen Wang and staff

Third level of the standard foundational sequence of modern Chinese, with study in speaking, listening, reading, and writing. Use of audiovisual materials, oral presentations, skits, and longer and more frequent writing assignments to assimilate more sophisticated grammatical structures. Further introduction to a wide variety of written forms and styles. Use of both traditional and simplified forms of Chinese characters. After CHNS 140 or equivalent. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. L5 1½ Course cr

***CHNS 151b, Advanced Modern Chinese II** Rongzhen Li and staff

Continuation of CHNS 150. After CHNS 150 or equivalent. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. L5 1½ Course cr

***CHNS 152a and 153b, Intermediate Modern Chinese for Advanced Learners**

Peisong Xu

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 work toward attaining an advanced level in all of them. After CHNS 142 or equivalent. L5 RP 1½ Course cr

***CHNS 154a, Advanced Modern Chinese III** William Zhou

Fourth level of the standard foundational sequence of modern Chinese, with study in speaking, listening, reading, and writing. Readings in a wide range of subjects form the basis of discussion and other activities. Students consolidate their skills, especially speaking proficiency, at an advanced level. Materials use both simplified and traditional characters. After CHNS 151 or equivalent. L5

***CHNS 155b, Advanced Modern Chinese IV** William Zhou

Continuation of CHNS 154. After CHNS 154 or equivalent. L5

***CHNS 156a, Chinese through Film** William Zhou

A survey of Chinese films of the past twenty years, optimized for language teaching. Texts include plot summaries, critical essays, and some scripts. Discussions, screenings, presentations, and writing workshops consolidate the four language skills. After CHNS 151 or equivalent. L5

CHNS 157b, Chinese Composition William Zhou

A writing course for advanced students with solid oral and reading proficiency. A systematic writing program, from simple assignments such as descriptions, narratives, and expositions to more sophisticated critical essays. Prerequisite: a course conducted in Chinese numbered 154 or higher. L5

***CHNS 162a and 163b, Advanced Modern Chinese for Advanced Learners** Wei Su

Third level of the advanced learner sequence in Chinese. Intended for students with advanced speaking and listening skills (able to conduct conversations fluently) and with high intermediate reading and writing skills (able to write 1,000–1,200 characters). Further readings on contemporary life in China and Taiwan, supplemented with authentic

video materials. Class discussion, presentations, and regular written assignments. Texts in simplified characters with vocabulary in both simplified and traditional characters. After CHNS 153 or equivalent. L5

***CHNS 164a, Readings in Contemporary Chinese Fiction** Wei Su

Selected readings in Chinese fiction of the 1980s and 1990s. Development of advanced language skills in reading, speaking, and writing for students with an interest in literature and literary criticism. After CHNS 151 or equivalent. L5

***CHNS 165b, Readings in Modern Chinese Fiction** Wei Su

Reading and discussion of modern short stories, most written prior to 1949. Development of advanced language skills in reading, speaking, and writing for students with an interest in literature and literary criticism. After CHNS 151 or equivalent. L5

***CHNS 166a and 167b, Chinese Media and Society** Shucheng Zhang

Advanced language course with a focus on speaking and writing skills. Issues in contemporary Chinese society explored through media forms such as newspapers, radio, television, and Internet blogs. After CHNS 155, 163, or equivalent. L5 RP

***CHNS 168a and 169b, Chinese for Global Enterprises** Shucheng Zhang

Advanced language course with a focus on Chinese business terminology and discourse. Discussion of China's economic and management reforms, marketing, economic laws, business culture and customs, and economic relations with other countries. Case studies from international enterprises that have successfully entered the Chinese market. After CHNS 155, 163, or equivalent. L5 RP

CHNS 170a^e and 171b^e, Introduction to Literary Chinese Pauline Lin, Michael Hunter

Reading and interpretation of texts in various styles of literary Chinese (*wenyan*), with attention to basic problems of syntax and literary style. After CHNS 151, 153, or equivalent. L5 RP

***CHNS 180b, Classical Tales from Tang to Qing** Tina Lu

Close reading and translation of classical tales from the Tang, Ming, and Qing dynasties. Focus on strengthening students' reading ability in classical Chinese. Attention to canonical Chinese narratives as well as some lesser-known texts. Discussion of themes such as romance, magical transformations, and proto-martial arts, including how these themes were transformed over time. After CHNS 171 or equivalent. L5, HU

***CHNS 181a, Chinese Informal Prose** Tina Lu

Translation and discussion of classical essays: first, models of *guwen* (ancient-style prose) from the Tang and Song dynasties, and second, the transformation of these models in the late Ming and early Qing into *xiaopin* ("lesser works"). *Guwen* as a choice both for philosophical and speculative writing and for describing the minutiae of everyday life. After CHNS 171 or equivalent. L5, HU

***CHNS 190b, Advanced Readings in Modern Chinese Literature** Jing Tsu

A rigorous introduction to literary criticism and analysis using texts in the original language. Focus on the contemporary period, drawing from fiction written in Chinese in different parts of the world, from mainland China to Taiwan and from Malaysia to Hong Kong. Texts in both simplified and traditional characters. After CHNS 163, 164, 165, or equivalent. L5, HU

***CHNS 200a^G/LITR 172a^G, Man and Nature in Chinese Literature** Kang-i Sun Chang
An exploration of man and nature in traditional Chinese literature, with special attention to aesthetics and cultural meanings. Topics include Daoism, Chan Buddhism, and lyricism; the *Book of Changes* as an inspiration for literature; body, sexuality, and nature; contemplation and self-cultivation; travel in literature; loss, lament, and self-reflection in song lyrics; nature and the supernatural in classical tales; landscape and the art of description; images of utopian communities; and religious pilgrimage and allegory. No knowledge of Chinese required. Some texts available in the original for students who read Chinese. HU Tr

CHNS 212a^G, Ancient Chinese Thought Michael Hunter
An introduction to the foundational works of ancient Chinese thought from the ruling ideologies of the earliest historical dynasties, through the Warring States masters, to the Qin and Han empires. Topics include Confucianism and Daoism, the role of the intellectual in ancient Chinese society, and the nature and performance of wisdom. HU

***CHNS 217b^G, The Plum in the Golden Vase** Tina Lu
Close reading of the late-sixteenth-century erotic novel *The Plum in the Golden Vase* in translation. The novel as a window on sixteenth-century Chinese society. Discussion of sexuality, commerce, and material culture. No knowledge of Chinese required. HU Tr

***CHNS 251a/ER&M 304a/HIST 308a/HUMS 448a/LITR 265a, China in the World**
Jing Tsu
A study of literary, linguistic, and cultural issues in China's interaction with the world from the sixteenth century to the present. Topics include intellectual thought, civilizational clash, translation, migration, fiction, philosophy, scientism, Chinoiserie, race, language, nationalism, ethnicity, globalization, and urbanization. The focus and period vary from year to year; for fall 2012, emphasis is on the twentieth century and beyond. HU

***CHNS 302a^G, Readings in Classical Chinese Prose** Kang-i Sun Chang
Readings in classical Chinese prose with commentaries and notes in modern Chinese. Exploration of a variety of themes and styles in premodern Chinese literature. Readings vary from year to year. Conducted in English and Chinese. HU

***CHNS 470a and 471b, Independent Tutorial** Edward Kamens and staff
For students with advanced Chinese language skills who wish to engage in concentrated reading and research on literary works in a manner not otherwise offered in courses. The work must be supervised by a specialist and must terminate in a term paper or its equivalent. Ordinarily only one term may be offered toward the major or for credit toward the degree. Permission to enroll requires submission of a detailed project proposal by the end of the first week of classes and its approval by the director of undergraduate studies.

***CHNS 491a or b, Senior Essay** Edward Kamens and staff
Preparation of a one-term senior essay under faculty supervision.

***CHNS 492a and 493b, Yearlong Senior Essay** Edward Kamens, Tina Lu
Preparation of a two-term senior essay under faculty supervision. Cr/year only

JAPANESE

***JAPN 110a, Elementary Japanese I** Hiroyo Nishimura and staff

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 *kanji*. Credit only on completion of JAPN 120. L1 RP 1½ Course cr

***JAPN 120b, Elementary Japanese II** Hiroyo Nishimura and staff

Continuation of JAPN 110. After JAPN 110 or equivalent. L2 RP 1½ Course cr

***JAPN 130a, Intermediate Japanese I** Yoshiko Maruyama and staff

Continued development in both written and spoken Japanese, with reinforcement of grammatical structures using texts, films, and animation. Materials expose students to aspects of Japanese culture. Computer software and multimedia are used to develop proficiency. After JAPN 120 or equivalent. L3 RP 1½ Course cr

***JAPN 140b, Intermediate Japanese II** Yoshiko Maruyama and staff

Continuation of JAPN 130. After JAPN 130 or equivalent. L4 RP 1½ Course cr

***JAPN 150a, Advanced Japanese I** Mari Stever and staff

Continued development of proficiency in aural and reading comprehension, as well as speaking and writing skills. Reading and discussion of short stories, essays, and journal articles. Viewing and discussion of Japanese anime, television shows, and films. Writing practice includes a diary, letters, essays, and criticism. After JAPN 140 or equivalent. L5 RP 1½ Course cr

***JAPN 151b, Advanced Japanese II** Mari Stever and staff

Continuation of JAPN 150. After JAPN 150 or equivalent. L5 RP 1½ Course cr

***JAPN 156a, Advanced Japanese III** Michiaki Murata and staff

Close reading of 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. Drama and films are included. After JAPN 151 or equivalent. L5 1½ Course cr

***JAPN 157b, Advanced Japanese IV** Michiaki Murata and staff

Continuation of JAPN 156. After JAPN 156 or equivalent. L5 1½ Course cr

***JAPN 162a, Advanced Japanese V** Masahiko Seto

Further development of skills used in academic settings, including public speaking, formal presentations, and expository writing based on research. Materials include lectures, scholarly papers, criticism, fiction, and films. After JAPN 157 or equivalent; recommended to be taken after or concurrently with JAPN 170. L5

***JAPN 163b, Advanced Japanese VI** Masahiko Seto

Continuation of JAPN 162. After JAPN 162 or equivalent; recommended to be taken after JAPN 170. L5

***JAPN 164a and 165b, Academic and Professional Spoken Japanese** Koichi Hiroe

Advanced language course with a focus on the speaking skills necessary for academic and professional settings. Includes online interviews, discussions, and debates with native

Japanese students and scholars on contemporary topics such as globalization, environment, technology, human rights, and cultural studies. After JAPN 157 or equivalent. L5

***JAPN 169a^G, Literature and the Humanities** John Treat

Canonical Japanese short stories and essays read in line-by-line translation. Use of reference works and the Internet to research structures and vocabulary. Designed to help students at the fourth-year level of modern Japanese prepare for either graduate-level courses in Japanese literature or independent study of written Japanese. After JAPN 151 or equivalent. L5

JAPN 170a^G, Introduction to Literary Japanese Edward Kamens

Introduction to the grammar and style of the premodern literary language (*bungotai*) through a variety of texts. After JAPN 151 or equivalent. L5

***JAPN 171b^G, Readings in Literary Japanese** Edward Kamens, William Fleming

Close analytical reading of a selection of texts from the Nara through the Tokugawa periods: prose, poetry, and various genres. Introduction to *kanbun*. After JAPN 170 or equivalent. L5

***JAPN 251b^G/LITR 251b, Japanese Literature after 1970** John Treat

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. Enrollment limited to 20. No knowledge of Japanese required. HU Tr

***JAPN 271a/FILM 448a, Japanese Cinema after 1960** Aaron Gerow

The development of Japanese cinema after the breakdown of the studio system, through the revival of the late 1990s, and to the present. No knowledge of Japanese required. HU Tr

***JAPN 272b, Japanese Popular Culture** Aaron Gerow

Contemporary Japanese popular culture and its historical antecedents, with particular focus on film, anime, manga, literature, television, and music. No knowledge of Japanese required. HU

***JAPN 290a^G/THST 289a, Kabuki Theater from Its Origins to the Present**

William Fleming

The conventions, repertoire, and historical development of Kabuki theater since its origins in the early seventeenth century. The significance of the popular stage in early modern society; Kabuki's influence on popular literature and adaptation into other media; the role of censorship and politics. No knowledge of Japanese required. HU

***JAPN 301b/EAST 415b, Curiosity and Spectacle in Early Modern Japan**

William Fleming

Cultural and intellectual movements of early modern (Edo) Japan explored through themes of curiosity and spectacle. Travel, material culture, print media, popular fiction and theater, sideshows and street performers, natural history, the supernatural, study of foreign cultures and of the past. No knowledge of Japanese required. HU

***JAPN 470a and 471b, Independent Tutorial** Edward Kamens and staff

For students with advanced Japanese language skills who wish to engage in concentrated reading and research on literary works in a manner not otherwise offered in courses. The

work must be supervised by a specialist and must terminate in a term paper or its equivalent. Ordinarily only one term may be offered toward the major or for credit toward the degree. Permission to enroll requires submission of a detailed project proposal by the end of the first week of classes and its approval by the director of undergraduate studies.

***JAPN 491a or b, Senior Essay** Edward Kamens and staff
Preparation of a one-term senior essay under faculty supervision.

***JAPN 492a and 493b, Yearlong Senior Essay** Edward Kamens, Tina Lu
Preparation of a two-term senior essay under faculty supervision. Cr/year only

KOREAN

***KREN 110a, Elementary Korean I** Angela Lee-Smith and staff
A beginning course in modern Korean. Pronunciation, lectures on grammar, conversation practice, and introduction to the writing system (*Hankul*). Credit only on completion of KREN 120. L1 RP 1½ Course cr

***KREN 120b, Elementary Korean II** Angela Lee-Smith and staff
Continuation of KREN 110. After KREN 110 or equivalent. L2 RP 1½ Course cr

***KREN 130a, Intermediate Korean I** Angela Lee-Smith, Choonhee Lee
Continued development of skills in modern Korean, spoken and written, leading to intermediate-level proficiency. After KREN 120 or equivalent. L3 RP 1½ Course cr

***KREN 132a, Intermediate Korean for Advanced Learners I** Angela Lee-Smith
Intended for students with some oral proficiency but little or no training in *Hankul*. Focus on grammatical analysis, the standard spoken language, and intensive training in reading and writing. L3 RP 1½ Course cr

***KREN 140b, Intermediate Korean II** Angela Lee-Smith, Choonhee Lee
Continuation of KREN 130. After KREN 130 or equivalent. L4 RP 1½ Course cr

***KREN 142b, Intermediate Korean for Advanced Learners II** Angela Lee-Smith
Continuation of KREN 132. After KREN 132 or equivalent. L4 RP 1½ Course cr

KREN 150a, Advanced Korean I Angela Lee-Smith
An advanced language course with emphasis on development of vocabulary and grammar, practice in reading comprehension, speaking on a variety of topics, and writing in both formal and informal styles. Use of storytelling, discussion, peer group activities, audio and written journals, oral presentations, and supplemental audiovisual materials and texts. Intended for nonheritage speakers. After KREN 140 or equivalent. L5 RP 1½ Course cr

KREN 151b, Advanced Korean II Angela Lee-Smith
Continuation of KREN 150. After KREN 150 or equivalent. L5 RP 1½ Course cr

***KREN 152a and 153b, Advanced Korean for Advanced Learners** Seungja Choi
An advanced course in modern Korean. Reading of short stories, essays, and journal articles, and introduction of 200 Chinese characters. Students develop their speaking and writing skills through discussions and written exercises. After KREN 142 or 151, or with permission of instructor. L5 1½ Course cr

***KREN 154b, Advanced Korean III** Seungja Choi

An advanced language course designed to develop reading and writing skills using Web-based texts in a variety of genres. Students read texts independently and complete comprehension and vocabulary exercises through the Web. Discussions, tests, and intensive writing training in class. After KREN 151 or equivalent. 15

***KREN 470a and 471b, Independent Tutorial** Edward Kamens and staff

For students with advanced Korean language skills who wish to engage in concentrated reading and research on material not otherwise offered in courses. The work must be supervised by an adviser and must terminate in a term paper or its equivalent. Permission to enroll requires submission of a detailed project proposal by the end of the first week of classes and its approval by the director of undergraduate studies.

East Asian Studies

Director of undergraduate studies: Koichi Shinohara, Rm. 404, 451 College St., 432-0839, koichi.shinohara@yale.edu; *eastasianstudies.research.yale.edu*

FACULTY ASSOCIATED WITH THE PROGRAM OF EAST ASIAN STUDIES

Professors Daniel Botsman (*History*), Kang-i Sun Chang (*East Asian Languages & Literatures*), Deborah Davis (*Sociology*), Aaron Gerow (*East Asian Languages & Literatures, Film Studies*), Valerie Hansen (*History*), Edward Kamens (*East Asian Languages & Literatures*), William Kelly (*Anthropology*), Tina Lu (*East Asian Languages & Literatures*), Peter Perdue (*History*), Frances Rosenbluth (*Political Science*), Helen Siu (*Anthropology*), William Summers (*History of Science, History of Medicine*), John Treat (*East Asian Languages & Literatures*), Jing Tsu (*East Asian Languages & Literatures*), Anne Underhill (*Anthropology*), Mimi Yiengpruksawan (*History of Art*)

Associate Professor Karen Nakamura (*Anthropology*)

Assistant Professors Seok-ju Cho (*Political Science*), Fabian Drixler (*History*), William Fleming (*East Asian Languages & Literatures*), William Honeychurch (*Anthropology*), Andrew Quintman (*Religious Studies*), Chloe Starr (*Divinity School*), Jeremy Wallace (*Visiting*), Eric Weese (*Economics*), Jessica Weiss (*Political Science*)

Senior Lecturers Annping Chin (*History*), Stephen Roach (*Global Affairs*), Koichi Shinohara (*Religious Studies, East Asian Languages & Literatures*)

Lecturers Martin Bale, Amy Lelyveld, Di Yin Lu, Akira Shimizu

Senior Lecturer II Seungja Choi

Senior Lectors Hsiu-hsien Chan, Min Chen, Koichi Hiroe, Zhengguo Kang, Angela Lee-Smith, Rongzhen Li, Ninghui Liang, Yoshiko Maruyama, Ling Mu, Michiaki Murata, Hiroyo Nishimura, Masahiko Seto, Jianhua Shen, Mari Stever, Wei Su, Haiwen Wang, Yu-lin Wang-Saussy, Peisong Xu, William Zhou

Lector Yukie Mammoto

In the East Asian Studies major, students concentrate on a country or an area within East Asia and organize their work in the humanities or the social sciences. The major offers a liberal education that serves as excellent preparation for graduate study or for business and professional careers in which an understanding of East Asia is essential.

The major The major in East Asian Studies is interdisciplinary, and students typically select classes from a wide variety of disciplines. The proposed course of study must be approved by the director of undergraduate studies.

The prerequisite to the major is completion of study at the L2 level of an East Asian language taught at Yale. Beyond this prerequisite, the major consists of thirteen course credits, which may include up to six taken in a preapproved program of study abroad. Six course credits must be taken in East Asian language courses, including a course at the L4 level and one year of advanced study (L5) with readings in the East Asian language.

Beyond the language requirement, the major includes seven course credits, six in the country or area of concentration and one outside it. Of the course credits in the area of concentration, one must be in the premodern period, at least two must be seminars, and one is the senior requirement (a senior seminar culminating in a senior thesis, a one-term senior essay, or a two-term directed research project). These courses are normally taken at Yale during the academic year, but with prior approval of the director of undergraduate studies the requirement may be fulfilled through successful course work undertaken elsewhere.

A maximum of one course taken Credit/D/Fail may be counted toward the requirements of the major, with permission of the director of undergraduate studies.

Senior requirement All students must satisfy a senior requirement undertaken during the senior year. This requirement can be met in one of three ways. Students may take one seminar in the country or area of concentration, culminating in a senior thesis. Alternatively, students who are unable to write a senior essay in a seminar may complete a one-term senior essay in EAST 480 or a one-credit, two-term senior research project in EAST 491, 492 culminating in an essay.

Upon entering the major, students are expected to draw up an intellectually coherent sequence of courses in consultation with the director of undergraduate studies. They must consult with the director of undergraduate studies each term concerning their course schedules. They should identify as soon as possible a faculty adviser in their area of specialization. As a multidisciplinary program, East Asian Studies draws on the resources of other departments and programs in the University. Students are encouraged to examine the offerings of other departments in both the humanities and the social sciences, as well as residential college seminars, for additional relevant courses. The stated area of concentration of each student determines the relevance and acceptability of other courses. For a complete listing of courses approved for the major, see the East Asian Studies Council Web site at eastasianstudies.research.yale.edu. Students are also encouraged to visit the IplanYale Web site, iplanyale.yale.edu, for help in planning the major.

REQUIREMENTS OF THE MAJOR

Prerequisite L2 level of an East Asian language taught at Yale

Number of courses 13 course credits beyond prereq (incl senior req); up to 6 may be in preapproved study abroad

Distribution of courses 6 course credits in East Asian lang courses, incl 1 L4 course and 1 year at L5 level with readings in the lang; 6 addtl course credits in country or area of concentration, incl 1 in premodern era and 2 sems; 1 course credit on East Asia outside country or area of concentration

Senior requirement 1 senior-year sem culminating in a senior thesis, or one-term senior essay in EAST 480, or one-credit, two-term senior research project in EAST 491, 492

EAST 320b/HIST 316b, History of China, 1550 to the Present Peter Perdue

For description see under History.

EAST 338a/ECON 338a/GLBL 318a, The Next China Stephen Roach

For description see under Global Affairs.

***EAST 357b/PLSC 390b⁶, State and Society in Post-Mao China** Jessica Weiss

For description see under Political Science.

***EAST 410b/SOCY 310b, Urban Development in China** Xiangming Chen

For description see under Sociology.

***EAST 415b/JAPN 301b, Curiosity and Spectacle in Early Modern Japan**

William Fleming

For description see under East Asian Languages & Literatures.

***EAST 421b, Politics of China** Jeremy Wallace

Introduction to Chinese political history of the twentieth and twenty-first centuries, with emphasis on the past thirty years. Factionalism and elite politics, economic reforms, contemporary social movements, development, international relations, and inequality. Methods and approaches used by scholars to explore Chinese politics. SO RP

***EAST 423a/ANTH 421a/ARCG 421a, Approaches to Korean Archaeology**

Martin Bale

Some of the big questions of world archaeology from the perspective of the Korean Peninsula, focusing on the period from 300,000 years ago to the tenth century A.D. The first modern humans in the peninsula; subsistence and the origins of cultivation; social organization; chiefdoms, state formation, and statecraft; the practice of archaeology in modern Korea and the role of nationalist discourses and politics. SO

***EAST 425b/HIST 311Jb, Shanghai and the Chinese Century** Di Yin Lu

The social and cultural history of Shanghai in the twentieth century; an overview of twentieth-century Chinese history through the lens of Shanghai. The city's character as global or distinctly Chinese. Introduction to the lives of residents, both ordinary and elite. HU

***EAST 427b/HIST 313Jb, The Variety of Food Histories in East Asia** Akira Shimizu

Various approaches to the study of food and foodways in East Asia, including perspectives from history, anthropology, and literature. Food aromas in constructions of stereotypes; possession of particular foodstuffs in relation to power; restaurants that provide atmosphere and service in addition to food. HU

***EAST 454b/ECON 474b/GLBL 312b, Economic and Policy Lessons from Japan**

Stephen Roach

For description see under Global Affairs.

***EAST 480a or b, One-Term Senior Essay** Koichi Shinohara

Preparation of a one-term senior essay under the guidance of a faculty adviser. Students must receive the prior agreement of the director of undergraduate studies and of the faculty member who will serve as the senior essay adviser. Students must arrange to meet with that adviser on a regular basis throughout the term.

***EAST 491a and 492b, Senior Research Project** Koichi Shinohara

Two-term directed research project under the supervision of a ladder faculty member. Students should write essays using materials in East Asian languages when possible. Essays should be based on primary material, whether in an East Asian language or English. Summary of secondary material is not acceptable. ½ Course cr per term Cr/year only

ELECTIVES WITHIN THE MAJOR

Premodern Period

***ANTH 362a^G, Unity and Diversity in Chinese Anthropology and History** Helen Siu

CHNS 170a^G and 171b^G, Introduction to Literary Chinese Pauline Lin, Michael Hunter
For description see under East Asian Languages & Literatures.

***CHNS 180b, Classical Tales from Tang to Qing** Tina Lu

For description see under East Asian Languages & Literatures.

***CHNS 200a^G/LITR 172a^G, Man and Nature in Chinese Literature** Kang-i Sun Chang

For description see under East Asian Languages & Literatures.

CHNS 212a^G, Ancient Chinese Thought Michael Hunter

For description see under East Asian Languages & Literatures.

CHNS 217b^G, *The Plum in the Golden Vase Tina Lu

For description see under East Asian Languages & Literatures.

***CHNS 302a^G, Readings in Classical Chinese Prose** Kang-i Sun Chang

For description see under East Asian Languages & Literatures.

***HIST 300Jb, Islam in China** Valerie Hansen

HIST 307b, The Making of Japan's Great Peace, 1550–1850 Fabian Drixler

HIST 315a/HUMS 421a, History of Traditional China to 1600 Valerie Hansen

For description see under History.

***HIST 374Jb, The Confucian Tradition** Annping Chin

HSAR 142a/RLST 187a, Introduction to the History of Art: The Classical Buddhist

World Mimi Yiengpruksawan

For description see under History of Art.

HSAR 143b/RLST 188b, Introduction to the History of Art: Buddhist Art and Architecture, 900 to 1600 Mimi Yiengpruksawan

For description see under History of Art.

***HSAR 488b, Buddhist Mandalas** Mimi Yiengpruksawan

***HUMS 418a/EALL 202a/RLST 130a/SAST 367a, Traditional Literature of India, China, and Japan** Koichi Shinohara, Phyllis Granoff

For description see under Humanities.

***JAPN 171b^c, Readings in Literary Japanese** Edward Kamens, William Fleming

For description see under East Asian Languages & Literatures.

***JAPN 290a^c/THST 289a, Kabuki Theater from Its Origins to the Present**
William Fleming

For description see under East Asian Languages & Literatures.

RLST 126a/SAST 262a, Tibetan Buddhism Andrew Quintman

For description see under Religious Studies.

RLST 134b/EALL 200b, Buddhism in China and Japan Koichi Shinohara

For description see under Religious Studies.

***RLST 182b/SAST 459b, Buddhist Traditions of Mind and Meditation**
Andrew Quintman

For description see under Religious Studies.

Modern Period

ANTH 254a, Japan: Culture, Society, Modernity William Kelly

ANTH 256b/WGSS 366b, Minorities and Sexualities in Modern Japan
Karen Nakamura

For description see under Anthropology.

***ANTH 342b^c, Cultures and Markets in Asia** Helen Siu

***ANTH 355b^c, China-Africa Encounters** Helen Siu, Michael McGovern

***CHNS 190b, Advanced Readings in Modern Chinese Literature** Jing Tsu

For description see under East Asian Languages & Literatures.

***CHNS 251a/ER&M 304a/HIST 308a/HUMS 448a/LITR 265a, China in the World**
Jing Tsu

For description see under East Asian Languages & Literatures.

***ECON 180a or b, Introduction to the Chinese Economy** Staff

***HIST 030a, Tokyo** Fabian Drixler

HIST 303a, Japan's Modern Revolution Daniel Botsman

***HIST 310Ja, Visualizing Asia** Peter Perdue

***HIST 327Ja, Navigating Life in Nineteenth-Century Japan** Fabian Drixler

*JAPN 251b^G/LITR 251b, **Japanese Literature after 1970** John Treat

For description see under East Asian Languages & Literatures.

*JAPN 271a/FILM 448a, **Japanese Cinema after 1960** Aaron Gerow

For description see under East Asian Languages & Literatures.

*JAPN 272b, **Japanese Popular Culture** Aaron Gerow

For description see under East Asian Languages & Literatures.

PLSC 179a, **China in World Politics** Jessica Weiss

*SAST 372a^G/ANTH 338a/FILM 329a, **Himalaya through Film and Text** Mark Turin

For description see under South Asian Studies.

COURSES IN THE GRADUATE AND PROFESSIONAL SCHOOLS

Qualified students may elect pertinent courses in the Graduate School and in some of the professional schools with permission of the instructor, the director of undergraduate studies, and the director of graduate studies or the dean or registrar of the professional school.

Ecology and Evolutionary Biology

Director of undergraduate studies: Thomas Near, 370A ESC, 432-3002,
karen.broderick@yale.edu; www.yale.edu/eeb

FACULTY OF THE DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY

Professors Leo Buss, †Peter Crane, Michael Donoghue, †Vivian Irish, †Kenneth Kidd, Nancy Moran, Howard Ochman, Jeffrey Powell, Richard Prum, †Eric Sargis, †Oswald Schmitz, †David Skelly, Stephen Stearns, Paul Turner (*Chair*), J. Rimas Vaišnys, Günter Wagner

Associate Professors Suzanne Alonzo, Walter Jetz, Thomas Near, David Post

Assistant Professors Antonia Monteiro, Jeffrey Townsend, David Vasseur

Senior Lecturer Marta Martínez Wells

Lecturers Gisella Caccone, Mary Beth Decker

†A joint appointment with primary affiliation in another department or school.

The Department of Ecology and Evolutionary Biology (EEB) offers broad education in the biological sciences. The subject matter includes molecules, cells, organs, organisms, and ecosystems and the evolutionary processes that shape them. The department offers a B.A. and a B.S. degree. The B.A. program is intended for students who are interested in ecology, evolution, and organismal diversity as part of a liberal education but do not intend to pursue graduate work in the discipline. The B.S. program is designed for students planning to attend medical or veterinary school or to pursue graduate study in ecology

and evolutionary biology, other biological disciplines, or the environmental sciences. The two programs share the same prerequisite and core requirements but differ in elective and senior requirements.

Students majoring in EEB select one of two tracks. The requirements for Track 1 emphasize courses appropriate for careers in ecology, evolutionary biology, and environmental science; Track 2 is most appropriate for premedical and preveterinary students because it allows them to use as electives many courses required by medical schools. The EEB major offers opportunities for independent research in both laboratory and field.

Courses for nonmajors Several EEB courses have no college-level prerequisites and are suitable for nonmajors. These include all 100-level offerings as well as 200-level courses that deal with particular organism groups such as fish, mammals, birds, or insects.

Prerequisites The prerequisites for the major are intended to provide core scientific literacy; they include courses in biology, chemistry, physics, and mathematics. The introductory biology sequence BIOL 101, 102, 103, and 104 is required, as is an introductory biology laboratory. Also required are CHEM 112, 113, or 114, 115, or 118, taken with their associated laboratories, and one term of organic chemistry with laboratory. CHEM 124, 125, with 222L, 223L satisfies both chemistry requirements. Two terms of physics are required, PHYS 170, 171 or higher, and one term of mathematics, MATH 115 or higher or STAT 101–106. A different statistics course approved by the director of undergraduate studies may be substituted for the mathematics prerequisite.

Acceleration credit awarded in chemistry, mathematics, and physics, or completion of advanced courses in those departments, is accepted in place of the corresponding prerequisites for the EEB major. Students who have mathematics preparation equivalent to MATH 115 or higher are encouraged to take a statistics course (most often STAT 101–106) and/or additional mathematics courses such as MATH 120, 121, 222, or 225. Because chemistry courses are prerequisite to several EEB courses, students are strongly urged to take general and organic chemistry in the freshman and sophomore years. Students who place out of general chemistry should take organic chemistry during their freshman year. Finishing the prerequisites early allows for a more flexible program in later years.

Placement Students can place out of the introductory biology sequence (BIOL 101, 102, 103, 104) only by means of the biology placement examination administered jointly by the biological science departments, EEB, MB&B, and MCDB. See the EEB departmental Web site, www.yale.edu/eeb, for information about the placement examination.

Potential EEB majors are expected to take the mathematics placement test. Those who place above the level of MATH 112 may proceed to prerequisite courses for the EEB major; those who place into MATH 112 must take calculus before other prerequisites. Placement in chemistry courses is arranged by the Chemistry department.

Requirements of the major Beyond the prerequisites, the B.A. requires three lecture courses and one laboratory, for three and one-half course credits. In Track 1, the required courses are E&EB 220, General Ecology; E&EB 225, Evolutionary Biology; and a lecture course and laboratory on organismal diversity chosen from E&EB 246, 247L; 250, 251L; 255, 256L; 257, 258L; 264, 265L; or 272, 273L. Required courses in Track 2 include E&EB

290 and 291L, Comparative Anatomy and laboratory; E&EB <295> (a course in comparative physiology scheduled for fall 2013) or BENG 350, Physiological Systems; and MCDB 300, Biochemistry.

The B.S. requirements are the same as those for the B.A., with the addition of at least two electives, for two course credits, in either Track 1 or Track 2. At least one of the electives must be a lecture or a seminar. Most EEB, MCDB, or MB&B courses numbered 200 or above qualify as electives, as do most research courses and laboratories in a biological sciences department or in the Medical School. Courses from other departments may qualify with permission of the director of undergraduate studies.

Limit on research courses While independent research courses may be taken multiple times for credit, there are restrictions on the number of such courses that can be included in a student's curriculum. See section C, "Course Credits and Course Loads," in chapter II of this bulletin.

Substitutions permitted Two upper-level courses in Geology and Geophysics (excluding G&G 125 and 315), Mathematics, Computer Science, or Engineering and Applied Science can be substituted for the required term of organic chemistry and laboratory. The second term of organic chemistry and laboratory and up to two terms of physics laboratories are allowed as electives. Courses from other departments may be also be suitable as electives. All substitutions require the permission of the director of undergraduate studies. College seminars may not be counted toward the requirements of the major.

Senior requirement Students in the B.A. degree program fulfill the senior requirement either by completing one term of independent study in E&EB 470 during the senior year or by writing a senior essay. The senior essay may be related to the subject matter of a course, but the essay is a separate departmental requirement in addition to any work done in a course and does not count toward the grade in any course. Students intending to write a senior essay must obtain an approval form from the office of the director of undergraduate studies and have it signed by the essay adviser before the end of the course selection period. Essays must be submitted to the director of undergraduate studies by the last day of classes.

Students in the B.S. degree program fulfill the senior requirement by completing one term of original research in E&EB 475 or 495 in the senior year. Additional research courses may be taken as electives and may be taken before the senior year, but any research course intended to satisfy the senior requirement must be taken during the senior year.

Credit/D/Fail No course taken Credit/D/Fail may be counted toward the EEB major, including prerequisites.

Advising Freshmen considering a major in Ecology and Evolutionary Biology are invited to consult with the director of undergraduate studies. After the freshman year, students should choose an adviser from the department faculty who has interests comparable to their own and/or is a fellow of their residential college. For additional information, visit the departmental Web site, www.yale.edu/eeb. The course schedules of all EEB majors (including sophomores intending to major in EEB) must be signed by a faculty member in EEB; the signature of the director of undergraduate studies is not required. Students whose regular adviser is on leave can consult the director of undergraduate studies to arrange for an alternate.

Study abroad Participation in study abroad field programs is encouraged. Credit for such programs may apply toward the major; interested students should consult the director of undergraduate studies prior to going abroad.

Combined B.S./M.S. degree program Exceptionally able and well-prepared students may accelerate their professional education by completing a course of study leading to the simultaneous award of the B.S. and M.S. degrees after eight terms of enrollment. Completion in fewer than eight terms is not allowed. The requirements are as follows:

1. Candidates must satisfy the Yale College requirements for the B.S. degree. In addition to the three lecture courses and one laboratory specified for the standard major, four courses are required, all of which must be graduate-level courses designated “G.” One of these is a graduate seminar selected with the approval of the director of undergraduate studies. Students must earn a grade of A or A– in two graduate-level courses and a grade of B or higher in the rest.
2. Six credits outside the major must be taken in the last two years, and at least two undergraduate courses in the last two terms.
3. In addition to the courses specified above, students must complete two graduate research courses for six course credits: (a) EEB 585, a two-credit course typically taken in the second term of the junior year. At the start of the course, each student forms a committee comprised of the adviser and two faculty members that meets to discuss the research project. Two of the members of this committee must be members of the EEB faculty. At the end of the course, the student completes a detailed prospectus describing the thesis project and the work completed to date. The committee evaluates an oral and written presentation of the prospectus and determines whether the student may continue in the combined program; (b) EEB 595, a four-credit, yearlong course that is similar to EEB 495, 496 and is taken during the senior year. In the first term of the course, the student gives an oral presentation describing the work. At the end of the course, the student submits a master’s thesis and gives an oral defense, followed by a comprehensive examination of the thesis conducted by the thesis committee. Upon successful completion of this examination, as well as all other requirements, the student is awarded the combined B.S./M.S. degree. Summer research between the junior and senior years is often required to obtain sufficient results for a credible master’s thesis.

Students must also satisfy the requirements of Yale College for the simultaneous award of the bachelor’s and master’s degrees, including the following:

1. Students must apply in writing to the director of undergraduate studies and obtain departmental approval no later than the beginning of the second term of their junior year. Applications must be submitted by November 1 in the preceding term. Students must have the approval of both the director of undergraduate studies and the director of graduate studies to receive graduate credit for the graduate courses they select.
2. Students must have two-thirds A or A– grades in all of their courses and two-thirds A or A– grades in EEB courses, including prerequisites, to be admitted to the program.

REQUIREMENTS OF THE MAJOR

Prerequisites BIOL 101, 102, 103, 104; 1 intro bio lab; CHEM 112, 113, or 114, 115, or 118 with labs; 1 term of organic chem with lab (CHEM 124, 125, with 222L, 223L satisfies both chem requirements); PHYS 170, 171 or higher; MATH 115 or higher or STAT 101–106

Number of courses *B.A.* – 3½ course credits (not incl senior req); *B.S.* – 5½ course credits (not incl senior req)

Specific courses required *Track 1* – E&EB 220, 225; organismal diversity lecture and lab as specified; *Track 2* – E&EB 290, 291L; E&EB <295> or BENG 350; MCDB 300

Distribution of courses *B.S.* – 2 electives

Substitutions permitted Other stat course approved by DUS for math or stat prereq; two upper-level courses in G&G (except G&G 125 and 315), math, comp sci, or E&AS for organic chem and lab, with DUS permission; the second term of organic chem and lab and two physics labs as electives, with DUS permission

Senior requirement *B.A.* – E&EB 470 taken in the senior year or senior essay; *B.S.* – E&EB 475 or 495 taken in senior year

INTRODUCTORY COURSES

[E&EB 115a/F&ES 315a, Conservation Biology]

E&EB 123Lb, Laboratory for Principles of Evolution, Ecology, and Behavior

Marta Martínez Wells

Experimental approaches to organismal and population biology, including study of the diversity of life. Enrollment limited to 12 per section. SC ½ Course cr

*E&EB 125b/G&G 125b, History of Life Derek Briggs, Leo Hickey

For description see under Geology & Geophysics.

*E&EB 150b, Genomics, Evolution, and Human Biology Howard Ochman

The biology of humans from an evolutionary perspective. Human genetics, genomics, and evolution as context for understanding the features that link us to all other organisms and those that make us unique. Designed for, but not limited to, majors in the biological sciences. WR, SC

[E&EB 160a, Diversity of Life]

[E&EB 171a, The Collections of the Peabody Museum]

INTERMEDIATE AND ADVANCED COURSES

Prerequisites for all E&EB courses numbered 200 and above are BIOL 101, 102, 103, and 104, or permission of the instructor.

E&EB 220a^G/EVST 223a, General Ecology David Vasseur, David Post

The theory and practice of ecology, including the ecology of individuals, population dynamics and regulation, community structure, ecosystem function, and ecological

interactions at broad spatial and temporal scales. Topics such as climate change, fisheries management, and infectious diseases are placed in an ecological context. Prerequisite: MATH 112 or equivalent. SC

E&EB 225b^c, Evolutionary Biology Nancy Moran, Michael Donoghue

An overview of evolutionary biology as the discipline uniting all of the life sciences. Reading and discussion of scientific papers to explore the dynamic aspects of evolutionary biology. Principles of population genetics, paleontology, and systematics; application of evolutionary thinking in disciplines such as developmental biology, ecology, microbiology, molecular biology, and human medicine. SC

E&EB 226Lb^c, Laboratory for Evolutionary Biology Gisella Caccone

The companion laboratory to E&EB 225. 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. Concurrently with or after E&EB 225 or with permission of instructor. SC
½ Course cr

[E&EB 228b^c, Ecology and Evolution of Infectious Diseases]

***E&EB 230a/EVST 221a/F&ES 221a, Field Ecology** Linda Puth

A field-based introduction to ecological research. Experimental and descriptive approaches, comparative analysis, and modeling are explored through field and small-group projects. Concurrently with or after E&EB 220 or with permission of instructor. SC

***E&EB 235a, Evolution and Medicine** Stephen Stearns

Survey of evolutionary insights that make important differences in medical research and clinical practice, including evolutionary mechanisms and the medical issues they affect. Individual genetic variation in susceptibility; evolutionary conflicts and tradeoffs in reproductive medicine; the evolution of antibiotic resistance and virulence in pathogens; emerging diseases; the evolution of aging; cancer as an evolutionary process. WR, SC

E&EB 240a, Animal Behavior Suzanne Alonzo

An introduction to the study of animal behavior from an evolutionary and ecological perspective. History and methods of studying animal behavior. Topics include foraging, predation, communication, reproduction, cooperation, and the role of behavior in conservation. Enrollment limited to 15 per section. WR, SC

E&EB 246a, Plant Diversity and Evolution Michael Donoghue

Introduction to the major plant groups and their evolutionary relationships, with an emphasis on the diversification and global importance of flowering plants. To be taken concurrently with E&EB 247L. Prerequisite: a general understanding of biology and evolution. SC

E&EB 247La, Laboratory for Plant Diversity and Evolution Michael Donoghue

Hands-on experience with the plant groups examined in the accompanying lectures. Local field trips. To be taken concurrently with E&EB 246. SC ½ Course cr

E&EB 250a^c, Biology of Terrestrial Arthropods Marta Martínez Wells

Evolutionary history and diversity of terrestrial arthropods (body plan, phylogenetic relationships, 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). SC

E&EB 251La^c, Laboratory for Biology of Terrestrial Arthropods Marta Martínez Wells
Comparative anatomy, dissections, identification, and classification of terrestrial arthropods; specimen collection; field trips. Concurrently with or after E&EB 250. SC
½ Course cr

[E&EB 255b^c, Invertebrates I]

[E&EB 256Lb^c, Laboratory for Invertebrates I]

[E&EB 257a, Invertebrates II]

[E&EB 258La, Laboratory for Invertebrates II]

E&EB 264a^c, Ichthyology Thomas Near
A survey of fish diversity, including jawless vertebrates, chimaeras and sharks, lungfishes, and ray-finned fishes. Topics include the evolutionary origin of vertebrates, the fossil record of fishes, evolutionary diversification of major extant fish lineages, biogeography, ecology, and reproductive strategies of fishes. SC

E&EB 265La^c, Laboratory for Ichthyology Thomas Near
Laboratory and field studies of fish diversity, form, function, behavior, and classification. The course primarily involves study of museum specimens and of living and fossil fishes. Concurrently with E&EB 264. SC ½ Course cr

***E&EB 272b^c, Ornithology** Richard Prum
An overview of avian biology and evolution, including the structure, function, behavior, and diversity of birds. The evolutionary origin of birds, avian phylogeny, anatomy, physiology, neurobiology, breeding systems, and biogeography. Enrollment limited to 50. SC

***E&EB 273Lb^c, Laboratory for Ornithology** Richard Prum
Laboratory and field studies of avian morphology, diversity, phylogeny, classification, identification, and behavior. Enrollment limited to 12. SC ½ Course cr

***E&EB 275a^c/EVST 400a, Biological Oceanography** Mary Beth Decker
For description see under Environmental Studies.

E&EB 290a, Comparative Anatomy Günter Wagner
A survey of the structure, variation, and evolution of major vertebrate groups. Topics include the microanatomy of major organ systems, the embryology of the vertebrate body plan, and the structure and evolution of the major organ systems such as the locomotory system, sensory organs, digestive tract, reproductive tract, and nervous system. SC

E&EB 291La, Comparative Anatomy Laboratory Günter Wagner
Microscopic examination of histological and embryological preparations. Dissection of selected vertebrate species including shark, bony fish, frog, lizard, and rat. To be taken with E&EB 290. SC ½ Course cr

***E&EB 310b^G, Evolutionary Genetics** Jeffrey Powell and staff

Introduction to population genetics and phylogenetics. Theoretical fundamentals and empirical data, with an emphasis on molecular aspects. After E&EB 225, MCDB 200, and STAT 101, or with permission of instructor.

[E&EB 315a, Ecology and Evolution of Plant-Insect Interactions]***E&EB 320b, Conservation Genetics** Gisella Caccone

An introduction to conservation genetics for advanced undergraduates and graduate students. The importance of genetic diversity and the means for preserving it. After E&EB 225 and MCDB 200, or with permission of instructor. SC

[E&EB 330a/EVST 330a/F&ES 330a, Ecosystem Ecology]**[E&EB 335b^C, Probabilistic Modeling in Ecology, Evolution, and Disease]*****E&EB 342b^C/ANTH 335b^C, Primate Diversity and Evolution** Eric Sargis

For description see under Anthropology.

***E&EB 380b^G, Life History Evolution** Stephen Stearns

Life history evolution studies how the phenotypic traits directly involved in reproductive success are shaped by evolution to solve ecological problems. The intimate interplay between evolution and ecology. After E&EB 220 and 225, or with permission of instructor. SC

***E&EB 390a^G, Evolution of Development** Antonia Monteiro

An introduction to the ways that developmental mechanisms change through time to give rise to organismal diversity. Ways in which mutations influence the processes of gene regulation, tissue growth, and cell and organ differentiation. SC

***E&EB 460b^G, Studies in Evolutionary Medicine I** Stephen Stearns and staff

Principles of evolutionary biology applied to issues in medical research and practice. Lactose and alcohol tolerance; the “hygiene hypothesis”; genetic variation in drug response and pathogen resistance; spontaneous abortions, immune genes, and mate choice; the evolution of aging; the ecology and evolution of disease; the emergence of new diseases. Students develop proposals for research to be conducted during the summer. Admission by competitive application; forms are available on the EEB Web site. SC

***E&EB 461a^G, Studies in Evolutionary Medicine II** Paul Turner

Continuation of E&EB 460. Prerequisite: E&EB 460 or permission of instructor. SC

***E&EB 470a or b, Tutorial** Marta Martínez Wells

Individual or small-group study for qualified students who wish to investigate an area of ecology or evolutionary biology not presently covered by regular courses. A student must be sponsored by a faculty member who sets requirements and meets weekly with the student. One or more written examinations and/or a term paper are required. To register, the student must submit a written plan of study approved by the faculty instructor to the director of undergraduate studies. Students are encouraged to apply during the term preceding the tutorial. The proposal must be submitted by Friday, September 7, for the fall term and Tuesday, January 22, for the spring term. The final paper is due in the hands of the director of undergraduate studies by Friday, December 7, for the fall term and Friday, April 26, for

the spring term. In special cases, with approval of the director of undergraduate studies, this course may be elected for more than one term, but only one term will count as an elective for the major. Normally, faculty sponsors must be members of the EEB department. Fulfills the senior requirement for the B.A. degree if taken in the senior year.

***E&EB 475a or b, Research** Marta Martínez Wells

One term of original research in an area relevant to ecology or evolutionary biology. This may involve, for example, laboratory work, fieldwork, or mathematical or computer modeling. Students may also work in areas related to environmental biology such as policy, economics, or ethics. The research project may not be a review of relevant literature but must be original. In all cases students must have a faculty sponsor who oversees the research and is responsible for the rigor of the project. Students are expected to spend ten hours per week on their research projects. Using the form available from the office of undergraduate studies or from the Classes server, students must submit a research proposal that has been approved by the faculty sponsor to the director of undergraduate studies, preferably during the term preceding the research. Proposals are due Friday, September 7, for the fall term and Tuesday, January 22, for the spring term. The final research paper is due in the hands of the director of undergraduate studies by Friday, December 7, for the fall term and Friday, April 26, for the spring term. Fulfills the senior requirement for the B.S. degree if taken in the senior year.

***E&EB 495a and 496b, Intensive Senior Research** Marta Martínez Wells

One term of intensive original research during the senior year under the sponsorship of a Yale faculty member. Similar to other research courses except that a more substantial portion of a student's time and effort should be spent on the research project (a minimum average of twenty hours per week). A research proposal approved by the sponsoring faculty member must be submitted to the instructor; forms are available from the office of undergraduate studies or from the instructor. For the fall term, approval is encouraged during the the spring term of the junior year and must be done by Friday, September 7; for the spring term, submission of the research proposal is encouraged during the fall term and must be done by Tuesday, January 22. Students who wish to take both E&EB 495 and 496 under the sponsorship of the same faculty member may submit a single proposal by the fall deadline; in this case, the grade assigned at the end of the spring term applies to all four credits. Students who take 495 and 496 under the sponsorship of different faculty members complete an interim oral report and submit a final paper in each term; a separate grade is assigned in each term. The due date for papers in E&EB 495 is Friday, December 7; the due date for E&EB 496 only or for 495 and 496 is Friday, April 26. One term fulfills the senior requirement for the B.S. degree. 2 Course cr per term

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Graduate courses in the biological and biomedical sciences that may be of interest to undergraduates are listed in the online bulletin of the Graduate School, and many are posted at bbs.yale.edu. Additional information is available from the director of undergraduate studies and the director of graduate studies. Undergraduates with an appropriate background may enroll with the permission of the director of graduate studies and the instructor.

Economics

Director of undergraduate studies: Anthony Smith, Rm. 306, 28 Hillhouse Ave., 432-3583 or 432-3574, qazi.azam@yale.edu; www.econ.yale.edu/undergrad/ugrad.htm

FACULTY OF THE DEPARTMENT OF ECONOMICS

Professors Joseph Altonji, Donald Andrews, Dirk Bergemann, Steven Berry, Truman Bewley, †Richard Brooks, Donald Brown, Xiaohong Chen, †Judith Chevalier, Pradeep Dubey (*Visiting*), Eduardo Engel, Ray Fair, †Joan Feigenbaum, †Howard Forman, John Geanakoplos, †William Goetzmann, Pinelopi Goldberg, Timothy Guinnane, Philip Haile, Koichi Hamada, Johannes Horner, Gerald Jaynes, Dean Karlan, Yuichi Kitamura, Alvin Klevorick, Naomi Lamoreaux, Richard Levin, Giovanni Maggi, Konstantinos Meghir, †Robert Mendelsohn, Giuseppe Moscarini, †Barry Nalebuff, William Nordhaus, Peter Phillips, Benjamin Polak, †John Roemer, Mark Rosenzweig, Larry Samuelson, Herbert Scarf, †Peter Schott, Robert Shiller, †Jody Sindelar, Anthony Smith, †Shyam Sunder, Aleh Tsyvinski, Christopher Udry, †Ernesto Zedillo

Associate Professors †Sheila Olmstead, Ebonya Washington

Assistant Professors Costas Arkolakis, David Atkin, †Christopher Blattman, Eduardo Faingold, Mitsuru Igami, Daniel Keniston, Amanda Kowalski, Guillermo Ordoñez, Taisuke Otsu, Nancy Qian, Kareen Rozen, Melissa Tartari, Eric Weese

Senior Lecturers Cheryl Doss, Tolga Koker

Lecturers Seven Agir, Irasema Alonso, Michael Boozer, Douglas McKee, Nicholas Perna, Michael Schmertzler, Katerina Simons, David Swensen, Dean Takahashi

†Primary appointment in another department or school.

Economics concerns the wealth of nations, its origins in production and exchange, its allocation among competing uses, its distribution among individuals, and its accumulation or decline. Economics at Yale is regarded and taught as part of a liberal education, not as a preparation for any particular vocation. Nonetheless, economics provides an especially relevant background for a number of professions.

Requirements of the major Students majoring in Economics are required to take twelve term courses. Two of these may be introductory economics courses, one in microeconomics and one in macroeconomics. All majors must take the following courses: one term of intermediate microeconomics (ECON 121 or 125); one term of intermediate macroeconomics (ECON 122 or 126); one term of econometrics (ECON 131, 132, or 136); and one Yale mathematics course, usually selected from MATH 112, 115, 118, or 120. Students who place out of these mathematics courses must take a higher-level mathematics course at Yale and should consult the director of undergraduate studies in Economics. All of these required courses should be completed prior to the senior year. Majors must also take two courses numbered ECON 400–491, at least one of which must be taken in the senior year.

Subject to approval by the director of undergraduate studies, students may count toward the major one course related to economics but taught in another field, in addition to the required course in mathematics.

Students who take a term abroad or take summer courses not at Yale may petition the director of undergraduate studies to count at most two courses from outside Yale toward the requirements of the major. Students who take a year abroad may petition to count at most three courses. Many economics courses taken outside Yale do not meet the requirements of the Economics major; students should consult with the director of undergraduate studies before taking such courses. Courses taken outside Yale may not be counted toward the major requirements in intermediate microeconomics, intermediate macroeconomics, or econometrics.

Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Introductory courses These courses serve students considering a major in Economics as well as others who would like an introduction to the subject. Most students enroll in ECON 115 and 116, lecture courses with a discussion section. ECON 115 is concerned with microeconomics and includes such topics as markets, prices, production, distribution, and the allocation of resources. ECON 116 covers such macroeconomic issues as unemployment, inflation, growth, and international economics; it has a microeconomics prerequisite.

ECON 110 and 111 are limited-enrollment alternatives to ECON 115 and 116; they are open only to freshmen selected from those who preregister. ECON 108 also covers microeconomics, but with a greater emphasis on quantitative methods and examples. It is intended for, but not restricted to, freshmen with little or no experience with calculus. Enrollment is limited, and preregistration is required. The substance of ECON 108, 110, and 115 is similar, and ECON 111 and 116 are similar as well. A student may receive credit for only one course each in introductory microeconomics and introductory macroeconomics.

The department recommends that students interested in majoring in Economics take introductory economics in the freshman year. In order to make the introductory courses available to all freshmen and to students majoring in other subjects, the introductory courses do not have a mathematics requirement.

Introductory courses: placement and exemptions Students with a score of 5 on the Advanced Placement tests for microeconomics and macroeconomics *and* a score of 5 on the Advanced Placement Calculus BC test may petition the director of undergraduate studies to place out of introductory microeconomics and enroll directly in intermediate microeconomics. It is recommended that students with a score of 5 on the Advanced Placement economics tests but without a 5 on the Calculus BC test take a Yale mathematics course such as MATH 115 or 120, and then petition the director of undergraduate studies to place out of introductory microeconomics and instead take intermediate microeconomics in the following term. Students with high scores on examinations equivalent to Advanced Placement, such as the GCE A-level or Higher Level International Baccalaureate, may also petition to be exempted from the introductory courses. For other placement and exemption questions, consult the Economics Web site, www.econ.yale.edu/undergrad/ugrad.htm.

Mathematics Students are advised to meet the mathematics requirement for the major during their freshman year. The department also recommends that majors either complete MATH 118 or complete two term courses including MATH 120 and either 222 or 225. The latter two-term sequence is preferable for students who wish to take further mathematics courses or who plan to pursue a graduate degree in economics.

Econometrics Students are advised to take a two-term sequence of statistics and econometrics courses, especially if they are considering a senior essay. One option is to take ECON 131 followed by 132. Students with a stronger mathematics background or who plan to pursue a graduate degree in economics are encouraged to take either ECON 135 or STAT 241 and 242, followed by ECON 136. Prospective majors are urged to start their econometrics sequence in the fall of sophomore year.

Intermediate microeconomics and macroeconomics Along with econometrics, intermediate microeconomics and macroeconomics form the core of the major. Two options are available in both microeconomics and macroeconomics. The standard intermediate courses are ECON 121 and 122. Students with a stronger mathematics background are encouraged to take ECON 125 and 126 instead. The intermediate courses need not be taken in sequence: in particular, ECON 125 is not required for 126.

Field courses The department offers a wide selection of upper-level courses that explore in greater detail material presented in introductory courses. Advanced fields of economics include theoretical, quantitative, and mathematical economics; market organization; human resources; finance; international and development economics; public policy and the public sector; and economic history. Some advanced field courses have only introductory microeconomics as a prerequisite. Others apply intermediate-level theory or econometrics to economic problems and institutions, and for this reason list one or more of the theory or econometrics courses as prerequisites.

Advanced lecture courses These advanced courses, numbered ECON 400–449, are limited-enrollment courses that cover relatively advanced material in more depth than regular field courses. Prerequisites usually include two of intermediate microeconomics, intermediate macroeconomics, and econometrics or a mathematics course such as MATH 120. Advanced lecture courses may be applied toward the senior requirement.

Seminars Although there is diversity in approaches in the various seminars (courses numbered ECON 450–489), all have in common an emphasis on class interaction, the writing of papers, and the reading of journal articles. Seminars represent an opportunity for students to apply and extend the economics they have learned through their earlier coursework.

Enrollment in seminars and advanced lecture courses is limited. Senior Economics majors who have not yet completed the senior requirement for the major are given priority for these courses and may preregister; see www.econ.yale.edu/undergrad/ugrad.htm for instructions. Students must take two of three core courses in intermediate microeconomics, intermediate macroeconomics, and econometrics before enrolling in a seminar. Underclassmen in the major and nonmajors may also enroll in Economics seminars and advanced lecture courses as space permits, but they do not preregister.

Senior requirement Majors are required to take two departmental courses numbered ECON 400–491, at least one of which must be taken in the senior year. The senior requirement must be met by Yale Economics courses; courses in other departments or taken elsewhere do not suffice. Residential college seminars do not count toward the major.

Senior essay Only those majors who submit a senior essay are eligible for Distinction in the Major. There are three types of senior essay: (1) students may write a one-term essay in an advanced departmental course (numbered 400–489) taken during the senior year; (2) students may write a one-term essay in the fall of the senior year as an independent project on a topic of their own design under the close and regular supervision of a faculty adviser (ECON 491); or (3) students may write a two-term essay starting in the fall of the senior year as an independent project on a topic of their own design under the close and regular supervision of a faculty adviser (ECON 491 and 492). Meetings to discuss the senior essay will be held at the beginning of the fall term; see below under “Distinction in the Major.”

Distinction in the Major To be considered for Distinction, students must meet the appropriate grade standards (see chapter I) and submit a senior essay to the Economics department by the end of the next-to-last week of classes in the spring term. Students who fail to submit such a paper will not be considered for Distinction in the Major. Note that the paper must be written during the senior year and that students may submit a senior essay only if they have an approved prospectus and a senior essay adviser. Senior essays that are not submitted on time will receive a grade of Incomplete. Senior essays with grades of Incomplete without permission of the residential college dean are subject to grade penalties when submitted. Grade computation for Distinction does not include the introductory economics courses, the required mathematics course, related-credit courses, or courses taken outside Yale. Meetings for seniors to discuss the senior essay will be held on Wednesday, August 29, at 4:30 p.m. and Thursday, August 30, at 1:30 p.m. in Room 106, 28 Hillhouse Avenue. Details regarding calculations for Distinction in the Major will be discussed in these meetings, and senior essay guidelines will be distributed. Senior essay prospectus forms are due Monday, October 1, 2012.

Graduate courses Well-qualified students who have acquired the requisite background in undergraduate courses may, with written permission of the instructor, the director of undergraduate studies, and the director of graduate studies, be admitted to graduate courses and seminars.

Students who are planning graduate work in economics should take additional mathematics courses beyond the one-term course required for the major. Many graduate programs in economics require courses in multivariate calculus and linear algebra. Students are urged to discuss their plans for graduate work with the director of undergraduate studies as early in their college careers as possible.

Combined B.A./M.A. program Students interested in the B.A./M.A. program in Economics may submit a preliminary application in the fall of their junior year to the directors of undergraduate and graduate studies. Admission to this program is limited to students who have achieved A grades in at least two-thirds of all of their undergraduate courses and have also achieved A grades in all courses relating to the major. Applicants must have taken MATH 120 and 222 or equivalent. If granted permission, applicants take two of the following three graduate courses: ECON 500, 510, and 550. Only students who earn a grade of at least A– in each course will be considered for candidacy in the B.A./M.A. program. Applications are forwarded to a joint committee of Yale College and the Graduate School. This committee makes the final decision on admission of students to the program. It is

not possible to enter the B.A./M.A. program except in the fall of the junior year. If admitted to the program, a student completes eight term courses of graduate work in the junior and senior years; these eight courses must be economics courses designed primarily for Ph.D. students (courses in the International and Development Economics program do not count toward this requirement). The eight graduate courses include the two required for candidacy in the program as well as two chosen from the six core courses in the graduate sequence of microeconomics, macroeconomics, and econometrics. In addition, the student must complete the two-term senior departmental essay by enrollment in ECON 491 and 492. All students in the program must complete ECON 132 or 136 or a graduate course in econometrics. It is recommended that students complete the distributional requirements before the senior year. Appropriate graduate theory courses may be substituted for the core Economics courses 121 and 122 as well as the one-term econometrics course required of majors. The eight graduate courses must not be entirely concentrated in the final two terms, and students in the program must take at least six term courses outside the major during their last four terms at Yale and at least two undergraduate courses during their last two terms. Course schedules must be approved each term by both the director of undergraduate studies in Economics and the director of graduate studies in Economics. To receive the M.A. as well as the B.A. at the end of the senior year, the student must receive two terms of A in the graduate courses, an average of B in the remaining graduate courses, and a reader's grade of B+ or higher on the senior essay.

Students interested in this program should see the director of undergraduate studies before or during registration for the first term of the junior year.

Faculty representatives The Economics department has faculty representatives associated with each residential college. Students majoring in Economics should secure written approval of their course selection from one of their college representatives. Changes in their major program must be approved by a representative. Questions concerning the major or programs of study should be directed to a college representative. For 2012–2013 the college representatives are as follows:

BK, T. Guinnane, E. Weese	MC, G. Jaynes, M. Tartari
BR, K. Meghir, E. Washington	PC, D. Bergemann, G. Moscarini
CC, J. Horner, A. Kowalski	SY, J. Altonji, T. Bewley
DC, D. Keniston, C. Udry	SM, D. Atkin, E. Faingold
TD, D. Andrews, K. Rozen	ES, J. Geanakoplos, G. Maggi
JE, X. Chen, N. Qian	TC, P. Haile, Y. Kitamura

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Distribution of courses 1 intro course in microeconomics, 1 in macroeconomics (or equivalents with DUS permission); 1 math course, as specified

Specific courses required ECON 121 or 125; 122 or 126; 131, 132, or 136

Substitution permitted 1 related course in another dept, as specified

Senior requirement 2 courses numbered ECON 400–491, at least 1 in senior year

INTRODUCTORY COURSES

***ECON 108a or b, Quantitative Foundations of Microeconomics** Tolga Koker [F],
Katerina Simons [Sp]

Introductory microeconomics with a special emphasis on quantitative methods and examples. Intended for students with limited or no experience with calculus. Enrollment limited. Online preregistration is required on Tuesday, August 28; visit www.econ.yale.edu/undergrad/ugrad.htm for more information. May not be taken after ECON 110 or 115. QR, SO

***ECON 110a, An Introduction to Microeconomic Analysis** Tolga Koker,
Katerina Simons, and staff

Similar to ECON 115, but taught as a lecture discussion with limited enrollment. Enrollment limited to freshmen. Online preregistration is required on Tuesday, August 28; visit www.econ.yale.edu/undergrad/ugrad.htm for more information. May not be taken after ECON 108 or 115. QR, SO

***ECON 111b, An Introduction to Macroeconomic Analysis** Irasema Alonso,
Katerina Simons, and staff

Similar to ECON 116, but taught as a lecture discussion with limited enrollment. Enrollment limited to freshmen. Online preregistration is required on Tuesday, August 28; visit www.econ.yale.edu/undergrad/ugrad.htm for more information. May not be taken after ECON 116. Prerequisite: ECON 108, 110, or 115. SO

ECON 115a or b, Introductory Microeconomics Christopher Udry [F],
Eric Weese [Sp]

An introduction to the basic tools of microeconomics to provide a rigorous framework for understanding how individuals, firms, markets, and governments allocate scarce resources. The design and evaluation of public policy. May not be taken after ECON 108 or 110. QR, SO

ECON 116a or b, Introductory Macroeconomics Ray Fair [F], Aleh Tsyvinski [Sp]

An introduction that stresses how the macroeconomy works, including the determination of output, unemployment, inflation, interest rates, and exchange rates. Economic theory is applied to current events. May not be taken after ECON 111. Prerequisite: ECON 108, 110, or 115. SO

INTERMEDIATE COURSES

ECON 121a or b, Intermediate Microeconomics Larry Samuelson [F],
Eduardo Faingold [Sp]

The theory of resource allocation and its applications. Topics include the theory of choice, consumer and firm behavior, production, price determination in different market structures, welfare, and market failure. After introductory microeconomics and completion of the mathematics requirement for the major or its equivalent. Elementary techniques from multivariate calculus are introduced and applied, but prior knowledge is not assumed. May not be taken after ECON 125. QR, SO Core

***ECON 122a or b, Intermediate Macroeconomics** William Nordhaus and staff

Contemporary theories of employment, finance, money, business fluctuations, and economic growth. Their implications for monetary and fiscal policy. Emphasis on empirical studies, financial and monetary crises, and recent policies and problems. Enrollment limited in the fall term. After two terms of introductory economics and completion of the mathematics requirement for the major or its equivalent. May not be taken after ECON 126. QR, SO Core

ECON 125a, Microeconomic Theory Karen Rozen

Similar to ECON 121 but with a more intensive treatment of consumer and producer theory, and covering additional topics including choice under uncertainty, game theory, contracting under hidden actions or hidden information, externalities and public goods, and general equilibrium theory. Recommended for students considering graduate study in economics. After introductory economics, and MATH 118 or 120 or equivalent. May not be taken after ECON 121. QR, SO Core

***ECON 126b, Macroeconomic Theory** Staff

Similar to ECON 122 but with a more intensive treatment of the mathematical foundations of macroeconomic modeling, and with rigorous study of additional topics. Recommended for students considering graduate study in economics. After two terms of introductory economics, and MATH 118 or 120 or equivalent. May not be taken after ECON 122. QR, SO Core

ECONOMETRICS AND STATISTICS COURSES**ECON 131a or b, Econometrics and Data Analysis I** David Atkin [F], Nancy Qian [Sp]

Basic probability theory and statistics, distribution theory, estimation and inference, bivariate regression, introduction to multivariate regression, introduction to statistical computing. After introductory microeconomics and MATH 112 or equivalent. QR, SO Core

ECON 132a or b, Econometrics and Data Analysis II Konstantinos Meghir [F], Joseph Altonji [Sp]

Continuation of ECON 131, with a focus on multivariate regression. Topics include statistical inference, choice of functional form, heteroskedasticity, serial correlation, two-stage least squares, qualitative choice models, time series models, and forecasting. Emphasis on statistical computing and the mechanics of how to conduct and present empirical research. After two terms of introductory economics, completion of the mathematics requirement for the major, and ECON 131 or 135 or a course in the STAT 101–106 series. QR, SO Core

ECON 135a, Introduction to Probability and Statistics Staff

Foundations of mathematical statistics: probability theory, distribution theory, parameter estimation, hypothesis testing, regression, and computer programming. Recommended for students considering graduate study in economics. After introductory microeconomics and either MATH 118 or MATH 120 and 222 or 225. QR, SO

ECON 136b, Econometrics Melissa Tartari

Continuation of ECON 135 with a focus on econometric theory and practice: problems that arise from the specification, estimation, and interpretation of models of economic behavior. Topics include classical regression and simultaneous equations models; panel data; and

limited dependent variables. Recommended for students considering graduate study in economics. After ECON 135 or STAT 241 and 242. QR, SO Core

FIELD COURSES

ECON 159a, Game Theory Benjamin Polak

An introduction to game theory and strategic thinking. Ideas such as dominance, backward induction, Nash equilibrium, evolutionary stability, commitment, credibility, asymmetric information, adverse selection, and signaling are applied to games played in class and to examples drawn from economics, politics, the movies, and elsewhere. After introductory microeconomics. No prior knowledge of game theory assumed. QR, SO

ECON 170a, Health Economics and Public Policy Howard Forman

Application of economic principles to the study of the U.S. health care system. Emphasis on basic principles about the structure of the U.S. system, current problems, proposed solutions, and the context of health policy making and politics. After introductory microeconomics. SO

***ECON 180a or b, Introduction to the Chinese Economy** Staff

An overview of the Chinese economy, with attention to its rapid growth in the past two decades and its current challenges. The cultural and political background of the economy, China's market transition, manufacturing and financial sectors, foreign trade, foreign direct investment and technology transfer, and the reform of state-owned enterprises. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. SO

ECON 182b/HIST 135b, American Economic History Melinda Miller

The growth of the American economy since 1790, both as a unique historical record and as an illustration of factors in the process of economic development. The American experience viewed in the context of its European background and patterns of industrialization overseas. After introductory microeconomics. WR, SO

ECON 184b/GLBL 234b, International Economics Peter Schott

Introduction to conceptual tools useful for understanding the strategic choices made by countries, firms, and unions in a globalized world. After two terms of introductory economics. SO

ECON 187a, European Economic History, 1815–1945 Timothy Guinnane

European economic growth and development from the industrialization of Germany and other Continental countries in the early nineteenth century through World War II. The role of institutional development, the role of trade and imperialism, agricultural improvements, and industrialization. After two terms of introductory economics. SO

ECON 200b, Firms, Markets, and Competition Mitsuru Igami, Philip Haile

Analysis of imperfectly competitive markets, focusing on the interactions among firm behavior, market structure, and market outcomes. Topics include oligopoly, collusion, predation, firm entry, advertising, and price discrimination as well as public policy implications of market behavior. After intermediate microeconomics or equivalent. QR, SO

ECON 211a/GLBL 211a/SAST 278a, Economic Performance and Challenges in India

Rakesh Mohan

For description see under Global Affairs.

ECON 251b, Financial Theory John Geanakoplos

Capital asset pricing model, arbitrage pricing theory, option pricing, social security, operation of security exchanges, investment banks, securitization, mortgage derivatives, interest rate derivatives, hedge funds, financial crises, agency theory, and financial incentives. After introductory microeconomics. QR, SO

ECON 252a, Financial Markets Robert Shiller

An overview of the ideas, methods, and institutions that permit human society to manage risks and foster enterprise. Description of practices today and analysis of prospects for the future. Introduction to risk management and behavioral finance principles to understand the functioning of securities, insurance, and banking industries. After two terms of introductory economics. SO

ECON 275b/PLSC 218b, Public Economics Ebonya Washington

The role of government in the economy and in our economic lives. Reasons for government intervention in the market economy and the impact of government expenditure programs and taxation systems on welfare and behavior. Tools of microeconomics applied to issues such as government response to global warming, the impact of redistribution and social insurance on individual behavior, school choice, social security vs. private retirement savings accounts, and government vs. private health insurance. After introductory microeconomics. SO

ECON 276a, Economics and Comparative Private Law Richard Brooks

Study of economic relationships organized through written contracts and other private legal structures. The body of law and institutions that govern the organization of economic exchange and influence its efficiency. Comparative legal and institutional approach. Prerequisites: ECON 115 and MATH 112 or equivalents. SO

***ECON 278a, Law and Economics** Marc Chan

Basic tools of economic analysis used to study law and the legal process. Focus on China's legal system, including its role in economic reform and a comparison with legal systems in Western countries. The economics of property, contract, and tort law; economics of crime and punishment; the role of law in the proper functioning of markets; where and how state interventions should occur; the effects of laws on people's incentives. Prerequisite: ECON 115 or equivalent. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program.

ECON 280a/AFAM 282a, Poverty under Postindustrial Capitalism Gerald Jaynes

For description see under African American Studies.

ECON 325b, Economics of Developing Countries Nancy Qian

Analysis of current problems of developing countries. Emphasis on the role of economic theory in informing public policies to achieve improvements in poverty and inequality, and on empirical analysis to understand markets and responses to poverty. Topics include microfinance, education, health, agriculture, intrahousehold allocations, gender, and corruption. After introductory microeconomics. SO

ECON 330a⁶/EVST 340a, Economics of Natural Resources Robert Mendelsohn
Microeconomic theory brought to bear on current issues in natural resource policy. Topics include regulation of pollution, hazardous waste management, depletion of the world's forests and fisheries, wilderness and wildlife preservation, and energy planning. After introductory microeconomics. QR, SO

***ECON 331b, The Economics of Energy and Climate Change** William Nordhaus
The essentials of energy and environmental economics, with applications. Analysis of core topics in public goods, intertemporal choice, uncertainty, decision theory, and exhaustible resources. Applications include energy security, nuclear power, the relationship between nuclear power and nuclear proliferation, and climate change. Enrollment limited. Prerequisite: two terms of introductory economics. SO

ECON 338a/EAST 338a/GLBL 318a, The Next China Stephen Roach
For description see under Global Affairs.

ECON 350a, Mathematical Economics: General Equilibrium Theory Truman Bewley
An introduction to general equilibrium theory and its extension to equilibria involving uncertainty and time. Discussion of the economic role of insurance and of intertemporal models, namely, the overlapping generations model and the optimal growth theory model. Recommended for students considering graduate study in economics. After MATH 118 or 120, and intermediate microeconomics. QR, SO

ECON 351b, Mathematical Economics: Game Theory Johannes Horner
Introduction to game theory and choice under uncertainty. Analysis of the role of information and uncertainty for individual choice behavior, as well as application to the decision theory under uncertainty. Analysis of strategic interaction among economic agents, leading to the theory of auctions and mechanism design. Recommended for students considering graduate study in economics. After MATH 118, 120, and intermediate microeconomics. QR, SO

ADVANCED LECTURE COURSES

Senior Economics majors may preregister for advanced lecture courses; see www.econ.yale.edu/undergrad/ugrad.htm for instructions. Other interested students may enroll with permission of the instructor during the course selection period.

***ECON 401a, Labor Economics and Welfare Policies** Melissa Tartari
Overview of the state of knowledge in the field of labor economics; introduction to research methods. Labor markets, labor supply and welfare programs, retirement and social security, wage determination, human capital, migration, and theories of unemployment. Prerequisites: intermediate microeconomics and econometrics. SO

***ECON 403a, Trade and Development** David Atkin
Comparison of selected developing countries, where international trade has brought about rapid growth and large-scale reductions in poverty, with other countries, where global trade has increased inequality and brought little growth. Both theoretical models and empirical evidence are used. Prerequisites: intermediate microeconomics and an econometrics or statistics course. SO

***ECON 405a, Economics of Health and Health Care** Amanda Kowalski

Economic principles and empirical methods applied to issues in health economics. Discussion of policies to address market failures in health care markets. Consumer behavior in medical markets, valuing medical improvements, and evaluating health insurance reform. Prerequisites: intermediate microeconomics and econometrics. SO

[ECON 407b/GLBL 310b, International Finance]***ECON 408b, International Trade Policy** Giovanni Maggi

Analysis of issues concerning international trade policy and agreements, including recent academic research. Welfare analysis of trade policy; the political economy of trade policy; international trade agreements. Attention to both theoretical methods and empirical research. Prerequisites: intermediate microeconomics and ECON 184. SO

SEMINARS

Senior Economics majors may preregister for departmental seminars; see www.econ.yale.edu/undergrad/ugrad.htm for instructions. Other interested students may enroll with permission of the instructor during the course selection period.

***ECON 450a, Investment Analysis** David Swensen, Dean Takahashi

Examination of investment management in theory and practice. Discussion of asset allocation, investment strategy, and manager selection from the perspective of an institutional investor. Focus on the degree of market efficiency and opportunity for generating attractive returns. SO

***ECON 453a, Antitrust Law and Economics** Alvin Klevorick

The character, logic, and economic effects of U.S. antitrust laws, drawing on legal and economic analyses. Major areas of antitrust law: price fixing and other horizontal restraints of trade, vertical restraints of trade, monopolization, and mergers. After intermediate microeconomics or equivalent. Preference to students who have completed ECON 200. SO

***ECON 454a/GLBL 331a^G, Evolution of Central Banking and Responses to Crises**

Rakesh Mohan

For description see under Global Affairs.

***ECON 455b, Information Economy** Judith Chevalier

The economics of information, communication, and electronic commerce. The communications infrastructure – telephone, broadband, and wireless communications – and the regulation and adoption of these technologies; the basic economics of selected uses of the Internet; the organization of businesses as they are affected by new communications technologies; intellectual property and antitrust issues in the information economy. Prerequisite: introductory microeconomics. SO

***ECON 456a, Private Equity Investing** Michael Schmertzler

A case-oriented study of principal issues and investment types found in substantial private equity portfolios. Discussion of enterprise valuation, value creation, business economics, negotiation, and legal structure, based on primary source materials and original cases. Prerequisites: intermediate microeconomics and econometrics. SO

***ECON 459a, Corporate Finance** Tri Dang and staff

Selected themes in corporate finance: financial instruments and financing patterns, the valuation of assets, capital structure decisions, taxes, financial contracting, costs of debt and equity finance, internal and external finance, venture capital and private equity finance, and security design. After introductory microeconomics. SO

***ECON 461b, Economics, Addiction, and Public Policy** Jody Sindelar

Smoking, alcoholism, illicit drugs, and obesity studied from economic and policy perspectives. Focus on causes of and solutions to problems. After introductory microeconomics. SO

***ECON 462b/EP&E 228b/GLBL 316b/LAST 410b, The Economics of Human Capital in Latin America** Douglas McKee

Economic issues related to a population's education, skills, and health; focus on contemporary Latin American societies. Determinants of health and education; evaluation of human capital development policies; the role of human capital in a variety of economic contexts, including the labor market, immigration, child investment, intrahousehold bargaining, inequality, and poverty. Prerequisites: intermediate microeconomics and econometrics. SO

***ECON 465a/EP&E 224a, Debating Globalization** Ernesto Zedillo

Facets of contemporary economic globalization, including trade, investment, and migration. Challenges and threats of globalization: inclusion and inequality, emerging global players, global governance, climate change, and nuclear weapons proliferation. Prerequisite: background in international economics and data analysis. Preference to seniors majoring in Economics or EP&E. SO RP

***ECON 466a/EP&E 448a, Economics of Aging** Douglas McKee

Overview of the economics of aging and retirement. Saving for retirement, the decision to retire, design of social security systems, how families decide who cares for the elderly, and how older people decide to whom to leave their assets. Prerequisites: intermediate microeconomics and econometrics. SO

***ECON 467b, Economic Evolution in Latin America and the Caribbean**

Ernesto Zedillo

Economic evolution and challenges in Latin American and Caribbean countries, with a focus on contemporary economic conditions. Obstacles and opportunities in the pursuit of full development; distinctive phases of the countries' economic histories since independence. Prerequisites: intermediate microeconomics and macroeconomics. SO

***ECON 470a/EP&E 413a, Topics in American Economic History** Melinda Miller

An empirical study of nineteenth- and early twentieth-century financial markets. Topics include institutions, banking, panics and crashes, the gold standard, capital market integration, deflation, and the Great Depression. Prerequisites: intermediate microeconomics, and econometrics or a course in the STAT 101–106 series. SO

***ECON 471b, Topics in Cooperative Game Theory** Pradeep Dubey

The theory and applications of cooperative games. Topics include matching, bargaining, cost allocation, market games, voting games, and games on networks. Prerequisite: intermediate microeconomics.

***ECON 473b/EP&E 227b/PLSC 343b, Equality** John Roemer

For description see under Ethics, Politics, & Economics.

***ECON 474b/EAST 454b/GLBL 312b, Economic and Policy Lessons from Japan**

Stephen Roach

For description see under Global Affairs.

***ECON 475b, Discrimination in Law, Theory, and Practice** Gerald Jaynes

How law and economic theory define and conceptualize economic discrimination; whether economic models adequately describe behaviors of discriminators as documented in court cases and government hearings; the extent to which economic theory and econometric techniques aid our understanding of actual marketplace discrimination. Prerequisites: introductory microeconomics and at least one additional course in Economics, African American Studies, Ethnicity, Race, and Migration, or Women's, Gender, and Sexuality Studies.

***ECON 478b, Bounded Rationality** Kareen Rozen

Introduction to decision theory, which emphasizes the limitations individuals face when making economic decisions. The imperfect ability of decision makers to reason and remember, to calculate with precision, and to ignore the context or framing of a problem. Defining economic rationality; deviations from rationality and their influence on markets; approaches to modeling bounded rationality. Prerequisite: intermediate microeconomics.

[ECON 482b/EP&E 256b, Labor and Public Policy]***ECON 484a, The United States Banking System** Nicholas Perna

The structure and functions of the U.S. banking system, with special attention to the role of the Federal Reserve, private sector banks, and related financial institutions in the overall economy. The role of monetary policy in promoting economic growth and stability; the U.S. banking system as compared with foreign systems; and future evolution of U.S. banking, including the role of electronic commerce. After intermediate macroeconomics. SO

***ECON 491a and 492b, The Senior Essay** Anthony Smith

Students deciding to write one-term senior essays by enrolling in ECON 491, or two-term senior essays by enrolling in ECON 491 and 492, must choose their topics and advisers by Monday, October 1, 2012. One-term senior essays are due at the end of the last week of classes in the fall term. In order to be considered for Distinction in the Major, students must submit three copies of their essay to the Economics department office two weeks prior to the last week of classes in the spring term. This is also the due date for two-term senior essays. Advisers are chosen with the assistance of the director of undergraduate studies. The format and character of the departmental senior essay may vary to suit the interest of the student and the demands of the topic, but it is expected that the tools and concepts of economic analysis will be employed and that the essay will contain original research. Paper lengths may vary; the normal expectation is thirty pages. Students may receive up to two credits for the senior essay, though it counts as only one departmental seminar whether one or two terms are taken. The first meeting is on Wednesday, August 29, from 4:30 to 5:20, or on Thursday, August 30, from 1:30 to 2:20, in Room 106, 28 Hillhouse Ave. Seniors planning to write a senior essay, including those who plan to write a spring-term essay, should attend this meeting. Details regarding calculation of Distinction will be discussed

and senior essay guidelines will be distributed.

***ECON 498a and 499b, Directed Reading** Anthony Smith

Students desiring a directed reading course in special topics in economics not covered in other graduate or undergraduate courses may elect this course, usually not more than once, with written permission of the director of undergraduate studies and of the instructor. The instructor meets with the student regularly, typically for an hour a week, and the student writes a paper or a series of short essays. Does not meet the requirement for a departmental seminar.

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Graduate courses in Economics are open to qualified undergraduates. Descriptions of courses are available in the Economics department office. Permission of the instructor and of the director of graduate studies is required.

Economics and Mathematics

Director of undergraduate studies (Economics): Anthony Smith, Rm. 306, 28 Hillhouse Ave., 432-3583 or 432-3574, qazi.azam@yale.edu; director of undergraduate studies (Mathematics): Andrew Casson, 216 LOM, 432-7056, andrew.casson@yale.edu

The Economics and Mathematics major is intended for students with a strong intellectual interest in both mathematics and economics and for students who may pursue a graduate degree in economics.

Prerequisites The major has prerequisites in both mathematics and economics: MATH 120; ECON 110 or 115; and ECON 111 or 116. With permission of the directors of undergraduate studies, upper-level courses may be substituted for prerequisite courses. Upper-level courses substituted for prerequisites do not count toward the total of twelve term courses (beyond the introductory level in economics and mathematics) required for the major.

Requirements of the major A total of twelve term courses is required beyond the introductory level in economics and in mathematics: seven term courses in economics and five term courses in mathematics. These courses must include:

1. One intermediate microeconomics course chosen from ECON 125 or 121, and one intermediate macroeconomics course chosen from ECON 126 or 122
2. A year of mathematical economics, ECON 350 and 351
3. Two term courses of econometrics, ECON 135 and 136 (with permission of the director of undergraduate studies in Economics, STAT 241 and 242 may be taken instead of ECON 135, in which case they count as one economics course and not as mathematics courses)
4. A term course in linear algebra, MATH 222 or 225 (or 230 and 231, for two course credits)
5. An introductory term course in analysis, MATH 300 or 301
6. Senior seminar in mathematics, MATH 480

Because optimization is an important theme in mathematics and is particularly relevant for economics, OPRS 235 is recommended for students majoring in Economics and Mathematics and can be counted toward either the Mathematics or Economics course requirements.

To be considered for Distinction in the Major, students must meet specified grade standards (see chapter I) and submit a senior essay written either in an Economics department seminar or in ECON 491 or in 491 and 492 to the Economics department; for details see under Economics. (The paper must be written in a course taken in the senior year.) All courses beyond the introductory level in Mathematics and Economics are counted in the computation of grades for Distinction.

Students interested in the major should consult both directors of undergraduate studies, and verify with each that their proposed program meets the relevant guidelines. Registration forms must be signed by both directors of undergraduate studies each term.

REQUIREMENTS OF THE MAJOR

Prerequisites MATH 120; ECON 110 or 115; ECON 111 or 116

Number of courses 12 term courses beyond prereqs (incl senior req)

Distribution of courses 5 courses in math and 7 in econ

Specific courses required ECON 121 or 125; ECON 122 or 126; ECON 135, 136, 350, 351; MATH 222 or 225 (or 230, 231); MATH 300 or 301

Substitution permitted STAT 241 and 242 for ECON 135, with permission of DUS in Econ

Senior requirement Senior sem in math (MATH 480); optional senior essay in Econ

Education Studies

Director: Linda Cole-Taylor, Rm. 203, 35 Broadway, 432-4631, linda.cole-taylor@yale.edu

Yale's Education Studies program combines theory, research, and practice to illuminate and confront the complexities of schooling, learning, and teaching. Through seminars, field placements, and direct work with faculty, the program affords opportunities to reorient and enhance the way younger students think and achieve. Course offerings are designed to examine the system of education as a civic institution and to challenge and discipline students' thinking about educational issues from historical, philosophical, and sociological perspectives.

***EDST 125b/CHLD 125b/PSYC 125b, Child Development** Nancy Close,
Carla Horwitz

For description see under Child Study Center.

***EDST 127a/CHLD 127a/PSYC 127a, Early Childhood Education: Implications of Curriculum and Policy** Carla Horwitz

For description see under Child Study Center.

***EDST 128b/CHLD 128b/PSYC 128b, Language, Literacy, and Play** Nancy Close,
Carla Horwitz

For description see under Child Study Center.

***EDST 190a or b, Schools, Community, and the Teacher** Linda Cole-Taylor

An introduction to the intellectual dilemmas that are a part of schooling in America. Illumination of social, philosophical, and institutional forces that shape the teaching and learning environment. Taken in conjunction with structured observation in a local school. SO RP

***EDST 191a or b/CHLD 126a or b, Clinical Child Development and Assessment of Young Children** Nancy Close

Exposure to both conceptual material and clinical observations on the complexity of assessing young children and their families. SO ½ Course cr

***EDST 192a or b, Observation** Linda Cole-Taylor

Directed clinical observation in a middle or high school in New Haven. Taken in conjunction with EDST 190. RP ½ Course cr

***EDST 291a, The Teaching of History** Linda Cole-Taylor

The educational challenges embedded in what it means to know, learn, and understand history. A review of guiding principles specific to this content area, in the context of a broader philosophy of education. RP

***EDST 293a, The Teaching of Mathematics** Karen Campe

Theory and practice combined within the discipline of mathematics; reference to other mathematically related fields. Approaches to ways that younger students can best approach mathematical thinking. Instructional strategies, practical application, and the development of a curricular unit. Open to all undergraduates. RP

***EDST 471a or b, Independent Study** Linda Cole-Taylor

Readings in educational topics, history, policy, or methodology; weekly tutorial and a substantial term essay. RP

Egyptian

(See under Near Eastern Languages and Civilizations.)

Electrical Engineering

Director of undergraduate studies: Mark Reed, 523 BCT, 432-4306, mark.reed@yale.edu

FACULTY OF THE DEPARTMENT OF ELECTRICAL ENGINEERING

Professors James Duncan, Jung Han, Roman Kuc, Tso-Ping Ma, A. Stephen Morse, Kumpati Narendra, Mark Reed, Peter Schultheiss (*Emeritus*), J. Rimas Vaišnys

Associate Professors Eugenio Culurciello (*Adjunct*), Peter Kindlmann (*Adjunct*), Richard Lethin (*Adjunct*), Andreas Savvides, Lawrence Staib, Hemant Tagare, Hongxing Tang, Sekhar Tatikonda

Assistant Professor Minjoo Lee

Electrical Engineering broadly encompasses disciplines such as microelectronics, photonics, computer engineering, signal processing, control systems, and communications, all of which enable and underpin a modern technological society. Three degree programs are offered that allow students to select the level of technical depth appropriate for individual goals. The B.A. in Engineering Sciences (Electrical) is suitable for a career outside technology, in which a student nevertheless benefits from an appreciation of electrical engineering perspectives. The B.S. in Engineering Sciences (Electrical) provides more technical exposure while retaining academic options outside the electrical engineering core area. The B.S. in Electrical Engineering, accredited by the Engineering Accreditation Commission of ABET, Inc., is appropriate for highly motivated students who are interested in learning the scientific fundamentals and the technologies and creative processes of contemporary electrical engineering. In a world deeply dependent on technology, recent ABET graduates have found their degree a particularly effective credential not only for further work in engineering, but also for careers in business, management consulting, investment banking, medicine, and intellectual property law.

Because the introductory courses are common to all three degree programs, the student does not usually need to make a final choice before the junior year. An interdepartmental program with Computer Science is also offered (see under Electrical Engineering and Computer Science), and students can pursue interdisciplinary studies in other areas of engineering and science.

Prerequisites All three degree programs require MATH 112, 115, ENAS 151 or MATH 120 or higher, ENAS 130 or CPSC 112 or higher, and PHYS 180, 181 or higher (PHYS 170, 171 is acceptable for the B.A. degree). Acceleration credits awarded on entrance can be used to satisfy the MATH 112 and 115 requirements. Students whose preparation exceeds the level of ENAS 151 or MATH 120 are asked to take a higher-level mathematics course instead, such as MATH 250. Similarly, students whose preparation at entrance exceeds the level of PHYS 180, 181 are asked to take higher-level physics courses instead, such as PHYS 200, 201. Students whose programming skills exceed the level of ENAS 130 or CPSC 112 are asked to take a more advanced programming course instead, such as CPSC 201; consult with the director of undergraduate studies.

B.S. degree program in Electrical Engineering The ABET-accredited B.S. in Electrical Engineering requires, beyond the prerequisites, four term courses in mathematics and science and thirteen term courses in topics in engineering. These courses include:

1. Mathematics and basic science (four term courses): ENAS 194; MATH 222 or 225; APHY 322 or equivalent; STAT 241 or equivalent.
2. Electrical engineering and related subjects (thirteen term courses): EENG 200, 201, 202, 203, 310, 320, 325, 348, 481 (the senior project); and four engineering electives, at least three of which should be at the 400 level. CPSC 365 and all 400-level Computer Science courses qualify as ABET electives.

Each student's program must be approved by the director of undergraduate studies.

For students who have taken the equivalent of one year of calculus in high school, a typical ABET-accredited B.S. program might include:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
EENG 200	CPSC 112 or ENAS 130	APHY 322	EENG 481
EENG 201	EENG 202	EENG 310	Four electives
ENAS 151 or MATH 120	EENG 203	EENG 320	
MATH 222	ENAS 194	EENG 325	
PHYS 180	STAT 241	EENG 348	
PHYS 181			

For students who start with MATH 112, a typical ABET-accredited B.S. program might include:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CPSC 112	EENG 200	EENG 202	APHY 322
EENG 201	ENAS 151 or MATH 120	EENG 203	EENG 481
MATH 112	ENAS 194	EENG 310	STAT 241
MATH 115	MATH 222	EENG 320	Four electives
	PHYS 180	EENG 325	
	PHYS 181	EENG 348	

Faster-paced and slower-paced variations are possible, depending on the student's level of preparation and commitment to the major; consult with the director of undergraduate studies.

B.S. degree program in Engineering Sciences (Electrical) This program requires fewer technical courses and allows more freedom for work in technical areas outside the traditional electrical engineering disciplines (e.g., economics or cognitive psychology). It requires thirteen technical term courses beyond the prerequisites, specifically: MATH 222 or 225; ENAS 194; EENG 200, 201, 202, 203; EENG 471 or, with permission of the director of undergraduate studies, 481 (the senior project); and six electives approved by the director of undergraduate studies, at least three of which must be at the 400 level.

For students who have taken the equivalent of one year of calculus in high school, a typical program for this degree might include:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
EENG 200	CPSC 112	Three electives	EENG 471
EENG 201	EENG 202		Three electives
ENAS 151 or MATH 120	EENG 203		
MATH 222	ENAS 194		
PHYS 180			
PHYS 181			

For students who start with MATH 112, a typical program for this degree might include:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CPSC 112	EENG 200	EENG 202	EENG 471
EENG 201	ENAS 151 or MATH 120	EENG 203	Four electives
MATH 112	ENAS 194	Two electives	
MATH 115	MATH 222		
	PHYS 180		
	PHYS 181		

Faster-paced and slower-paced variations are possible, depending on the student's level of preparation and commitment to the major; consult with the director of undergraduate studies. The implied flexibility during the junior and senior years in the schedules above is often used to accommodate a second major, such as Economics, or to master a related technical area, such as recent developments in biology or environmental studies.

B.A. degree program in Engineering Sciences (Electrical) This program is appropriate for those planning a career in fields such as business, law, or medicine where scientific and technical knowledge is likely to be useful. It requires eight technical term courses beyond the prerequisites, specifically: MATH 222 or 225, or ENAS 194; EENG 200, 201, 202, and 471 (the senior requirement); and three approved electives.

Senior requirement A research or design project carried out in the fall term of the senior year is required in all three programs. The student must take EENG 471 or 481, present a written report, and make an oral presentation. The written report is due in the departmental office by the last day of reading period. Arrangements to undertake a project in fulfillment of the senior requirement must be made by the end of the reading period of the preceding term, when a registration form (available from the departmental office), signed by the intended faculty adviser and the director of undergraduate studies, must be submitted.

Approval of programs All Electrical Engineering and Engineering Sciences majors must have their programs approved by the director of undergraduate studies. Arrangements to take EENG 471, 472, or 481 must be made during the term preceding enrollment in the course. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

REQUIREMENTS OF THE MAJOR

ELECTRICAL ENGINEERING, B.S.

Prerequisites MATH 112, 115; ENAS 151 or MATH 120 or higher; ENAS 130 or CPSC 112 or higher; PHYS 180, 181 or higher

Number of courses 17 term courses beyond prereqs, incl senior req

Specific courses required ENAS 194; MATH 222 or 225; APHY 322; STAT 241; EENG 200, 201, 202, 203, 310, 320, 325, 348

Distribution of courses 4 engineering electives, 3 at 400 level

Senior requirement One-term design project (EENG 481)

ENGINEERING SCIENCES (ELECTRICAL), B.S. AND B.A.

Prerequisites *Both degrees*—MATH 112, 115; ENAS 151 or MATH 120 or higher; ENAS 130 or CPSC 112 or higher; *B.S.*—PHYS 180, 181 or higher; *B.A.*—PHYS 170, 171 or higher

Number of courses *B.S.*—13 term courses beyond prereqs, incl senior req; *B.A.*—8 term courses beyond prereqs, incl senior req

Specific courses required *B.S.*—ENAS 194; MATH 222 or 225; EENG 200, 201, 202, 203; *B.A.*—1 from ENAS 194, or MATH 222 or 225; EENG 200, 201, 202

Distribution of courses *B.S.*—6 electives approved by DUS, 3 at 400 level; *B.A.*—3 electives approved by DUS

Senior requirement *B.S.*—one-term research or design project (EENG 471 or, with permission of DUS, 481); *B.A.*—one-term research or design project (EENG 471)

EENG 200a, Introduction to Electronics Tso-Ping Ma

Introduction to the basic principles of analog and digital electronics. Analysis, design, and synthesis of electronic circuits and systems. Topics include current and voltage laws that govern electronic circuit behavior, node and loop methods for solving circuit problems, DC and AC circuit elements, frequency response, nonlinear circuits, semiconductor devices, and small-signal amplifiers. A lab session approximately every other week. After or concurrently with MATH 115 or equivalent. QR

EENG 201b, Introduction to Computer Engineering Andreas Savvides

Introduction to the theoretical principles underlying the design and programming of simple processors that can perform algorithmic computational tasks. Topics include data representation in digital form, combinational logic design and Boolean algebra, sequential logic design and finite state machines, and basic computer architecture principles. Hands-on laboratory involving the active design, construction, and programming of a simple processor. QR

EENG 202a, Communications, Computation, and Control Sekhar Tatikonda

Introduction to systems that sense, process, control, and communicate. Topics include communication systems (compression, channel coding); network systems (network architecture and routing, wireless networks, network security); estimation and learning (classification, regression); and signals and systems (linear systems, Fourier techniques, bandlimited sampling, modulation). MATLAB programming and laboratory experiments illustrate concepts. Prerequisite: MATH 115. QR

EENG 203b, Circuits and Systems Design Mark Reed

Introduction to design in a laboratory setting. A wide variety of practical systems are designed and implemented to exemplify the basic principles of systems theory. Systems include audio filters and equalizers, electrical and electromechanical feedback systems, radio transmitters and receivers, and circuits for sampling and reconstructing music. Prerequisites: EENG 200 and 202. QR RP

***EENG 235a and 236b, Special Projects** Mark Reed

Faculty-supervised individual or small-group projects with emphasis on laboratory experience, engineering design, or tutorial study. Students are expected to consult the director of undergraduate studies and appropriate faculty members about ideas and suggestions for suitable topics during the term preceding enrollment. These courses may be taken at any time during the student's career. Enrollment requires permission of both the instructor and the director of undergraduate studies, and submission to the latter of a one- to two-page prospectus signed by the instructor. The prospectus is due in the departmental office one day prior to the date that the student's course schedule is due. Additional sections offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. $\frac{1}{2}$ Course cr per term

EENG 310b, Signals and Systems Kumpati Narendra

Concepts for the analysis of continuous and discrete-time signals including time series. Techniques for modeling continuous and discrete-time linear dynamical systems including linear recursions, difference equations, and shift sequences. Topics include continuous and discrete Fourier analysis, Laplace and Z transforms, convolution, sampling, data smoothing, and filtering. Prerequisite: MATH 115. Recommended preparation: EENG 202. QR

***EENG 320a, Introduction to Semiconductor Devices** Mark Reed

An introduction to the physics of semiconductors and semiconductor devices. Topics include crystal structure; energy bands in solids; charge carriers with their statistics and dynamics; junctions, p-n diodes, and LEDs; bipolar and field-effect transistors; and device fabrication. Additional lab one afternoon per week. Prepares for EENG 325 and 401. Prerequisites: PHYS 180 and 181 or permission of instructor. Recommended preparation: EENG 200. QR, SC

EENG 325b, Electronic Circuits Hongxing Tang

Models for active devices; single-ended and differential amplifiers; current sources and active loads; operational amplifiers; feedback; design of analog circuits for particular functions and specifications, in actual applications wherever possible, using design-oriented methods. Includes a team-oriented design project for real-world applications, such as a high-power stereo amplifier design. Electronics Workbench is used as a tool in computer-aided design. Additional lab one afternoon per week. Prerequisite: EENG 200. QR RP

EENG 348a, Digital Systems Roman Kuc and staff

Development of engineering skills through the design and analysis of digital logic components and circuits. Introduction to gate-level circuit design, beginning with single gates and building up to complex systems. Hands-on experience with circuit design using computer-aided design tools and microcontroller programming. Recommended preparation: EENG 201. QR

EENG 397b/ENAS 397b, Mathematical Methods in Engineering J. Rimantas Vaišnys

Exploration of several areas of mathematics useful in science and engineering; recent approaches to problem solving made possible by developments in computer software. Mathematica and Eureka are used to investigate and solve problems involving nonlinear differential equations, complex functions, and partial differential equations. Prerequisites: MATH 222, and ENAS 194 or MATH 246, or equivalents; familiarity with computer programming. QR

EENG 401b^c/APHY 321b^c, Semiconductor Silicon Devices and Technology

Minjoo Lee

Introduction to integrated circuit technology, theory of semiconductor devices, and principles of device design and fabrication. Laboratory involves the fabrication and analysis of semiconductor devices, including Ohmic contacts, Schottky diodes, p-n junctions, solar cells, MOS capacitors, MOSFETs, and integrated circuits. Prerequisite: EENG 320 or equivalent or permission of instructor. QR, SC

EENG 406a^c, Photovoltaic Energy Minjoo Lee

Survey of photovoltaic energy devices, systems, and applications, including review of optical and electrical properties of semiconductors. Topics include solar radiation, solar cell design, performance analysis, solar cell materials, device processing, photovoltaic systems, and economic analysis. Prerequisite: EENG 320 or permission of instructor. QR, SC

EENG 408a^c, Electronic Materials: Fundamentals and Applications Jung Han

Survey and review of fundamental issues associated with modern microelectronic and optoelectronic materials. Topics include band theory, electronic transport, surface kinetics,

diffusion, materials defects, elasticity in thin films, epitaxy, and Si integrated circuits. Prerequisite: EENG 320 or permission of instructor. QR, SC

***EENG 410b⁶, Physics and Devices of Optical Communication** Jung Han

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. QR, SC

[EENG 412b⁶, Advanced Semiconductor Fundamentals]

***EENG 425a⁶, Introduction to VLSI System Design** Richard Lethin

Chip design; integrated devices, circuits, and digital subsystems needed for design and implementation of silicon logic chips. CMOS fabrication overview, complementary logic circuits, design methodology, computer-aided design techniques, timing, and area estimation. Exploration of recent and future chip technologies. A course project is the design, through layout, of a digital CMOS subsystem chip; selected projects are fabricated for students. Prerequisite: familiarity with computer programming and with circuits at the level of introductory physics. QR

EENG 428a⁶, Sensors and Biosensors Eugenio Culurciello and staff

Analysis of the design of integrated sensors, using modern fabrication technologies and recent circuit topologies. Creation of a framework for sensor design that attains performance as close as possible to the fundamental limits of transduction and processing. Particular attention to mapping algorithms and topologies into circuits that can match the physical level of the quantities to be sensed. Students develop sensory systems for biomedical application and for sensor networks. QR

EENG 436b, Systems and Control Kumpati Narendra

Design of feedback control systems with applications to engineering, biological, and economic systems. Topics include state-space representation, stability, controllability, and observability of discrete-time systems; system identification; optimal control of systems with multiple outputs. Prerequisites: ENAS 194, MATH 222 or 225, and EENG 310 or permission of instructor. QR

***EENG 442a⁶/AMTH 342a, Linear Systems** A. Stephen Morse

Introduction to finite-dimensional, continuous, and discrete-time linear dynamical systems. Exploration of the basic properties and mathematical structure of the linear systems used for modeling dynamical processes in robotics, signal and image processing, economics, statistics, environmental and biomedical engineering, and control theory. Prerequisite: MATH 222 or permission of instructor. QR

[EENG 444b⁶, Digital Communication Systems]

EENG 450b, Applied Digital Signal Processing Roman Kuc and staff

An analysis, by computer, of processing requirements. Relevant probability and estimation theories applied to measurements corrupted by noise. Point estimates and system identification from random processes. MATLAB simulations verify the analysis. Prerequisite: EENG 310 or permission of instructor. QR

***EENG 460a^G/CPSC 436a^G, Networked Embedded Systems and Sensor Networks**

Andreas Savvides

Introduction to the fundamental concepts of networked embedded systems and wireless sensor networks, presenting a cross-disciplinary approach to the design and implementation of smart wireless embedded systems. Topics include embedded systems programming concepts, low-power and power-aware design, radio technologies, communication protocols for ubiquitous computing systems, and mathematical foundations of sensor behavior. Laboratory work includes programming assignments on low-power wireless devices. Open to seniors in Electrical Engineering or Computer Science only. Prerequisite: CPSC 223 or equivalent programming experience in a high-level language.

***EENG 471a and 472b, Advanced Special Projects** Mark Reed

Faculty-supervised individual or small-group projects with emphasis on research (laboratory or theory), engineering design, or tutorial study. Students are expected to consult the director of undergraduate studies and appropriate faculty members about ideas and suggestions for suitable topics during the term preceding enrollment. These courses may be taken at any appropriate time during the student's career and may be taken more than once. Enrollment requires permission of both the instructor and the director of undergraduate studies, and submission to the latter of a one- to two-page prospectus signed by the instructor. The prospectus is due in the departmental office one day prior to the date that the student's course schedule is due.

***EENG 481a, Advanced ABET Projects** Roman Kuc

Study of the process of designing an electrical device that meets performance specifications, including project initiation and management, part specification, teamwork, design evolution according to real-world constraints, testing, ethics, and communication skills. Design project consists of electronic sensor, computer hardware, and signal analysis components developed by multidisciplinary teams. Prerequisites: EENG 310, 320, 325, and 348. RP

Electrical Engineering and Computer Science

Directors of undergraduate studies: Mark Reed (Electrical Engineering), 523 BCT, 432-4306, mark.reed@yale.edu; Stanley Eisenstat (Computer Science), 208 AKW, 432-1246, stanley.eisenstat@yale.edu

Electrical Engineering and Computer Science is an interdepartmental major designed for students who want to integrate work in these two fields. It covers discrete and continuous mathematics, algorithm analysis and design, digital and analog circuits, signals and systems, systems programming, and computer engineering. It provides coherence in its core program, but allows flexibility to pursue technical electives.

The prerequisites for the major are MATH 112, 115, and ENAS 151 or MATH 120; CPSC 112; and PHYS 180 and 181, or 200 and 201. Acceleration credits may be used to satisfy some of these requirements. However, since the B.S. programs in Electrical Engineering and in Engineering Sciences (Electrical) both limit the use of such credits, students who wish to retain the option of switching to these programs should consult the director of undergraduate studies in Electrical Engineering when planning their course schedules.

The major requires fifteen term courses beyond the prerequisites: CPSC 201, 202, 223, 323, and 365; EENG 200, 201, 202, and 203; one from MATH 222, 225, or STAT 241; four advanced electives, two in electrical engineering, two in computer science; and a senior project. MATH 244 may be substituted for CPSC 202. Electives must be 300- or 400-level courses in the departments of Electrical Engineering and Computer Science, or must be approved by the director of undergraduate studies in each department. Double-titled courses may be counted either way to fulfill this requirement. CPSC 480 and 490 may not be used as electives. With permission of the director of undergraduate studies in each department, EENG 471 or 472 may be used as an electrical engineering elective.

Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

For students who have taken the equivalent of one year of calculus in high school and have some programming experience, a typical program would be:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
EENG 200a	CPSC 201a	CPSC 202a	Senior project
ENAS 151a	EENG 202a	CPSC 323a	One elective
PHYS 180a			
EENG 201b	CPSC 223b	CPSC 365b	Two electives
PHYS 181b	EENG 203b	One elective	
	MATH 222b		

Students with no programming experience should take CPSC 112 in the fall of their freshman year and either postpone EENG 200 until their sophomore year or take ENAS 151 or MATH 120 in the spring.

For students with one term of calculus and no programming experience, a typical program would be:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CPSC 112a	CPSC 201a	CPSC 202a	Two electives
MATH 115a	EENG 200a	CPSC 323a	
PHYS 180a	EENG 202a	STAT 241a	
EENG 201b	CPSC 223b	CPSC 365b	Senior project
MATH 120b	EENG 203b	One elective	One elective
PHYS 181b			

For students with no calculus and no programming experience, a typical program would be:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
CPSC 112a	CPSC 201a	CPSC 202a	Two electives
MATH 112a	EENG 200a	CPSC 323a	
PHYS 170a	ENAS 151a	EENG 202a	
EENG 201b	CPSC 223b	CPSC 365b	Senior project
MATH 115b	MATH 222b	EENG 203b	One elective
PHYS 171b		One elective	

Students who start with MATH 112 may satisfy the physics prerequisite by taking PHYS 170 and 171 in their freshman year, as shown in the table above. However, since the B.S. programs in Electrical Engineering and in Engineering Sciences (Electrical) do not allow this substitution, students who wish to retain the option of switching to these programs should postpone physics until their sophomore year.

Senior requirement The senior project must be completed in CPSC 490 or EENG 471 or 472, depending on the adviser's department, and must be approved by the director of undergraduate studies in each department.

Approval of programs The entire program of a student majoring in Electrical Engineering and Computer Science must be approved by the director of undergraduate studies in each department.

Accreditation Students interested in pursuing an ABET-accredited degree should consider the B.S. program in Electrical Engineering. See under Electrical Engineering.

REQUIREMENTS OF THE MAJOR

Prerequisites MATH 112, 115, and ENAS 151 or MATH 120; CPSC 112; PHYS 180, 181, or 200, 201 (PHYS 170, 171 is acceptable for students who need to take MATH 112)

Number of courses 15 term courses beyond prereqs (incl senior project)

Specific courses required CPSC 201, 202, 223, 323, and 365; EENG 200, 201, 202, and 203; one from MATH 222 or 225 or STAT 241

Distribution of courses 4 addtl 300- or 400-level electives, 2 in electrical engineering, 2 in comp sci

Substitution permitted MATH 244 for CPSC 202; advanced courses in other depts, with permission of DUS in each dept

Senior requirement Independent project (CPSC 490 or EENG 471 or 472) approved by DUS in each dept

Engineering

Dean of the School of Engineering & Applied Science: T. Kyle Vanderlick, 222 DL, 432-4200, engineering@yale.edu; www.seas.yale.edu

Engineering programs are offered in the departments of Biomedical Engineering, Chemical and Environmental Engineering, Electrical Engineering, and Mechanical Engineering and Materials Science. These departments are administered by the dean of the School of Engineering & Applied Science. The School also offers interdisciplinary courses bearing on engineering programs.

Curricula in Yale's undergraduate engineering programs range from technically intensive ones to those with lesser technical content that allow students considerable freedom to include courses of a nontechnical nature in their studies. Programs accredited by the Engineering Accreditation Commission of ABET, Inc., the accreditor for university programs in engineering, are the most intensive. ABET-accredited programs include B.S. degrees in Chemical Engineering, Electrical Engineering, and Mechanical Engineering.

Some students find that less intensive programs better meet their needs when considering a joint major and/or careers in fields requiring less comprehensive technical knowledge. Such non-ABET programs include the B.S. in Biomedical Engineering or Environmental Engineering and the B.S. in Engineering Sciences (Chemical, Electrical, or Mechanical), as well as the B.A. in Engineering Sciences (Electrical, Environmental, or Mechanical) designed for students planning careers in business, law, medicine, journalism, or politics who want their liberal arts education to include study of the impact science and technology have on society. A related major in Applied Mathematics is also available.

For engineering courses and descriptions of the major programs mentioned above, see under Applied Mathematics, Biomedical Engineering, Chemical Engineering, Electrical Engineering, Engineering and Applied Science, Environmental Engineering, and Mechanical Engineering in this chapter.

Engineering and Applied Science

Director of undergraduate studies: Roman Kuc, 233 DL, 432-0159, roman.kuc@yale.edu

Courses in Engineering and Applied Science fall into three categories: those intended primarily for students majoring in one of the several engineering disciplines; those designed for students majoring in subjects other than engineering and the natural sciences; and those designed to meet common interests of students majoring in engineering or the natural sciences.

In the first category, the departments of Biomedical Engineering, Chemical and Environmental Engineering, Electrical Engineering, and Mechanical Engineering and Materials Science offer courses intended primarily for majors in engineering disciplines. Courses in these departments may also be relevant for students with appropriate backgrounds who are majoring in chemistry, physics, biology, geology and geophysics, mathematics, and computer science. For information about majors in engineering and their related courses, see under Biomedical Engineering, Chemical Engineering, Electrical Engineering, Environmental Engineering, and Mechanical Engineering in this chapter.

The School of Engineering and Applied Science is responsible for courses in the other two categories: technology for students majoring in subjects other than engineering and the natural sciences, and topics common to students majoring in engineering or the natural sciences. Courses for non-science majors are intended for all students seeking a broad perspective on issues of scientific and technological import, and they introduce students who may be planning careers in law, business, or public service to concepts and methods of engineering and applied science. Courses for science and engineering majors include topics in applied mathematics and computation.

COURSES WITHOUT PREREQUISITES IN ENGINEERING

*ENAS 060b/APHY 060b/PHYS 060b, **Energy Technology and Society** Paul Fleury
For description see under Applied Physics.

ENAS 101a/ENVE 101a/EVST 105a/MENG 101a, Energy, Engines, and Environment

Alessandro Gomez

For description see under Mechanical Engineering.

***ENAS 110b/APHY 110b, The Technological World** Victor Henrich

For description see under Applied Physics.

ENAS 118b, Introduction to Engineering, Innovation, and Design John Morrell,

Joseph Zinter

An introduction to engineering, innovation, and design process. Principles of material selection, stoichiometry, modeling, data acquisition, sensors, rapid prototyping, and elementary microcontroller programming. Types of engineering and the roles engineers play in a wide range of organizations. Lectures are interspersed with practical exercises. Students work in small teams on an engineering/innovation project at the end of the term. Priority to freshmen. RP

***ENAS 120b/CENG 120b/ENVE 120b, Introduction to Environmental Engineering**

Jordan Peccia

For description see under Environmental Engineering.

***ENAS 323a, Creativity and New Product Development** Henry Bolanos

An overview of the stages of product development in a competitive marketplace, with simulation of the process in class. A hands-on approach to creativity and the development process. SO

ENAS 335a, Professional Ethics Mercedes Carreras

A theoretical and case-oriented approach to ethical decision making. Concepts, tools, and methods for constructing and justifying solutions to moral problems that students may face as professionals. SO

ENAS 360b⁶/ENVE 360b, Green Engineering and Sustainable Design Paul Anastas

and staff

For description see under Environmental Engineering.

ENAS 443a/ENVE 443a⁶/F&ES 380a⁶, Greening Business Operations

Thomas Graedel and staff

For description see under Environmental Engineering.

APPLIED MATHEMATICS AND COMPUTATION COURSES**ENAS 130b, Introduction to Computing for Engineers and Scientists** Marshall Long

An introduction to the use of the Fortran and C++ programming languages and the software packages Mathematica and MATLAB to solve a variety of problems encountered in mathematics, the natural sciences, and engineering. General problem-solving techniques, object-oriented programming, elementary numerical methods, data analysis, and a brief introduction to numerical simulations. Prerequisite: MATH 115 or equivalent. QR

ENAS 151a or b/APHY 151a or b, Multivariable Calculus for Engineers

Victor Henrich [F], Mitchell Smooke [Sp]

An introduction to multivariable calculus focusing on applications to engineering problems. Topics include vector-valued functions, vector analysis, partial differentiation, multiple integrals, vector calculus, and the theorems of Green, Stokes, and Gauss. Prerequisite: MATH 115 or equivalent. QR RP

ENAS 194a or b/APHY 194a or b, Ordinary and Partial Differential Equations with Applications Richard Dobbins [F], Charles Ahn [Sp]

Basic theory of ordinary and partial differential equations useful in applications. First- and second-order equations, separation of variables, power series solutions, Fourier series, Laplace transforms. Prerequisites: ENAS 151 or equivalent, and knowledge of matrix-based operations. QR RP

[ENAS 391a, Dynamics of Evolving Systems]**ENAS 397b/EENG 397b, Mathematical Methods in Engineering** J. Rimas Vaišnys

For description see under Electrical Engineering.

[ENAS 428b, Sensors and Biosensors]**ENAS 440a^c/MENG 440a, Applied Numerical Methods I** Beth Anne Bennett

The derivation, analysis, and implementation of various numerical methods. Topics include root-finding methods, numerical solution of systems of linear and nonlinear equations, eigenvalue/eigenvector approximation, polynomial-based interpolation, and numerical integration. Additional topics such as computational cost, error analysis, and convergence are studied in several contexts throughout the course. Prerequisites: MATH 115, and 222 or 225, or equivalents; ENAS 130 or some knowledge of MATLAB, C++, or Fortran programming. QR RP

ENAS 441b^c/MENG 441b, Applied Numerical Methods II Beth Anne Bennett

The derivation, analysis, and implementation of numerical methods for the solution of ordinary and partial differential equations, both linear and nonlinear. Additional topics such as computational cost, error estimation, and stability analysis are studied in several contexts throughout the course. Prerequisites: MATH 115, and 222 or 225, or equivalents; ENAS 130 or some knowledge of MATLAB, C++, or Fortran programming; ENAS 194 or equivalent. ENAS 440 is not a prerequisite. QR RP

[ENAS 452a, MEMS Design]**ENAS 496b^c, Probability and Stochastic Processes** Mohamed Belabbas and staff

A study of stochastic processes and estimation, including fundamentals of detection and estimation. Vector space representation of random variables, Bayesian and Neyman-Pearson hypothesis testing, Bayesian and nonrandom parameter estimation, minimum-variance unbiased estimators, and the Cramer-Rao bound. Stochastic processes. Linear prediction and Kalman filtering. Poisson counting process and renewal processes, Markov chains, branching processes, birth-death processes, and semi-Markov processes. Applications from communications, networking, and stochastic control. QR RP

English Language and Literature

Director of undergraduate studies: Stefanie Markovits [F], John Rogers [Sp]; associate director of undergraduate studies: Caleb Smith; registrar: Erica Sayers, erica.sayers@yale.edu; assistant registrar: Jennifer Sholtis, jennifer.sholtis@yale.edu; 107 LC, 432-2224; english.yale.edu/undergraduate-program

FACULTY OF THE DEPARTMENT OF ENGLISH

Professors Elizabeth Alexander, Harold Bloom, Leslie Brisman, David Bromwich, Jill Campbell, Janice Carlisle, Joe Cleary (*Visiting*), Michael Denning, Wai Chee Dimock, Anne Fadiman (*Adjunct*), Roberta Frank, Paul Fry, Louise Glück (*Adjunct*), Jacqueline Goldsby, Langdon Hammer, Margaret Homans, Amy Hungerford, David Scott Kastan, Traugott Lawler (*Emeritus*), Pericles Lewis, Lawrence Manley, Donald Margulies (*Adjunct*), Stefanie Markovits, J. D. McClatchy (*Adjunct*), Barry McCrea, Alastair Minnis, Annabel Patterson (*Emeritus*), Linda Peterson, Caryl Phillips, David Quint, Claude Rawson, Joseph Roach, Marc Robinson, John Rogers, Caleb Smith, Robert Stepto, Katie Trumpener, Michael Warner, Ruth Yeazell

Associate Professors Murray Biggs (*Adjunct*), Jessica Brantley

Assistant Professors GerShun Avilez, Ian Cornelius, Paul Grimstad, Wendy Lee, Justin Neuman, Catherine Nicholson, Shital Pravinchandra, Anthony Reed, Sam See, Brian Walsh, R. John Williams

Senior Lecturers James Berger, John Crowley, Michael Cunningham, Fred Strebeigh, Cynthia Zarin

Lecturers Edward Ball, Emily Barton, Steven Brill, Natalia Cecire, Richard Deming, Andrew Ehrgood, George Fayen, Michael Gibbons, Joseph Gordon, Karin Gosselink, Alfred Guy, Briallen Hopper, Mary Kate Hurley, Rosemary Jones, Colleen Kinder, Penelope Laurans, John Loge, Stephen Longmire, Allyson McCabe, Mark Oppenheimer, Paula Resch, Timothy Robinson, Pamela Schirmeister, Mark Schoofs, Kim Shirkhani, Joel Silverman, Margaret Spillane, Michele Stepto, Barbara Stuart, Arvind Thomas, Ryan Wepler, Leslie Woodard, Carl Zimmer

Courses offered by the Department of English are designed to develop students' understanding of important works of English, American, and world literatures in English; to provide historical perspectives from which to read and analyze these works; and to deepen students' insight into their own experience. Courses also aim to develop students' abilities to express their ideas orally and in writing.

Introductory courses Courses numbered from 001 to 130 are introductory. Students planning to elect an introductory course in English should refer to the departmental Web site, english.yale.edu/undergraduate-program, for information about preregistration.

Prerequisite It is valuable for students majoring in English to have both a detailed understanding of major poets who have written in English and some acquaintance with the classics of European and American literature. The prerequisite for the major is ENGL 125, 126. It is strongly recommended that prospective English majors take at least ENGL 125 or

126 by the end of the sophomore year. If a student takes both ENGL 125 and 126, then any two terms of ENGL 114, 115, 120, 121, 127–130, or DRST 001, 002 in the Directed Studies program, or THST 110, 111 may count toward the twelve remaining term courses required for the major. If ENGL 125 and 126 are not taken, two terms of ENGL 114, 115, 127–130, or DRST 001, 002 may count as the prerequisite so long as the student also takes, as part of the major, four advanced courses that deal substantially and intensively with poets included in ENGL 125 and 126. Two of these courses should substitute for two of the four units in ENGL 125 (Chaucer, Spenser, Shakespeare, and Donne), and two should substitute for two of the four units in ENGL 126 (Milton, Pope, Wordsworth, and Eliot or another modern anglophone poet). Courses that deal with more than one poet are acceptable for this purpose. Such courses may also count toward the requirement of three term courses in English literature before 1800 and one term course in English literature before 1900.

Regardless of how the prerequisite is fulfilled, the total number of term courses toward the major may not be fewer than fourteen, of which no more than four may be introductory (numbered 130 or below).

Advanced courses Courses numbered 150 and above are open to upperclassmen; the faculty recommends that students both within and outside the major prepare for such work with two terms of introductory English. Seminars are intended primarily for junior and senior English majors; sophomores and nonmajors may be admitted where openings are available. Students are strongly encouraged to consult the director of undergraduate studies, the departmental representative in their residential college, and their departmental adviser for advice about their course choices.

When choosing courses, students should bear in mind that the English department's lecture courses and seminars play different roles in the curriculum. Lecture courses cover major periods, genres, and figures of English and American literature. They serve as general surveys of their subjects, and are typically offered every year or every other year. Seminars, by contrast, offer more specialized or intensive treatment of their topics, or engage topics not addressed in the lecture courses (for example, topics that span periods and genres). While seminars are often offered more than once, students should not expect the same seminars to be offered from one year to the next. Sophomores and juniors are encouraged to enroll in lecture courses in order to gain broad perspectives in preparation for more specialized study.

The major Each student, in consultation with a departmental faculty adviser, bears the responsibility for designing a coherent program, which must include the following elements.

Each student must take: (1) three term courses in literature written in English before 1800, one term course in literature written in English before 1900, and one term course in American literature, all representing a variety of periods and figures. Courses satisfying this requirement are indicated by the phrase "Pre-1800," "Pre-1900," or "Amer" at the end of the course description. Pre-1800 courses can, by definition, satisfy the pre-1900 requirement. Courses in American literature in the pre-1800 or pre-1900 periods can satisfy both one of the period requirements and the American requirement; (2) at least one seminar in both the junior and the senior years. The nature of senior seminars (400-level literature seminars) is discussed below.

Certain residential college seminars, with permission of the director of undergraduate studies, may be substituted for a departmental seminar; courses in creative writing may not. Courses taken Credit/D/Fail may be counted toward the major.

A student whose program meets these requirements may count toward the major two upper-level literature courses in other departments, whether in English translation or in another language; alternatively, the student may count one such literature course and, with the permission of an adviser, one other upper-level course in any subject that is relevant to the student's major in English. Such courses may not be counted toward the pre-1800 or the pre-1900 requirement. Two courses in creative writing may be counted toward the major. A student may petition the director of undergraduate studies for permission to include a third writing course.

In exceptional cases, a student whose interests and aims are well defined may, in consultation with the director of undergraduate studies, work out a program of study departing from the usual requirements of the major. Such a program must, however, meet the stated general criteria of range and coherence. For interdepartmental programs that include courses covering English literature, see the Literature Major; Directed Studies; American Studies; African American Studies; Ethnicity, Race, and Migration; Theater Studies; and Women's, Gender, and Sexuality Studies.

Students considering graduate work in English should be aware that a reading knowledge of certain classical and modern European languages is ordinarily required for admission to graduate study, and that a course orienting them to critical theory can be especially helpful preparation for graduate study.

Senior requirement Students must complete a two-course senior requirement consisting of one of the following combinations: (1) a senior seminar and a senior essay; (2) two senior seminars; (3) a senior seminar or senior essay, and a junior seminar in which the student, with the permission of the instructor, fulfills the senior requirement; (4) a two-term senior essay, with permission of the director of undergraduate studies; (5) a senior seminar or senior essay followed by the senior project in the writing concentration. Students who wish to complete the senior requirement by the end of the fall term of the senior year may begin it in the spring of the junior year.

Senior seminar Senior seminars are open to interested juniors as well, but one must be taken in the senior year to fulfill the senior requirement. These courses, usually numbered 400–449, are listed in the section “Senior Seminars.” The final essays written for senior seminars should provide an appropriate culmination to the student's work in the major and in Yale College. Such essays should rest on substantial independent work and should be approximately twenty double-spaced pages in length. In researching and writing the essay, the student should consult regularly with the seminar instructor, and may consult with other faculty members as well. Seniors, with the permission of the director of undergraduate studies and the instructor, may arrange to take a junior seminar for one term of the senior requirement. At the start of term the student must arrange with the instructor to do any additional work necessary to make the course an appropriate capstone experience.

The senior essay The senior essay is an independent literary-critical project on a topic of the student's own design, which is undertaken in regular consultation with a faculty

adviser. It should ordinarily be written on a topic in an area on which the student has focused in previous studies. It may be written during one or two terms; single-term essays may be converted to yearlong essays through application to the director of undergraduate studies. See the course listings for ENGL 490 and 491 for procedures. Students fulfilling the senior requirement through a two-term senior essay or through a senior essay followed by the senior writing concentration project must take a seminar during their senior year, but it need not be a 400-level seminar.

Writing courses Besides introductory courses that concentrate on the writing of expository prose (ENGL 114, 115, 120, 121), the English department offers several creative writing courses (ENGL 245, 246, and 450–475). These courses are open to all students on the basis of the instructor's judgment of their work. Instructions for the submission of writing samples for admission to creative writing seminars and workshops are available in 107 LC and on the English department Web site at english.yale.edu/undergraduate-program. Students may in some cases arrange a tutorial in writing (ENGL 470), normally after having taken intermediate and advanced writing courses. All students interested in creative writing courses should also consult the current listing of residential college seminars.

The writing concentration The writing concentration is a special course of study open to students in the English major with demonstrated interest and achievement in writing. Admission is competitive. Interested English majors normally apply for admission to the concentration during the second term of their junior year. Application can also be made during the first term of the senior year. Every student admitted to the concentration must complete at least eleven literature courses as well as the other requirements of the major. Students admitted to the writing concentration may count up to four creative writing courses toward completion of the B.A. degree in English; the four courses must include at least two courses in one genre and at least one course in another genre; at least three must be at the 400 level; only one of the four courses may be from ENGL 134, 135, 245, or 246. Residential college seminars are not acceptable for credit toward the writing concentration, except by permission of the director of undergraduate studies. As one of the four writing courses, each student must complete ENGL 489, The Writing Concentration Senior Project, a tutorial in which students produce a single sustained piece of writing or a portfolio of shorter works. The writing concentration senior project may be offered in partial fulfillment of the senior requirement.

Seniors applying for the spring of 2013 must do so by noon on November 9, 2012. Juniors applying to the writing concentration for the fall of 2013 must do so by noon on April 5, 2013. Students are admitted selectively on the overall strength of their performance in the major and on the quality of their writing samples.

Advising A student planning a program of study in English should consult as early as possible with the appropriate residential college departmental representative:

BK, L. Manley	MC, S. See
BR, R. Frank	PC, S. Markovits
CC, A. Hungerford	SY, L. Brisman
DC, C. Nicholson	SM, J. Brantley
TD, A. Reed	ES, T. Lawler
JE, D. Bromwich	TC, J. Carlisle

Schedules for all majors must be discussed with, and approved by, a faculty adviser from the English department, the director of undergraduate studies, or the associate director of undergraduate studies. Only then may they be submitted to the residential college dean's office. During the sixth term, each student completes a statement outlining progress in the major, in consultation with the student's adviser.

Applications and prospectuses for ENGL 490 and 491 and writing samples for admission to writing courses are received in the office of the English major in 107 LC or on line as directed on the English department Web site. Prospectuses and applications for senior essays should be submitted during the designated sign-up period in the term before enrollment is intended. Students will receive e-mail notification of acceptances; students with any questions about admission should come to the office of the director of undergraduate studies, 107 LC.

REQUIREMENTS OF THE MAJOR

Prerequisite ENGL 125, 126 or, with 4 addtl courses in major English poets, 2 terms selected from DRST 001 or 002 or ENGL 114, 115, 127, 129, or 130

Number of courses 14 term courses (incl prereq and senior req)

Distribution of courses 3 courses in lit in English before 1800, 1 course in lit in English before 1900, and 1 course in American lit, all representing a variety of figures and periods; 2 sems, 1 in junior, 1 in senior year; no more than 4 intro-level courses (ENGL 001–130)

Substitution permitted 2 upper-level lit courses in other depts or, with permission, 1 upper-level lit course and 1 addtl upper-level course in other depts may count toward the major; 2 creative writing courses (ENGL 134, 135, 245, 246, 450–475) may count toward the major; college sem designated by DUS for sem

Senior requirement 1 senior sem (ENGL 400–449) and senior essay (ENGL 490); or 2 sems in senior year, 1 of which is a senior sem, the other certified for senior req; or, with DUS permission, two-term senior essay; or 1 senior sem or senior essay and writing concentration senior project (ENGL 489)

INTRODUCTORY COURSES

Students who wish to take a fall-term introductory course in English must preregister for a specific section during Freshman Orientation through an online preregistration system. Details about preregistration will be available on the English department Web site at english.yale.edu. Syllabi showing the different topics taught in sections of ENGL 114, 115, and 121 will be posted on this site approximately two weeks before the beginning of classes. For further information about the levels of introductory courses and the guidelines for placement, see the Freshman Web site, yalecollege.yale.edu/content/english-language-and-literature-1. Students uncertain about which course to take or with questions about enrollment in introductory courses should consult with a faculty member during English Department Placement during Freshman Orientation, which will be announced in the *Calendar for the Opening Days of College* and on the departmental Web site. Those who miss the initial preregistration may attend the section they would like to join, where, if there is space, they

may be admitted by the instructor; if the section is full, they may be placed on a waiting list. Students wishing to begin or to continue introductory English study in the spring can preregister for courses on line starting the first week of December. Consult the English department Web site for details. If, after consulting the departmental Web site, you have questions about English courses, call 432-2226 or send an e-mail message to erica.sayers@yale.edu.

A note about class attendance: (1) to retain their place in a section, students must attend the first and all subsequent class meetings for the section until the end of the second week of classes. If a student misses a class meeting during this period without informing the instructor beforehand, his or her place will immediately be filled from the waiting list; (2) students may change their section by attending the desired section. If there are no available seats, the student may be placed on the instructor's waiting list for that section.

English for Freshmen

***ENGL 010b, Jane Austen** Stefanie Markovits

Close study of Austen's novels, with special attention to the critique of social and literary convention. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem, Pre-1900

***ENGL 012b, Literary Cities: New York, Chicago, San Francisco** Wai Chee Dimock

An introduction to American literature, told through the vibrant lives, ethnic diversities, and innovative genres revolving around three urban centers. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem, Amer

***ENGL 013b, Forms of Communication and Intimacy** Jill Campbell

New forms of electronic communication and their effects on social relationships and individuals' sense of self. Advantages and limitations of these forms in relation to means of communication and intimacy not dependent on electronic mediation. Correspondence by post, in-person conversation and nonverbal communication, social gatherings centered on food, erotic intimacy, group sociability, and silence. Analytical and creative writing assignments. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem

***ENGL 114a or b, Writing Seminars** Janice Carlisle and staff

Instruction in writing well-reasoned analyses and academic arguments, with emphasis on the importance of reading, research, and revision. Using examples of nonfiction prose from a variety of academic disciplines, individual sections focus on topics such as vision, globalization, generosity, experts and expertise, the good life, and dissent in American culture. WR

***ENGL 115a or b, Literature Seminars** R. John Williams [F], Ryan Wepler [Sp]

Exploration of major themes in selected works of literature. Individual sections focus on topics such as war, justice, childhood, sex and gender, the supernatural, and the natural world. Emphasis on the development of writing skills and the analysis of fiction, poetry, drama, and nonfiction prose. WR, HU

English for Freshmen and Sophomores

Courses numbered 120 through 130 are especially appropriate for sophomores, and for freshmen who feel they are already confident readers and writers. Test scores are an imperfect measure of preparation in English, but some freshmen find useful the numerical guidelines specified on the Freshman Web site, yalecollege.yale.edu/content/english-language-and-literature-1.

***ENGL 120a or b, Reading and Writing the Modern Essay** Fred Strebeigh and staff
Close study of selected works of nonfiction prepares students to become critical readers and to apply professionals' strategies to their own writing. Readings from such authors as Joan Didion, Malcolm Gladwell, Maxine Hong Kingston, N. Scott Momaday, George Orwell, Brent Staples, Jonathan Swift, Henry David Thoreau, Tom Wolfe, and Alice Walker. Written assignments, involving frequent revision, include autobiography, portraiture, nature writing, cultural critique, and formal argument. WR

***ENGL 121a or b, Styles of Academic and Professional Prose** Andrew Ehrgood and staff
A seminar and workshop in the conventions of good writing in a specific field. Each section focuses on one academic or professional kind of writing and explores its distinctive features through a variety of written and oral assignments, in which students both analyze and practice writing in the field. Section topics include science writing, food writing, legal writing, writing in the social sciences, and writing about the arts. Prerequisite: ENGL 114 or 120 or permission of instructor. Not open to freshmen in the fall term. WR

***ENGL 125a or b, Major English Poets, Chaucer to Donne** Lawrence Manley and staff
An introduction to the diversity and the continuity of the English literary tradition through close reading of four poets from the fourteenth through the seventeenth centuries, Chaucer, Spenser, Shakespeare, and Donne. Emphasis on developing skills of literary interpretation and critical writing. WR, HU

***ENGL 126b, Major English Poets, Milton to T. S. Eliot** Catherine Nicholson and staff
An introduction to the diversity and the continuity of the English literary tradition through close reading of four poets from the seventeenth through the twentieth centuries, Milton, Pope, Wordsworth, and Eliot or another modern anglophone poet. Emphasis on developing skills of literary interpretation and critical writing. WR, HU

***ENGL 127a or b, Readings in American Literature** GerShun Avilez [F],
R. John Williams [Sp]
Major works of the American literary tradition in a variety of poetic and narrative forms and in diverse historical contexts. Emphasis on analytical reading and critical writing. Authors may include Melville, Poe, Hawthorne, Bryant, Whitman, Dickinson, Thoreau, Emerson, Douglass, Stowe, Twain, Wharton, Cather, H. Crane, Stevens, Stein, L. Hughes, Paredes, Ellison, O'Connor, Ginsberg, Lowell, O'Hara, M. Robinson, C. McCarthy, Morrison, E. P. Jones, J. Díaz. WR, HU Amer

***ENGL 129a, Tragedy** Margaret Homans and staff
The genre of tragedy from its origins in ancient Greece and Rome through the European Renaissance to the present day. Themes of justice, religion, free will, family, gender,

race, and dramaturgy. Works include Homer's *Iliad* and plays by Aeschylus, Sophocles, Euripides, Seneca, Shakespeare, Racine, Ibsen, Chekhov, Brecht, Beckett, and Soyinka. Focus on textual analysis and developing the craft of persuasive argument through writing. WR, HU

***ENGL 130b, Epic** Stefanie Markovits and staff

The epic tradition traced from its foundations in ancient Greece and Rome to the modern novel. The creation of cultural values and identities; exile and homecoming; the heroic in times of war and of peace; the role of the individual within society; memory and history; politics of gender, race, and religion. Works include Homer's *Odyssey*, Vergil's *Aeneid*, Dante's *Inferno*, Cervantes's *Don Quixote*, and Joyce's *Ulysses*. Focus on textual analysis and developing the craft of persuasive argument through writing. WR, HU

English for Sophomores

***ENGL 131a, Versification** Penelope Laurans

A course in history and practice: at once a historical study of the evolving technical aspects of English verse from Anglo-Saxon through modern times and a writing course that requires regular exercises in meters and stanza forms. Intended principally for aspiring poets who wish to learn the history of their craft, but open also to students of poetry who wish to have a firmer command of historical and technical poetic matters. HU

***ENGL 132a, Science Fiction** Alfred Guy

A survey of twentieth- and twenty-first-century science fiction, focusing on how changing technologies produce new ideas about human identity. Emphasis on innovations in science and engineering as well as new forms of social, political, and economic life. Works by Robert Heinlein, Philip K. Dick, Ursula Le Guin, and William Gibson. Not open to freshmen. WR, HU RP

ADVANCED COURSES

Lecture Courses

Lecture courses, open to upperclassmen, are intended both for English majors and for nonmajors who have taken two terms of introductory English or the equivalent.

***ENGL 185a, Medieval Literature in Movies** Alastair Minnis

A study of medieval narrative traditions and their appropriation in modern film. *Beowulf*, selections from Chaucer's *Canterbury Tales*, and Malory's *Morte D'Arthur* are compared with modern film and television adaptations. HU Pre-1800

ENGL 200b, Shakespeare: Comedies and Romances Lawrence Manley

Love, sex, gender, society, and theater practice in Shakespeare's comic genres, from the early farces and romantic comedies to the problem plays and late romances. WR, HU Pre-1800

ENGL 201a, Shakespeare: Histories and Tragedies David Scott Kastan

A study of Shakespeare's histories and tragedies, focusing on attentive reading of the play texts and consideration of the theatrical, literary, intellectual, political, and social worlds in which the plays were written, performed, and experienced. HU Pre-1800

ENGL 213b/DEVN 195b, Style, Purpose, and Persuasion in Literature

David Bromwich

For description see under DeVane Lecture Course.

[ENGL 220a, Milton]

ENGL 223a or b/HUMS 243a or b/LITR 223a or b/THST 223a or b, Foundations of Modern Drama Murray Biggs and staff

For description see under Theater Studies.

ENGL 265a, The Victorian Novel Ruth Yeazell

A selection of nineteenth-century novels, with attention to cultural contexts. Authors chosen from the Brontës, Gaskell, Dickens, Collins, Eliot, Trollope, and Hardy. HU Pre-1900

[ENGL 280b/AMST 210b, American Literature, Colonial Period to Civil War]

ENGL 282a/AMST 282a, American Literature, Civil War to Modernism Caleb Smith
A survey of American literature from the late nineteenth century to the early twentieth. Social protest, literary experimentation, and avant-garde aesthetics. Readings may include works by Twain, DuBois, James, Stein, Williams, and Faulkner. HU Amer, Pre-1900

ENGL 291b/AMST 261b, The American Novel since 1945 Amy Hungerford

American fiction; works by Richard Wright, Flannery O'Connor, Jack Kerouac, Vladimir Nabokov, Philip Roth, Thomas Pynchon, John Barth, Maxine Hong Kingston, Toni Morrison, Cormac McCarthy, Lev Grossman, Alison Bechdel, and Junot Diaz. Optional WR section. HU Amer

***ENGL 296b/AFAM 296b/AMST 296b/WGSS 292b, African American Literature III: 1970 to the Present** GerShun Avilez

For description see under African American Studies. Amer

ENGL 300b/LITR 300b^G, Introduction to Theory of Literature Paul Fry

For description see under Literature.

***ENGL 344a/ER&M 236a, Global Fictions** Justin Neuman

An interdisciplinary investigation of literary fictions and energy systems from 1851 to the present. The shifting ways in which writers of fiction, film, corporate documents, and government policy have imagined petroleum; the social, political, historical, and environmental transformations wrought by petroleum's extraction and consumption. HU

Junior Seminars

Junior seminars are intended primarily for junior and senior English majors, and are open to sophomores and nonmajors as space permits.

***ENGL 150a/LING 150a, Old English** Roberta Frank

An introduction to the literature and culture of earliest England. A selection of prose and verse, including riddles, heroic poetry, meditations on loss, a dream vision, and excerpts from *Beowulf*, read in the original old English. HU Pre-1800

***ENGL 155b/LING 183b, Readings in Old Norse Poetry and Prose: Chronicles of the Vikings** Roberta Frank

An introduction to the language and literature of earliest Norway and Iceland. Texts (to be 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. HU Pre-1800

***ENGL 177b/THST 279b, Medieval Drama** Jessica Brantley

An exploration of medieval dramatic traditions in the context of medieval and modern performative practices, including pageantry, song, spectacle, recitation, liturgy, and meditative reading. Texts include the York plays, *Everyman*, *Mankind*, the Digby *Mary Magdalene*, and Sarah Ruhl's *Passion Play*. WR, HU Pre-1800

ENGL 211b/THST 433b, Production Seminar: *Richard III Joseph Roach

For description see under Theater Studies.

***ENGL 235a, The Eighteenth-Century British Novel** Wendy Lee

The genesis of the modern novel in British fiction of the eighteenth century. The quirks of eighteenth-century fiction: its violent sense of humor, outrageous sexuality, unhinged narrative economy, and staple characters of orphans, maids, and castaways. HU Pre-1800

***ENGL 236a/AMST 330a, Dystopic and Utopian Fictions** James Berger

For description see under American Studies. Amer

***ENGL 248a/EVST 325a, Nature Writing in the English-Speaking World**

Linda Peterson

Natural history and environmental writing in the English-speaking world from the late eighteenth century to the present. Readings include Gilbert White's *Natural History of Selborne*, Thoreau's *Walden*, and Darwin's *Voyage of the Beagle*, as well as recent work by writers from Canada, the United States, India, and South Africa. Pre-1900 with permission of instructor. WR, HU

***ENGL 250a, Romantic Poetry** Leslie Brisman

An introduction to the work of Blake, Coleridge, Wordsworth, Shelley, and Keats, with some attention to Byron and the minor poets of this rich period of poetic innovation and revolutionary spirit. WR, HU RP Pre-1900

***ENGL 256b/HUMS 275b/LITR 458b, Class, Desire, and the Novel** Barry McCrea

For description see under Literature.

***ENGL 259b, Austen** Wendy Lee

Jane Austen's oeuvre, including juvenilia and letters, as well as film adaptations and contemporary spin-offs. Historical and transhistorical treatment of Austen's place in the canon. HU Pre-1900

***ENGL 279b/PLSC 265b, Classics of Political Journalism** Mark Oppenheimer

For description see under Political Science.

***ENGL 281a/AMST 358a, Animals in Modern American Fiction** James Berger

For description see under American Studies. Amer

***ENGL 286b, Modernism and Childhood** Natalia Cecire

The construction of childhood in British and American literary modernism examined through concepts such as play, cuteness, innocence, and learning. Readings include literature written for children and canonical modernist texts. WR, HU

***ENGL 288a/THST 291a, Eloquence: Classical Rhetoric for Modern Media**

Joseph Roach

For description see under Theater Studies.

***ENGL 294a/AFAM 294a, African American Literature I: 1740–1900** Anthony Reed

For description see under African American Studies. Amer, Pre-1900

***ENGL 298a/AFAM 279a/AMST 273a/WGSS 342a, Black Women's Literature**

Jacqueline Goldsby

For description see under African American Studies. Amer

***ENGL 299a/AMST 301a/FILM 311a, East Asia in U.S. Literature and Film**

R. John Williams

An introductory course on American images of Asia and Asian America in twentieth-century literature and cinema. WR, HU Amer

***ENGL 303b, Consciousness in the Novel from Austen to Woolf** Ruth Yeazell

Close study of selected novels by Jane Austen, George Eliot, Henry James, and Virginia Woolf, with particular attention to the representation of consciousness and the development of free indirect discourse, as well as recent speculations about so-called theory of mind. Readings supplemented by narrative theory. Pre-1900 with permission of instructor. WR, HU

***ENGL 306b^G/AFAM 423b^G/AMST 384b^G, American Artists and the African American Book** Robert Stepto

For description see under African American Studies. Amer

***ENGL 309b, Representations of Physical Difference** Janice Carlisle, Natalie Prizel

Visual and verbal texts from the mid-eighteenth century to the twenty-first, treating the distinction between the able-bodied and the disabled. Fiction, poetry, and nonfiction prose by Wordsworth, Dickens, Eliot, and Conan Doyle, along with nineteenth-century paintings and examples of contemporary popular culture. WR, HU Pre-1900

***ENGL 310a/AFAM 337a, Modern Poetry** Anthony Reed

An introduction to major twentieth-century poets and movements. Works by Frost, Eliot, Moore, Brooks, Hughes, Hayden, and others. Relations between poetic traditions, stylistic innovations, and historical changes. WR, HU Amer

***ENGL 325b/AMST 257b, Modern Apocalyptic Narratives** James Berger

For description see under American Studies. Amer

***ENGL 329b/HSAR 441b/LITR 402b, Picture Book to Graphic Novel**

Katie Trumpener, Ksenia Sidorenko

For description see under Literature.

*ENGL 331b/WGSS 353b, **World War I, Gender, and Literature** Margaret Homans
Fiction, poetry, journalism, and memoirs by U.S. and British writers from World War I and its aftermath, with special attention to the war's effects on gender, on sexuality, and on literary modernism. Topics include trauma, shell shock, memory and memorial art, violence and subjectivity, the relation of the front lines to the home front, and representations of the injured body. WR, HU

*ENGL 335b/AFAM 338b/LITR 280b, **Caribbean Poetry** Anthony Reed
Survey of major twentieth-century Caribbean poets such as Derek Walcott, Kamau Brathwaite, and Aimé Césaire. WR, HU

*ENGL 336b/LITR 323b/THST 303b, **The Opera Libretto** J. D. McClatchy
A selective survey of the genre from its seventeenth-century Italian origins to the present day. The libretto's history, from *opera seria* to *opéra comique* to melodrama, featuring libretti by Hofmannsthal, W. S. Gilbert, and Auden. Emphasis on literary adaptations, from Da Ponte and Beaumarchais to Britten and Thomas Mann. Source material includes works by Shakespeare, Schiller, Hugo, Melville, and Tennessee Williams. Readings in English; musical background not required. WR, HU

*ENGL 339a/AFAM 327a/AMST 373a/ER&M 399a/WGSS 336a, **American Literary Nationalisms** GerShun Avilez
For description see under African American Studies. Amer

*ENGL 340a, **Colonial and Postcolonial Narrative** Joe Cleary
A survey of twentieth-century literary and intellectual responses to the decline of the European empires after World Wars I and II. Ways in which late European imperial romance, colonial settler, and postcolonial narratives formally and thematically register crises provoked by the break-up of empire. Focus on the novel, with some attention to critical essays. HU

*ENGL 342b, **Religion and Postwar Global Fiction** Justin Neuman
Study of post–World War II global fiction, with a focus on issues concerning secularism and religion and their intersections with politics, power, subjectivity, and ethics. Authors include J. M. Coetzee, Bharati Mukerjee, Salman Rushdie, Ben Okri, Hanif Kureishi, Yann Martel, and Ian McEwan; works by Orhan Pamuk and Elie Wiesel in translation. WR, HU

*ENGL 353a/HUMS 295a/LITR 463a, **Medieval Celtic Literature** David Gabriel
For description see under Literature. Pre-1800

*ENGL 354b/AMST 235b, **Language, Disability, Fiction** James Berger
For description see under American Studies.

*ENGL 357a/WGSS 340a, **Feminist and Queer Theory** Margaret Homans
For description see under Women's, Gender, & Sexuality Studies.

*ENGL 358b, **Literature for Young People** Michele Stepto
An eclectic approach to stories and storytelling for and by children. Authors include Nathaniel Hawthorne, Louisa May Alcott, J. K. Rowling, Leo Lionni, Laurent de Brunhoff, Dr. Seuss, Maurice Sendak, and children themselves. HU RP

***ENGL 364b/AFAM 369b/AMST 378b/LITR 271b/THST 369b, African American Theater** Paige McGinley

For description see under Theater Studies. Amer

***ENGL 371b/AFAM 389b/ER&M 389b/WGSS 389b, Black Sexuality in Literature and Popular Culture** GerShun Avilez

For description see under African American Studies. Amer

***ENGL 395a/LITR 154a, The Bible as Literature** Leslie Brisman

Study of the Bible as a literature—a collection of works exhibiting a variety of attitudes toward the conflicting claims of tradition and originality, historicity and literariness. Pre-1800 with completion of supplementary assignments in the language of the King James Bible. If there is sufficient interest, a second section will be offered. WR, HU RP

Senior Seminars

Senior English majors fulfilling the senior requirement have priority in placement in these courses. These seminars are also open to interested juniors and to seniors outside the major as space permits.

***ENGL 402b, Alliterative Poetry in Middle English** Ian Cornelius

A study of Middle English alliterative poetry: Arthurian and classical romance, biblical narrative, saints' lives, and allegorical dream-visions. Readings include *Sir Gawain and the Green Knight*, the alliterative *Morte Arthure*, *Susannah*, *St. Erkenwald*, and portions of *Piers Plouman*. WR, HU Pre-1800

***ENGL 403b, Medieval Manuscripts** Jessica Brantley

A history of the medieval book and its social uses, based on materials at the Beinecke Library. Topics include the roles of authors, scribes, artists, and readers in constructing, writing, illuminating, and editing manuscripts. WR, HU Pre-1800

***ENGL 404a/FILM 464a/LITR 464a, Film and Fiction** Dudley Andrew, David Bromwich

For description see under Literature.

***ENGL 405b/AFAM 406b^c/AMST 405b^c, Autobiography in America** Robert Stepto

For description see under American Studies. Amer

***ENGL 407a, Satire from Swift to T. S. Eliot** Claude Rawson

A study of works by Swift, Pope, Johnson, Byron, and T. S. Eliot in the context of satiric traditions launched by the Roman satirists Horace, Juvenal, and Persius. WR, HU

ENGL 408a/THST 379a, Versions of *The Tempest Lawrence Manley

A study of Shakespeare's *Tempest* in relation to its sources and analogues, including earlier magician plays and Renaissance works on science and exploration. Influence of *The Tempest* on later plays, poems, novels, films, and opera. Pre-1800 with permission of instructor. WR, HU RP

***ENGL 410a, Shakespeare and His Dramatic Contemporaries** Brian Walsh

Selected plays of Shakespeare studied in relation to works by his major contemporaries, including Marlowe, Dekker, Jonson, Middleton, Webster, and Ford. The cultural and

professional matrix from which Shakespeare's canon of plays emerged; trends in scholarship on early modern drama. WR, HU Pre-1800

***ENGL 411b/FILM 355b, Shakespeare on Film** Brian Walsh

A survey of the lively tradition of putting Shakespeare's plays on film, from the beginnings of cinema at the close of the nineteenth century to the present day. Pre-1800 with permission of instructor. WR, HU

***ENGL 412b^c, Victorian Poetry** Leslie Brisman

The major Victorian poets, Tennyson and Browning, in the context of the romanticism they inherited and transformed. Significant attention to Barrett Browning's *Aurora Leigh*, and some attention to Swinburne, the Rossettis, and Morris. WR, HU RP Pre-1900

***ENGL 414b/AMST 338b/THST 410b/WGSS 333b, Gertrude Stein** Sam See

An exploration of Gertrude Stein's major works, including her nonfiction prose, narrative prose fiction, verse, and drama. Special attention to Stein's modernist legacy and its divergence from the "Men of 1914" strain of modernism. Several class meetings held in the Beinecke Library. WR, HU Amer

***ENGL 416a, Contemporary British Fiction** Caryl Phillips

A study of literature that responds to a changing post-World War II Britain, with attention to the problem of who "belongs" and who is an "outsider." Authors include Alan Hollinghurst, Kazuo Ishiguro, Colin McInnes, Samuel Selvon, Ruth Praver Jhabvala, and John Osborne. WR, HU RP

***ENGL 418b, Spenser** Catherine Nicholson

A reading of most of *The Faerie Queene*, together with a selection of shorter poems. Emphasis on Spenser's engagement with poetic precursors, his efforts to marry ethical and aesthetic ambitions, and his reinvention of the English language. WR, HU RP Pre-1800

***ENGL 421a, Edgar Allan Poe** Paul Grimstad

Chronological study of the poetry and prose of Edgar Allan Poe. Aspects of the author's career, including his work as magazine editor and reviewer, his invention of the detective story, his relation to slavery and abolition, and his posthumous influence on French literature. WR, HU Amer, Pre-1900

ENGL 422a/LITR 440a, James Joyce's *Ulysses Pericles Lewis

Advanced study of James Joyce's *Ulysses* in relation to three precursor texts: Homer's *Odyssey*, Shakespeare's *Hamlet*, and Joyce's *Portrait of the Artist as a Young Man*. Joyce's experiments in form and representation; major themes of the novel; Joyce's literary and historical context; and critical approaches to *Ulysses*. No previous knowledge of Joyce's work assumed. WR, HU RP

***ENGL 423a/LITR 404a, *Paradise Lost* and Epic** David Quint

A reading of *Paradise Lost* and other works by Milton against the background of classical and Renaissance epic by authors such as Tasso, Camões, and Spenser. Examination of the epic conventions and ideas that inform and are revised by Milton's poem. WR, HU Pre-1800

***ENGL 431a, The Brontës and Their Afterlives** Linda Peterson

The novels of Charlotte, Emily, and Anne Brontë, with modern adaptations in film and fiction. Additional readings include Gaskell's *Life of Charlotte Brontë*, Marsye Conde's *Windward Heights*, and Rhys's *Wide Sargasso Sea*; films include *Jane Eyre*, *Wuthering Heights*, and "biographies" of the Brontë sisters. WR, HU Pre-1900

***ENGL 433b, Dickens on the Page** Janice Carlisle

An in-depth study of selected Dickens works in the various forms of publication in which they originally appeared. Class meetings are held in the Beinecke Library to take advantage of its collection of first editions. Approaches to Dickens's novels and journalism from multiple perspectives, including his biography and Victorian book illustration. WR, HU Pre-1900

***ENGL 446b⁶/WGSS 426b, Virginia Woolf** Margaret Homans

A study of the major novels and other writings by Virginia Woolf, with additional readings in historical contexts and in Woolf biography and criticism. Focus on Woolf's modernist formal experimentation and on her responses and contributions to political movements of her day, principally feminism and pacifism; attention also to the critical reception of her work, with emphasis on feminist and queer literary criticism and theory. WR, HU

***ENGL 448b/AFAM 429b, Black Pulp Fiction** Jacqueline Goldsby

Examination of pulp fiction written by African American authors from the early twentieth century to the present. Historical contexts and cultural politics that have shaped black novelists' use of sensationalist techniques and technologies in their prose works. WR, HU Amer

COURSES IN WRITING

Creative writing courses require an application. Consult the English department Web site at english.yale.edu/undergraduate-program/course-applications-deadlines for detailed instructions and application deadlines.

***ENGL 134a or b, Reading Fiction for Craft** Michael Cunningham and staff

Fundamentals of the craft of fiction writing explored through readings from classic and contemporary short stories and novels. Focus on how each author has used the fundamentals of craft. Writing exercises emphasize elements such as voice, structure, point of view, character, and tone. HU

***ENGL 135a or b, Reading Poetry for Craft** Cynthia Zarin and staff

An introduction to reading and writing poetry. Classic examples from Shakespeare and Milton, the modernist poetics of Stein, Pound, Moore, and Stevens, and recent work in a variety of forms and traditions. Students develop a portfolio of poems and write an essay on the poetic craft of poets who have influenced their work. HU

***ENGL 245a or b, Introduction to Writing Fiction** Leslie Woodard, Emily Barton

An intensive introduction to the craft of fiction, designed for aspiring creative writers. Focus on the fundamentals of narrative technique and peer review. Not open to freshmen in the fall term. Prerequisite: a previous course in English or in another literature.

***ENGL 246a, Introduction to Verse Writing** Louise Glück

A seminar workshop for students who are beginning to write poetry (or students without prior workshop experience at Yale). Preference given to freshmen and sophomores. RP

***ENGL 450b, Daily Themes** Richard Deming

Writing of prose at the intermediate level. Daily assignments of c. 300 words, a weekly lecture, and a weekly tutorial. Application forms available on the Web by mid-November. Application deadline is noon on Friday, December 7, 2012. Not open to freshmen. Counts as a nonfiction course in the writing concentration. WR

***ENGL 453a/THST 320a, Playwriting** Donald Margulies

A seminar and workshop in writing for the stage. Readings include modern American and British plays by Pinter, Mamet, Churchill, Kushner, Williams, and Wilder. Emphasis on play structure, character, and conflict. In addition to weekly exercises, students write a one-act play.

***ENGL 454a, Nonfiction Writing: Voice and Structure** Fred Strebeigh

A nonfiction workshop, confronting the challenges of journalism as an art. Emphasis on voice and structure. Study of texts that may suggest modes, voices, forms, and styles for nonfiction pieces. Frequent writing projects and revisions. WR RP

***ENGL 455b, Writing about Oneself** Anne Fadiman

A seminar and workshop in first-person writing. Students explore a series of themes (e.g., family, love, loss, identity) both by writing about their own lives and by reading British and American memoirs, autobiographies, and personal essays. An older work, usually from the nineteenth or early twentieth century, is paired each week with a more recent one on the same theme. WR

***ENGL 458b, The Writing of Fiction** Michael Cunningham, Emily Barton

A workshop in the craft of writing fiction. May be repeated for credit with a different instructor. RP

***ENGL 459a/EVST 215a, Scientific and Environmental Writing** Carl Zimmer

For description see under Environmental Studies.

***ENGL 460a or b, The Writing of Verse** Louise Glück [F], J. D. McClatchy [Sp]

A seminar and workshop in the writing of verse. May be repeated for credit with a different instructor. RP

***ENGL 461a, Writing for Film: Voice and Vision** John Crowley

Practice in all aspects of writing a screenplay. Focus on elements shared with other forms of fiction, including story, character, narrative, personal voice, and audience expectations. Study of one or more published screenplays in conjunction with viewings of the resulting films. Students plan, pitch, outline, and write a large part of a single screenplay, in addition to shorter exercises in screenplay craft. RP

***ENGL 465a, Advanced Fiction Writing** Caryl Phillips

An advanced workshop in the craft of writing fiction. May be repeated for credit with a different instructor.

***ENGL 466b, Writing the Contemporary Essay** Cynthia Zarin

A seminar and workshop in the contemporary essay. Public versus private voice, the responsibilities of the essayist, and the evolution of writing in the first person. Readings include essays by Joan Didion, Jonathan Lethem, Jenny Diski, Zadie Smith, M. F. K. Fisher, Bruce Chatwin, John Berger, and Oliver Sacks.

***ENGL 467a or b, Journalism** Steven Brill [F], Mark Schoofs [Sp]

An intensive workshop in the journalism profession and its changing role and accelerating challenges. Definitions of journalism; the role of journalism in a democracy and a free market; differences between information, news, vicarious news, and entertainment; knowing and telling a good story; the structure of newspaper articles, blogs, online newspapers and magazines, mixed digital media, magazine features, television reports, and nonfiction books; interviewing techniques; fairness; sourcing; the economics of journalism; and audience. Fulfills the core seminar requirement for Yale Journalism Scholars. No prerequisites. Admission by application including writing samples and statement of interest. WR

***ENGL 468b/THST 327b, Advanced Playwriting Workshop** Donald Margulies

An intensive workshop in advanced playwriting techniques. Discussion of works by contemporary playwrights. In addition to weekly exercises, students write a full-length play. Prerequisite: an intermediate course in playwriting or screenwriting, or with permission of the instructor. RP

***ENGL 469a, Advanced Nonfiction Writing** Anne Fadiman

A seminar and workshop with the theme “At Home in America.” Students consider the varied ways in which modern American literary journalists write about place, and address the theme themselves in both reportorial and first-person work. No prerequisites. WR, HU

***ENGL 470a or b, Tutorial in Writing** Stefanie Markovits [F], John Rogers [Sp]

A writing tutorial in fiction, poetry, playwriting, screenwriting, or nonfiction for students who have already taken writing courses at the intermediate and advanced levels. Conducted with a faculty member after approval by the director of undergraduate studies. Prerequisites: two courses in writing.

***ENGL 472b, Utopia as Fiction** John Crowley

Utopian writings as a form of fiction. Students read and discuss major utopian fictions and conceive, propose, and write a utopia of their own. HU RP

SPECIAL PROJECTS***ENGL 488a or b, Special Projects for Juniors or Seniors** Stefanie Markovits [F], John Rogers [Sp]

Special projects set up by the student in an area of particular interest with the help of a faculty adviser and the director of undergraduate studies, intended to enable the student to cover material not otherwise offered by the department. The course may be used for research or for directed reading, but in either case a term paper or its equivalent is normally required. The student meets regularly with the faculty adviser. To apply for admission, a student must submit an application and prospectus signed by the faculty adviser to the office of the director of undergraduate studies. Students must apply by December 7, 2012,

for spring-term projects and by April 26, 2013, for fall-term projects. Application details and forms are available at english.yale.edu/undergraduate-program. (Formerly ENGL 471)

***ENGL 489a or b, The Writing Concentration Senior Project** Stefanie Markovits [F], John Rogers [Sp]

A term-long project in writing, under tutorial supervision, aimed at producing a single longer work (or a collection of related shorter works). An application and prospectus signed by the student's adviser must be submitted to the office of the director of undergraduate studies by December 7, 2012, for spring-term projects and by April 26, 2013, for fall-term projects. The project is due by the end of the last week of classes (fall term), or the end of the next-to-last week of classes (spring term). Application details and forms are available at english.yale.edu/undergraduate-program.

THE SENIOR ESSAY COURSE

***ENGL 490a or b, The Senior Essay I** Stefanie Markovits [F], John Rogers [Sp]

Students wishing to undertake an independent senior essay in English must apply through the office of the director of undergraduate studies. Applications are due by December 7, 2012, for spring-term essays or for yearlong essays beginning in the spring term; applications are due by April 26, 2013, for fall-term essays or for yearlong essays beginning in the fall term. Application details and forms are available at english.yale.edu/undergraduate-program. For one-term senior essays, the essay itself is due in the office of the director of undergraduate studies according to the following schedule: (1) end of the fourth week of classes: five to ten pages of writing and/or an annotated bibliography; (2) end of the ninth week of classes: a rough draft of the complete essay; (3) end of the last week of classes (fall term) or end of the next-to-last week of classes (spring term): the completed essay. Consult the director of undergraduate studies regarding the schedule for submission of the yearlong senior essay.

***ENGL 491a or b, The Senior Essay II** Stefanie Markovits [F], John Rogers [Sp]

Second term of the optional yearlong senior essay. Students may begin the yearlong essay in the spring term of the junior year, allowing for significant summer research, with permission of the instructor. After ENGL 490.

RELATED COURSES THAT COUNT TOWARD THE MAJOR

***HUMS 218a, Shakespearian Character: Falstaff, Hamlet, Iago, Cleopatra**
Harold Bloom

***HUMS 219b, Shakespeare: Four Late Masterworks** Harold Bloom

***HUMS 221a, Whitman, Melville, Dickinson** Harold Bloom

***HUMS 224b, Wallace Stevens and Hart Crane** Harold Bloom

***THST 277b, Moving Texts** Emily Coates, Deb Margolin

Environment

At Yale, the environment is studied from a variety of perspectives. Majors are offered in Architecture, Chemical Engineering, Ecology and Evolutionary Biology, Environmental Engineering, Environmental Studies, and Geology and Geophysics. The program in Forestry & Environmental Studies offers courses in environmental science, policy, and management. Many other departments and programs offer courses pertinent to the study of environment, including American Studies, Anthropology, Chemistry, Economics, English, Global Affairs, History, History of Art, Political Science, Sociology, and Study of the City. Some professional schools and programs offer relevant courses that may admit undergraduates, including Public Health, Forestry & Environmental Studies, the Law School, and the School of Management.

Environmental Engineering

Director of undergraduate studies: Jordan Peccia, 313C ML, 432-4385, jordan.peccia@yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM IN ENVIRONMENTAL ENGINEERING

Professors Michelle Bell (*Forestry & Environmental Studies*), Gaboury Benoit (*Forestry & Environmental Studies*), Ruth Blake (*Geology & Geophysics*), Stephen Edberg (*School of Medicine*), Menachem Elimelech (*Chemical & Environmental Engineering*), Thomas Graedel (*Forestry & Environmental Studies*), Edward Kaplan (*School of Management*), Yehia Khalil (*Adjunct*) (*Chemical & Environmental Engineering*), Lisa Pfefferle (*Chemical & Environmental Engineering*), Joseph Pignatello (*Adjunct*) (*Chemical & Environmental Engineering*), James Saiers (*Forestry & Environmental Studies*)

Associate Professors William Mitch (*Chemical & Environmental Engineering*), Jordan Peccia (*Chemical & Environmental Engineering*), Julie Zimmerman (*Chemical & Environmental Engineering*)

Environmental engineering encompasses the scientific assessment and development of engineering solutions to environmental problems affecting land, water, and air (the biosphere). The field embraces broad environmental concerns, including the safety of drinking water, groundwater protection and remediation, wastewater treatment, indoor and outdoor air pollution, solid and hazardous waste disposal, cleanup of contaminated sites, the prevention of pollution through product and process design, and strategies for sustainable water and energy use and production.

Environmental engineers must balance competing technical, social, and legal issues concerning the use of environmental resources. Because of the complexity of these challenges, environmental engineers need a broad understanding not only of engineering disciplines but also of chemistry, biology, geology, and economics. Accordingly, the program allows students in the major to select an emphasis on environmental engineering technology, sustainability, global health, economics, or energy and climate change. The program

prepares students for leadership positions in industry and government agencies or for further studies in engineering, science, business, law, and medicine.

The major for the Class of 2014 and previous classes Students in the Class of 2014 and previous classes may fulfill the requirements of the major as described below for the Class of 2015 and subsequent classes. Alternatively, they may fulfill the requirements of the major that were in place when they entered the major, as described in previous editions of this bulletin.

The major for the Class of 2015 and subsequent classes Two degree programs are offered: the B.S. in Environmental Engineering, and the B.A. in Engineering Sciences (Environmental). The B.S. degree program in Environmental Engineering is for students who desire a strong background in environmental engineering leading to a career in the field. The B.A. degree program in Engineering Sciences (Environmental) is intended for students whose careers will involve, but not be dominated by, the skills of environmental engineering. The B.A. program is appropriate for those contemplating a career in which scientific and technological problems can play an important role, as is often the case in law, business, medicine, or public service.

Prerequisites The B.S. degree program has the following prerequisites in mathematics and basic sciences: MATH 112, 115; MATH 120 or ENAS 151; ENAS 194; either CHEM 112 and 113 or 114 and 115 with 116L and 117L, or CHEM 118 and 119L by Advanced Placement test only; PHYS 180, 181; and MCDB <120>, or BIOL 103 and 104. The B.A. degree program requires MATH 112 and 115; CHEM 112 and 113, or 114 and 115; and PHYS 170, 171.

B.S. degree program in Environmental Engineering The B.S. degree program requires at least twelve term courses beyond the prerequisites, including the senior requirement. Students take CENG 300 or MENG 211, ENVE 120, 360, 373, 377, and either 315 or 448, EVST 344, and MENG 361 or F&ES 714. At least three electives within one of the following tracks must be chosen in consultation with the director of undergraduate studies: environmental engineering technology, sustainability, global health, economics, or energy and climate change.

B.A. degree program in Engineering Sciences (Environmental) The B.A. degree program requires nine term courses beyond the prerequisites, including the senior requirement. Students take ENVE 120, 360, and either 373 or 377, or the equivalents. Five electives must be chosen in consultation with the director of undergraduate studies.

Senior requirement Students in the B.S. program must pass ENVE 416 in their senior year. Students in the B.A. program must pass ENVE 490 in their senior year.

Credit/D/Fail option For the Class of 2015 and subsequent classes, no course taken Credit/D/Fail may count toward the major, including prerequisites.

REQUIREMENTS OF THE MAJOR

ENVIRONMENTAL ENGINEERING, B.S.

Prerequisites MATH 112, 115; MATH 120 or ENAS 151; ENAS 194; either CHEM 112, 113 or 114, 115 with 116L, 117L, or CHEM 118 and 119L by Advanced Placement test only; PHYS 180, 181; MCDB <120>, or BIOL 103 and 104

Number of courses 12 term courses beyond prereqs (incl senior req)

Specific courses required CENG 300 or MENG 211; ENVE 120, 360, 373, 377; ENVE 315 or 448; EVST 344; MENG 361 or F&ES 714

Distribution of courses 3 electives as specified

Senior requirement ENVE 416

ENGINEERING SCIENCES (ENVIRONMENTAL), B.A.

Prerequisites MATH 112, 115; either CHEM 112, 113 or 114, 115; PHYS 170, 171

Number of courses 9 term courses beyond prereqs (incl senior req)

Specific courses required ENVE 120, 360; ENVE 373 or 377

Distribution of courses 5 electives approved by DUS

Senior requirement ENVE 490

ENVE 101a/ENAS 101a/EVST 105a/MENG 101a, Energy, Engines, and Environment

Alessandro Gomez

For description see under Mechanical Engineering.

***ENVE 120b/CENG 120b/ENAS 120b, Introduction to Environmental Engineering**

Jordan Peccia

Introduction to engineering principles related to the environment, with emphasis on causes of problems and technologies for abatement. Topics include air and water pollution, global climate change, hazardous chemical and emerging environmental technologies. Prerequisites: high school calculus and chemistry or CHEM 114, 115 (may be taken concurrently) or permission of instructor. QR, SC

ENVE 210a/CENG 210a, Principles of Chemical Engineering and Process Modeling

Gary Haller

For description see under Chemical Engineering.

ENVE 315b/CENG 315b, Transport Phenomena Chinedum Osuji, André Taylor

For description see under Chemical Engineering.

ENVE 360b/ENAS 360b⁶, Green Engineering and Sustainable Design Paul Anastas and staff

Study of green engineering, focusing on key approaches to advancing sustainability through engineering design. Topics include current design, manufacturing, and disposal processes; toxicity and benign alternatives; policy implications; pollution prevention and source reduction; separations and disassembly; material and energy efficiencies and flows; systems analysis; biomimicry; and life cycle design, management, and analysis. Prerequisites: CHEM 112, 113, or 114, 115, or permission of instructor.

ENVE 373a/CENG 373a, Air Pollution Control Yehia Khalil

Kinetics, thermodynamics, and transport of chemical reactions of common air pollutants including suspended particulate matter. The role of surface chemistry and transport phenomena in air pollution. Pollutant dispersion modeling. Technology available to prevent or control air pollutants. Prerequisite: ENVE 210 or permission of instructor. QR, SC RP

***ENVE 377b/CENG 377b, Water Quality Control** William Mitch

Study of the preparation of water for domestic and other uses and treatment of wastewater for recycling or discharge to the environment. Topics include processes for removal

of organics and inorganics, regulation of dissolved oxygen, and techniques such as ion exchange, electro dialysis, reverse osmosis, activated carbon adsorption, and biological methods. Prerequisite: ENVE 120 or permission of instructor. SC RP

ENVE 416b/CENG 416b, Chemical Engineering Process Design Gary Haller and staff
For description see under Chemical Engineering.

ENVE 441a^G, Biological Processes in Environmental Engineering Jordan Peccia
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. Prerequisites: CHEM 112, 113, or 114, 115, or 118; MCDB 290 or equivalent; or with permission of instructor. SC

ENVE 443a^G/ENAS 443a/F&ES 380a^G, Greening Business Operations

Thomas Graedel and staff

Engineering, environmental, and financial perspectives applied to selected industries. Methods from operations management, industrial ecology, green chemistry and engineering, and accounting and finance are used to investigate sustainability approaches and the relationship between environmental and economic considerations. Tools include discounted cash-flow analysis, life-cycle assessment, and environmental cost accounting. Field trips to companies.

ENVE 448a^G, Environmental Transport Processes Menachem Elimelech

Analysis of transport phenomena governing the fate of chemical and biological contaminants in environmental systems. Emphasis on quantifying contaminant transport rates and distributions in natural and engineered environments. Topics include distribution of chemicals between phases; diffusive and convective transport; interfacial mass transfer; contaminant transport in groundwater, lakes, and rivers; analysis of transport phenomena involving particulate and microbial contaminants. Prerequisite: ENVE 120 or permission of instructor. QR, SC

***ENVE 490a or b, Senior Project** Jordan Peccia

Individual research and design projects supervised by a faculty member in Environmental Engineering, or in a related field with permission of the director of undergraduate studies.

Environmental Studies

Director of undergraduate studies: Amity Doolittle, 121 KRN, 432-9771,
amity.doolittle@yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF ENVIRONMENTAL STUDIES

Professors D. Michelle Addington (*School of Architecture, Forestry & Environmental Studies*), Paul Anastas (*Forestry & Environmental Studies*), Gaboury Benoit (*Forestry & Environmental Studies*), Graeme Berlyn (*Forestry & Environmental Studies*), Ruth Blake (*Geology & Geophysics*), Garry Brewer (*School of Management*), Derek Briggs (*Geology*)

& Geophysics), Kelly Brownell (*Psychology, Public Health*), Gary Brudvig (*Chemistry, Molecular Biophysics & Biochemistry*), Benjamin Cashore (*Forestry & Environmental Studies*), Peter Crane (*Forestry & Environmental Studies*), Michael Donoghue (*Ecology & Evolutionary Biology, Forestry & Environmental Studies*), Michael Dove (*Forestry & Environmental Studies, Anthropology*), Menachem Elimelech (*Chemical & Environmental Engineering*), John Mack Faragher (*History, American Studies*), Durland Fish (*Public Health, Forestry & Environmental Studies*), Thomas Graedel (*Forestry & Environmental Studies*), Leo Hickey (*Geology & Geophysics*), Daniel Kevles (*History, History of Science*), Benedict Kiernan (*History*), Robert Mendelsohn (*Forestry & Environmental Studies, Economics*), Mark Pagani (*Geology & Geophysics*), Jeffrey Park (*Geology & Geophysics*), Peter Perdue (*History*), Linda Peterson (*English*), Jeffrey Powell (*Ecology & Evolutionary Biology, Forestry & Environmental Studies*), Peter Raymond (*Forestry & Environmental Studies*), Nicholas Robinson (*Adjunct*) (*Forestry & Environmental Studies*), Susan Rose-Ackerman (*Law School, Political Science*), James Saiers (*Forestry & Environmental Studies*), Oswald Schmitz (*Forestry & Environmental Studies, Ecology & Evolutionary Biology*), James Scott (*Political Science, Anthropology*), Kalyanakrishnan Sivaramakrishnan (*Anthropology, Forestry & Environmental Studies*), David Skelly (*Forestry & Environmental Studies, Ecology & Evolutionary Biology*), Brian Skinner (*Geology & Geophysics*), Ronald Smith (*Geology & Geophysics, Forestry & Environmental Studies*), Stephen Stearns (*Ecology & Evolutionary Biology*), Charles Tomlin (*Forestry & Environmental Studies*) (*Visiting*), Karl Turekian (*Geology & Geophysics*), John Wargo (*Forestry & Environmental Studies, Political Science*), Harvey Weiss (*Near Eastern Languages & Civilizations, Anthropology*), John Wettlaufer (*Geology & Geophysics*), Robert Wyman (*Molecular, Cellular, & Developmental Biology*)

Associate Professors William Mitch (*Chemical & Environmental Engineering*), David Post (*Ecology & Evolutionary Biology*), Karen Seto (*Forestry & Environmental Studies*), Melinda Smith (*Ecology & Evolutionary Biology*)

Assistant Professors Hagit Affek (*Geology & Geophysics*), Mark Bradford (*Forestry & Environmental Studies*), Alex Felson (*Forestry & Environmental Studies*), Anjelica Gonzalez (*Biomedical Engineering*), Karen Hébert (*Forestry & Environmental Studies, Anthropology*), Alan Mikhail (*History*), William Rankin (*History, History of Science*), Paul Sabin (*History*), David Vasseur (*Ecology & Evolutionary Biology*), Zhengrong Wang (*Geology & Geophysics*), Julie Zimmerman (*Chemical & Environmental Engineering*)

Senior Lecturers Shimon Anisfeld, Carol Carpenter, John Grim

Lecturers Mary Beth Decker, Amity Doolittle, Kealoha Freidenburg, Gordon Geballe, Julie Newman, Linda Puth, Catherine Skinner, Carl Zimmer

Environmental Studies provides an interdisciplinary approach to understanding and solving environmental problems. From the natural sciences, students learn experimental techniques and methods of analysis needed to make accurate observations, to document change, to distinguish those changes resulting from human activity, and to understand what comprises healthy landscapes and functioning ecosystems. Students look to the humanities and social sciences for explanations of the ways people behave and for analyses of our institutions and their social, political, and economic activities. The Environmental

Studies major prepares students for graduate study in a range of disciplines including law, medicine, and public health, and for careers in business, environmental management and conservation, teaching, and writing.

Prerequisites The major requires preparation in chemistry, either CHEM 112 and 113, or 114 and 115, or 118; a term of introductory biology, either MCDB <120> or E&EB <122>, or two half-term courses chosen from BIOL 101, 102, 103, and 104; a natural science laboratory chosen from CHEM 117L, 119L, MCDB 121L, or E&EB 123L; and a term course in mathematics (MATH 112 or above, except MATH 190) or in physics (PHYS 170 or above). Students are advised to take chemistry and biology during the freshman year before enrolling in the EVST core courses in natural sciences. Students should complete the prerequisites by the end of the fall term in their sophomore year, prior to application to the major (see below). Where relevant, students may employ acceleration credit to fulfill the prerequisites. Students entering Yale with advanced placement in both biology and chemistry must complete one term of introductory laboratory science. Students with advanced placement in only one of these subjects must take the remaining science prerequisite and its associated laboratory.

Requirements of the major In addition to the prerequisites, twelve and one-half or thirteen and one-half course credits are required for the major, including four core courses, one core laboratory, a departmental seminar, a concentration of six courses, and a one- or two-term senior project and colloquium (EVST 496). All courses in the major must be taken for a letter grade.

Core courses Students are required to take at least two core courses from Group A (humanities and social sciences), and two from Group B (environmental sciences) with the associated lab. Completing one course in each group is recommended before the end of the sophomore year.

Group A, humanities and social sciences: EVST 120, 226, 255, 340, 345

Group B, environmental sciences: EVST 201, 202L, 223

Application to the Environmental Studies major Students typically apply to enter the major during their sophomore year. Application must be made in writing to the director of undergraduate studies during the designated application period in either the fall or the spring term; details can be found on the program's Web site at www.yale.edu/evst. Juniors who have already completed considerable course work toward the major may also apply during the designated application period. Students considering a major in Environmental Studies should consult the director of undergraduate studies as early as possible in the freshman year.

Departmental seminar All majors must complete a departmental seminar approved by the director of undergraduate studies. This requirement may be completed in any year of study. See under "Departmental Seminars" in the course listings for approved seminars.

Area of concentration Students plan their concentration in consultation with the director of undergraduate studies and the student's adviser. A concentration is defined as six courses

that provide depth in a problem or issue of interest, as well as disciplinary expertise. Past concentrations have included biodiversity, climate change, energy, environmental history, food and agriculture, human health, resource use and sustainability, and urban planning. Students also have the opportunity to design a unique concentration within the major, working with the director of undergraduate studies.

Summer environmental internship During the summer between the junior and senior years, many students gain experience in the field through research or internships in an area pertinent to their senior research project. Internships may be arranged with nonprofit organizations, government agencies, or corporations. Although the summer program is optional, many students take advantage of this opportunity with some financial support from the program.

Senior requirement Seniors must complete one or two terms of an independent research project and colloquium, taken as EVST 496. In the junior year, students consult with their advisers on the design of the project and submit a preliminary plan for approval to the director of undergraduate studies.

REQUIREMENTS OF THE MAJOR

Prerequisites CHEM 112 and 113, or 114 and 115, or 118; MCDB <120> or E&EB <122>, or 2 from BIOL 101–104; CHEM 117L, 119L, MCDB 121L, or E&EB 123L; MATH 112 or above (except MATH 190) or PHYS 170 or above

Number of courses 12½ or 13½ course credits beyond prereqs, incl one- or two-term senior project

Distribution of courses 2 core courses from Group A and 2 from Group B with the associated lab, 1 departmental sem, 6 courses in area of concentration

Senior requirement One- or two-term research project and colloq (EVST 496)

CORE COURSES

Group A

EVST 120a/AMST 163a/HIST 120a/HSHM 204a, Introduction to Environmental History Paul Sabin

Ways in which people have shaped and been shaped by the changing environments of North America from precolonial times to the present. Migration of species and trade in commodities; contrasting uses of land; the impact of industry and markets; the rise of modern conservation and environmental movements; the development of public policy; the global search for resources by the United States. WR, HU

EVST 226a/ARCG 226a, Global Environmental History Harvey Weiss

The dynamic relationship between environmental and social forces from the Pleistocene glaciations to the Anthropocene present. Pleistocene extinctions; transition from hunting and gathering to agriculture; origins of cities, states, and civilization; adaptations and collapses of Old and New World civilizations in the face of climate disasters; the destruction and reconstruction of the New World by the Old. Focus on issues of adaptation, resilience, and sustainability, including forces that caused long-term societal change. SO

EVST 255b/F&ES 255b/PLSC 215b, Environmental Politics and Law John Wargo
Exploration of the politics, policy, and law associated with attempts to manage environmental quality and natural resources. Themes of democracy, liberty, power, property, equality, causation, and risk. Case histories include air quality, water quality and quantity, pesticides and toxic substances, land use, agriculture and food, parks and protected areas, and energy. SO

EVST 340a/ECON 330a^c, Economics of Natural Resources Robert Mendelsohn
For description see under Economics.

***EVST 345a/ANTH 382a/F&ES 384a, Environmental Anthropology** Michael Dove,
Carol Carpenter
History of the anthropological study of the environment: nature-culture dichotomy, ecology and social organization, methodological debates, politics of the environment, and knowing the environment. SO

Group B

EVST 201a/G&G 140a, Atmosphere, Ocean, and Environmental Change
Ronald Smith

Physical processes that control Earth's atmosphere, ocean, and climate. Quantitative methods for constructing energy and water budgets. Topics include clouds, rain, severe storms, regional climate, the ozone layer, air pollution, ocean currents and productivity, the seasons, El Niño, the history of Earth's climate, global warming, energy, and water resources. Must be taken concurrently with EVST 202L. QR, SC

***EVST 202La/G&G 141La, Laboratory for Atmosphere, Ocean, and Environmental Change** Ronald Smith

Laboratory and field exercises to accompany EVST 201. Must be taken concurrently with EVST 201. SC ½ Course cr

EVST 223a/E&EB 220a^c, General Ecology David Vasseur, David Post
For description see under Ecology & Evolutionary Biology.

INTERMEDIATE AND ADVANCED COURSES

The following courses have been approved for developing areas of concentration. Other courses may be suitable for designing an area of concentration with permission of the director of undergraduate studies.

EVST 105a/ENAS 101a/ENVE 101a/MENG 101a, Energy, Engines, and Environment
Alessandro Gomez

For description see under Mechanical Engineering.

EVST 123b/PLSC 231b/PSYC 123b, The Psychology, Biology, and Politics of Food
Kelly Brownell

For description see under Psychology.

EVST 125a/G&G 120a, Earth's Changing Climate John Wettlaufer, Mark Pagani
For description see under Geology & Geophysics.

***EVST 170a, Sustainability and Institutions: Innovation and Transformation**

Julie Newman

Sustainable development as it relates to institutional change, decision-making processes, and systems thinking. The origins, theory, and grounding principles of sustainable development. The application of those principles, using Yale University as a case study. SO

***EVST 200b/G&G 115b, Earth System Science** Jeffrey Park

For description see under Geology & Geophysics.

EVST 206a/AMST 176a/HIST 144a/HSHM 206a/HUMS 323a, Science and Technology in the United States Daniel Kevles

For description see under History of Science, Medicine, and Public Health.

***EVST 221a/E&EB 230a/F&ES 221a, Field Ecology** Linda Puth

For description see under Ecology & Evolutionary Biology.

***EVST 234La, Field Science: Environment and Sustainability** Kealoha Freidenburg

A field course that explores the effects of human influences on the environment. Analysis of pattern and process in forested ecosystems; introduction to the principles of agroecology, including visits to local farms; evaluation of sustainability within an urban environment. Weekly field trips and one weekend field trip. SC

***EVST 244a, Coastal Environments in a Changing World** Mary Beth Decker

The effects of human action and natural phenomena on coastal marine ecosystems. Methods used by coastal scientists to address environmental issues; challenges associated with managing and conserving coastal environments. Priority to Environmental Studies majors; open to nonmajors as space permits. SC

EVST 245b/F&ES 245b/PLSC 146b, International Environmental Policy and Governance Benjamin Cashore

The development of international environmental policy and the functioning of global environmental governance. Critical evaluation of theoretical claims in the literature and the reasoning of policy makers. Introduction of analytical and theoretical tools used to assess environmental problems. Case studies emphasize climate, forestry, and fisheries. SO

EVST 250b/ANTH 245b, Nature and Globalization Karen Hébert

For description see under Anthropology.

***EVST 260a^G/F&ES 260a^G, Structure, Function, and Development of Vascular Plants** Graeme Berlyn

Morphogenesis and adaptation of trees from seed formation and germination to maturity. Physiological and developmental processes associated with structural changes in response to environment are discussed from both a phylogenetic and an adaptive point of view. SC

***EVST 261a/F&ES 261a/G&G 261a^G, Minerals and Human Health**

Catherine Skinner, Ruth Blake

For description see under Geology & Geophysics.

***EVST 275b/F&ES 275b^G, Ecosystems Patterns and Processes** Peter Raymond, Mark Bradford

Introduction to the ecosystem concept. Topics include the structure and functioning of ecological systems, the response of systems to changing environmental conditions, and

preservation and management issues. Discussion of both terrestrial and marine/aquatic systems. Undergraduate enrollment limited to 15. SC RP

EVST 307b/F&ES 307b^c, Organic Pollutants in the Environment Shimon Anisfeld
An overview of pollution problems posed by organic chemicals, including petroleum, pesticides, PCBs, dioxins, chlorinated solvents, and emerging contaminants. Processes governing the environmental fate of organic pollutants, e.g., evaporation, sorption, bioconcentration, and biodegradation. Technologies for prevention and remediation of organic pollution. No background in organic chemistry required.

***EVST 325a/ENGL 248a, Nature Writing in the English-Speaking World**

Linda Peterson

For description see under English Language & Literature.

***EVST 344b/F&ES 344b^c, Aquatic Chemistry** Gaboury Benoit

A detailed examination of the principles governing chemical reactions in water. Emphasis on developing the ability to predict the aqueous chemistry of natural, engineered, and perturbed systems based on a knowledge of their biogeochemical setting. Calculation of quantitative solutions to chemical equilibria. Focus on inorganic chemistry. Topics include elementary thermodynamics, acid-base equilibria, alkalinity, speciation, solubility, mineral stability, redox chemistry, and surface complexation reactions. SC

***EVST 346b, Urbanization and the Environment in China and India** Karen Seto,

Angel Hsu

Study of contemporary urbanization processes in China and India, with a focus on environmental challenges and sustainable development. Energy, food, water, and land-use systems; manufacturing, industry, and technology; cultures and lifestyles. Introduction to conceptual and analytical tools for assessing the effects of urbanization. SO

***EVST 362b/ARCG 362b/G&G 362b, Observing Earth from Space** Ronald Smith

For description see under Geology & Geophysics.

[EVST 365a/E&EB 365a, Landscape Ecology]

***EVST 400a/E&EB 275a^c, Biological Oceanography** Mary Beth Decker

Exploration of a range of coastal and pelagic ecosystems. Relationships between biological systems and the physical processes that control the movements of water and productivity of marine systems. Anthropogenic impacts on oceans, such as the effects of fishing and climate change. Includes three Friday field trips. Enrollment limited to 15. SC

***EVST 415b/BENG 405b^c, Biotechnology and the Developing World**

Anjelica Gonzalez

For description see under Biomedical Engineering.

***EVST 422a/ANTH 409a/F&ES 422a, Anthropology of Climate Change, Past and Present** Michael Dove

The history of thinking regarding climate and society. Climate theory from the classical era and the Enlightenment; modern anthropological literature on social and environmental change, climatic vulnerability and control, and climate knowledge and its circulation. SO

***EVST 424a/ANTH 406a/PLSC 420a, Rivers: Nature and Politics** James Scott

For description see under Political Science.

EVST 441a/F&ES 441a/G&G 440a^c/MCDB 317a, Methods in Geomicrobiology

Ruth Blake

For description see under Geology & Geophysics.

***EVST 443b/HIST 180Jb, Energy in American History** Paul Sabin

For description see under History.

***EVST 473b/ANTH 473b^c/ARCG 473b^c, Abrupt Climate Change and Societal Collapse**

Harvey Weiss

For description see under Anthropology.

DEPARTMENTAL SEMINARS

***EVST 215a/ENGL 459a, Scientific and Environmental Writing** Carl Zimmer

An intensive workshop in writing about science and the environment for a broad audience. Translating complex subjects into elegant prose, conducting interviews, handling controversies, researching articles, and finding one's voice. Readings include exemplary works ranging from newspaper articles to book excerpts. WR RP

***EVST 285b/F&ES 285b, Political Ecology: Nature, Culture, and Power**

Amity Doolittle

Study of the relationship between society and the environment. Global processes of environmental conservation, development, and conflicts over natural resource use; political-economic contexts of environmental change; ways in which understandings of nature are discursively bound up with notions of culture and identity. SO

***EVST 290a/F&ES 290a, Geographic Information Systems** Charles Tomlin

A practical introduction to the nature and use of geographic information systems (GIS) in environmental science and management. Applied techniques for the acquisition, creation, storage, management, visualization, animation, transformation, analysis, and synthesis of cartographic data in digital form.

[EVST 367b/F&ES 367b, Water Resources and Environmental Change]

[EVST 398a/PLSC 262a, Energy, Climate, Law, and Policy]

SENIOR PROJECT

***EVST 496a or b, Senior Research Project and Colloquium** Paul Sabin, John Wargo

Independent research under the supervision of members of the faculty, resulting in a senior essay. Students meet with peers and faculty members regularly throughout the fall term to discuss the progress of their research. Projects should offer substantial opportunity for interdisciplinary work on environmental problems. Students may choose to do either a one- or a two-term senior project.

Epidemiology and Public Health

(See under Public Health.)

Ethics, Politics, and Economics

Director of undergraduate studies: Steven Wilkinson, 31 Hillhouse Ave., 432-7178, steven.wilkinson@yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF ETHICS, POLITICS, AND ECONOMICS

Professors Seyla Benhabib (*Political Science, Philosophy*), Donald Brown (*Economics*), David Cameron (*Political Science*), Ron Eyerman (*Sociology*), Bryan Garsten (*Political Science*), Shelly Kagan (*Philosophy*), Joseph LaPalombara (*Political Science*), Thomas Pogge (*Philosophy*), Benjamin Polak (*Economics*), Douglas Rae (*Political Science*), John Roemer (*Political Science*), Susan Rose-Ackerman (*Political Science, Law School*), Nicholas Sambanis (*Director*) (*Political Science*), Prakash Sethi (*Political Science*) (*Visiting*), Ian Shapiro (*Political Science*), Steven Wilkinson (*Political Science*)

Senior Lecturer Boris Kapustin (*Global Affairs*)

Lecturers Thomas Donahue (*Political Science*), Alexandra Dufresne (*Political Science*), Christopher Lebron (*Political Science*), Jonathan Schell (*Global Affairs*), David Simon (*Political Science*)

In an era of global interdependence and rapid technological change, we need to think practically about the institutional dynamics of power and governance. We have to understand the technical complexities of economic and statistical analysis at the same time that we think critically about basic moral and political choices. Constructive responses to such problems as coping with natural and social hazards, allocation of limited social resources (e.g., medical care), or morally sensitive political issues (e.g., affirmative action and war crimes) require close knowledge of their political, economic, and social dimensions, and a capacity to think rigorously about the basic questions they raise.

The major in Ethics, Politics, and Economics joins the analytic rigor of the social sciences and the enduring normative questions of philosophy to promote an integrative and critical understanding of the institutions, practices, and policies that shape the contemporary world.

Requirements of the major Fourteen term courses are required for the major, including five introductory courses, one intermediate microeconomics course, three core courses, one advanced seminar, and four courses comprising a student's individual area of concentration. The concentration is developed in consultation with the director of undergraduate studies and should culminate in a senior essay written in the area defined by the concentration.

Introductory courses Introductory courses provide a basic familiarity with contemporary economic analysis and survey central issues in ethics and political philosophy. Such a background is necessary to understand theories that combine different approaches to the three areas of inquiry and to assess policies with complex social, economic, and moral implications.

The five introductory courses include two in economics (microeconomics and macroeconomics), one in political philosophy, one in ethics, and one in statistics. An intermediate course in microeconomics is also required.

Core courses Three core courses comprise the center of the major in Ethics, Politics, and Economics. The first core course, required for all majors, is EP&E 215, *Classics of Ethics, Politics, and Economics*. Students must complete two additional core courses, each selected from a different one of the following three groups: rationality and social choice, political systems, and social theory and cultural analysis. The three core courses must be taken before the senior year. Core courses are listed by group on the program's Web site at epe.yale.edu/requirements-major.

Advanced seminars All majors must complete one advanced seminar. The course is selected from an approved group of seminars that focus on how core modes of reasoning drawn from the major's three areas of inquiry can be applied to a particular area or problem. For information about which courses fulfill the advanced seminar requirement, see the program's Web site at epe.yale.edu/requirements-major.

Area of concentration Each student defines an area of concentration in consultation with the director of undergraduate studies. The concentration enables students to frame an important problem and shape a systematic course of inquiry, employing analytical methods and substantive theories drawn from the three fields. Students should not only recognize the accomplishments of varied interdisciplinary efforts, but also attempt to represent and in some cases further develop those accomplishments in their own work.

For many students the concentration treats a contemporary problem with a substantial policy dimension (domestic or international), but some students may wish to emphasize philosophical and methodological issues. Areas of concentration must consist of four courses appropriate to the theme, including the seminar or independent study course in which the senior essay is written (see "Senior essay" below). In designing the area of concentration, students are encouraged to include seminars from other departments and programs. The director of undergraduate studies will also require students to show adequate competence in data analysis when the area of concentration requires it.

The following are examples of possible areas of concentration: distributive justice; government regulation of market economies; environmental policy; philosophy of law; gender relations; democracy and multiculturalism; contemporary approaches to public policy; war and coercion; war crimes and crimes against humanity; medical ethics; international political economy; philosophy of the social sciences; social theory and ethics; cultural analysis and political thought; civil society and its normative implications.

Senior essay A senior essay is required for the major and should constitute an intellectual culmination of the student's work in Ethics, Politics, and Economics. The essay should fall within the student's area of concentration and may be written within a relevant seminar, with the consent of the instructor and approval of the director of undergraduate studies. If no appropriate seminar is offered in which the essay might be written, the student may instead enroll in EP&E 491 with approval of the director of undergraduate studies and

a faculty member who will supervise the essay. Students who wish to undertake a more substantial yearlong essay may enroll in EP&E 492, 493.

The senior essay reflects more extensive research than an ordinary Yale College seminar paper and employs a method of research appropriate to its topic. Some papers might be written entirely from library sources; others may employ field interviews and direct observation; still others may require statistical or econometric analysis. The student should consult frequently with the seminar instructor or adviser, offering partial and preliminary drafts for criticism.

Senior essays written in the fall term are due December 10, 2012. Senior essays written in the spring term and yearlong essays are due April 15, 2013. One-term essays are normally expected to be forty to fifty pages in length; yearlong essays are normally expected to be eighty to one hundred pages in length.

Credit/D/Fail option Students admitted to the major may take any one of their Ethics, Politics, and Economics courses Credit/D/Fail. Such courses count as non-A grades in calculations for Distinction in the Major.

Application to the Ethics, Politics, and Economics major Students must apply to enter the major at the end of the fall term of their sophomore year. Application must be made in writing to the director of undergraduate studies no later than Monday, December 10, 2012, in the program registrar's office, 31 Hillhouse Avenue. Applications must include the application cover sheet (available on the program's Web site), a transcript of work at Yale that indicates fall-term 2012 courses, and a brief application essay. If possible, applicants should include a copy of a paper written for a course related to the subject matter of Ethics, Politics, and Economics. More information regarding the application process is posted at epe.yale.edu/applying-major. A list of accepted applicants will be posted on the same site by December 31, 2012.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 14 (incl senior req)

Specific course required EP&E 215

Distribution of courses 1 intro course each in microeconomics, macroeconomics, political phil, ethics, and stat; 1 intermediate microeconomics course; 2 addtl core courses, as specified; 1 advanced sem, as specified; 4 courses, incl course for senior req, in area of concentration defined by student in consultation with DUS

Senior requirement Senior essay in area of concentration (in a sem or in EP&E 491 or in EP&E 492 and 493)

EP&E 203a/PLSC 452a/STAT 102a^c, Introduction to Statistics: Political Science

Jonathan Reuning-Scherer, Alan Gerber

For description see under Statistics.

EP&E 209a/PLSC 453a/STAT 103a^c, Introduction to Statistics: Social Sciences

Jonathan Reuning-Scherer

For description see under Statistics.

***EP&E 215a or b, Classics of Ethics, Politics, and Economics** Boris Kapustin,
Thomas Donahue

A critical examination of classic and contemporary works that treat problems of ethics, politics, and economics as unities. Topics include changing conceptions of private and public spheres, the content and domain of individual freedom, and ethical and political limits to the market. Readings from the works of Aristotle, Hobbes, Locke, Smith, Bentham, Mill, Hegel, Marx, Hayek, Rawls, and others. HU, SO Core

***EP&E 220a/PLSC 327a, Collective Choice and Political Morality** Thomas Donahue
Social choice theory and its implications for political morality. Challenges involved in creating a collective choice procedure, given diverse individual preferences. Philosophical foundations of social choice theory, including its assumptions about the nature of liberty. The feasibility of democracy and the existence of a public interest. SO Core

***EP&E 224a/ECON 465a, Debating Globalization** Ernesto Zedillo
For description see under Economics. Core

***EP&E 226a, Fundamentals of Game Theory** Alexandre Debs
Introduction to fundamental tools and solution concepts in game theory, with applications to economics and political science. SO Core

***EP&E 227b/ECON 473b/PLSC 343b, Equality** John Roemer
Egalitarian theories of justice and their critics. Readings in philosophy are paired with analytic methods from economics. Topics include Rawlsian justice, utilitarianism, the veil of ignorance, Dworkin's resource egalitarianism, Roemer's equality of opportunity, Marxian exploitation, and Nozickian procedural justice. Some discussion of American economic inequality, Nordic social democracy, and the politics of inequality. Recommended preparation: intermediate microeconomics. SO Core

***EP&E 228b/ECON 462b/GLBL 316b/LAST 410b, The Economics of Human Capital in Latin America** Douglas McKee
For description see under Economics.

***EP&E 232a, Microeconomic Public Policy** Donald Brown
An intermediate microeconomics course that focuses on the design and evaluation of public policies, using concepts and perspectives from applied fields such as public finance, industrial economics, and labor economics. Case studies of market failures in which the government intervened to restore efficiency and equity. SO

***EP&E 233a, Theories of Rationality** Casiano Hacker-Cordon
Theories of reason in the history of philosophy and in contemporary social and economic thought. Rationality in human values, desires, behavior, and social structures; objectivity in reasoning; cultural relativism; the nature of economic behavior; relationships between collective and individual rationality, between simplification and explanation, and between prudence and morality. SO Core

***EP&E 234b, States, Markets, and Rational Individuals** Edwin Camp
Critical evaluation of rational choice theory, with applications to issues in economics and politics. Success and failure of cooperation among individuals; conditions under which markets fail; state facilitation or stifling of market activity; the ability of individuals to make collective decisions. SO Core

*EP&E 235a/PHIL 457a^G/PLSC 283a^G, **Recent Work on Justice** Thomas Pogge
For description see under Philosophy.

*EP&E 242b/PLSC 372b, **Politics and Markets** Peter Swenson
For description see under Political Science. Core

*EP&E 243a/GLBL 336a/LAST 423a/PLSC 423a, **Political Economy of Poverty Alleviation** Ana De La O
For description see under Political Science. Core

*EP&E 245a/PLSC 152a, **Global Firms and National Governments**
Joseph LaPalombara
For description see under Political Science. Core

*EP&E 246a/AFST 420a/LAST 406a/PLSC 430a, **The Politics of Development Assistance** David Simon
Study of development assistance, a dominant feature of the political economies of some of the world's poorest countries. The motivations and politics of aid from donors' perspectives; the political and economic impact of aid on developing countries. Proposals to make aid a more effective instrument of development. SO Core

*EP&E 248b/PLSC 256b, **American Political Institutions** Michael Fotos
For description see under Political Science.

*EP&E 252b/GLBL 366b/PLSC 401b, **Promoting Democracy in Developing Countries**
Harry Blair
For description see under Political Science. Core

*EP&E 258b/PLSC 446b/SOCY 369b, **Welfare States across Nations** Sigrun Kahl
For description see under Political Science.

*EP&E 259b/PLSC 183b, **Europe, the United States, and the Iraq Crisis**
Jolyon Howorth
For description see under Political Science.

*EP&E 266a/SOCY 309a^G, **Religious Nationalism** Philip Gorski
For description see under Sociology. Core

*EP&E 267a/SOCY 216a/WGSS 314a, **Social Movements** Ron Eyerman
For description see under Sociology. Core

*EP&E 271b/AFST 447b^G/ER&M 271b/PLSC 447b^G, **The Rwandan Genocide in Comparative Context** David Simon
An examination of the 1994 Rwandan genocide: historical sources of the conflict, the motivations of the killers, actions and reactions of outside actors, efforts to reconstruct a post-genocide society, and continuation of the genocidal dynamic within the Great Lakes region. Consideration of other countries in similar situations, as well as other genocides in recent decades. SO

*EP&E 273b/MMES 343b/RLST 291b^G/SOCY 343b^G, **Sociology of Islam**
Jonathan Wyrzten, Jeffrey Guhin
For description see under Sociology.

***EP&E 280a/GLBL 245a/PLSC 151a^G, International Dimensions of Democratization**

Nikolay Marinov

The role played by international factors such as socialization, coercion, and emulation in the current wave of democratizations around the world. Focus on the extent to which democratic processes can be affected from the outside. SO

***EP&E 282b/PLSC 341b, Positive Political Theory** Seok-Ju Cho

For description see under Political Science.

***EP&E 300b, Contemporary Issues in Energy Policy** Ioannis Kessides

Overview of challenges in the global energy framework generated by concerns about energy security and climate change; public policies necessary for addressing these issues. Potential contributions and limitations of existing, improved or transitional, and advanced technologies. SO

[EP&E 310b/PLSC 227b, Refugee Law and Policy]***EP&E 312b/PLSC 297b, Moral Choices in Politics** Boris Kapustin

A study of how and why people make costly moral choices in politics. Figures studied include Thomas More, Abraham Lincoln, Nelson Mandela, Václav Havel, and Aung San Suu Kyi. SO Core

***EP&E 323a/PLSC 221a, U.S. Immigration Law and Policy** Alexandra Dufresne

Major themes and controversies in American immigration law and policy, including admission and deportation of noncitizens, protection of asylum-seekers and refugees, illegal immigration, strategies of immigration law enforcement, constitutional limits on executive power, the role of administrative agencies and federal courts, and civil rights of noncitizens before and after 9/11. Emphasis on legal reasoning and analysis. Recommended preparation: PLSC 113 and 233. SO

***EP&E 334b/PHIL 455b^G, Normative Ethics** Shelly Kagan

A systematic examination of normative ethics, the part of moral philosophy that attempts to articulate and defend the basic principles of morality. 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). Prerequisite: a course in moral philosophy. HU Core

***EP&E 353a/PLSC 305a, Critique of Political Violence** Boris Kapustin

Methods of conceptualizing political violence that are prevalent in contemporary political philosophical discourse. Use of theoretical-analytical tools to examine the modes violence assumes and the functions it performs in modern political life as well as the meanings and possibilities of nonviolence in politics. SO Core

***EP&E 354b/HUMS 386b/PLSC 322b^G, Empire and Modern Political Thought**

Karuna Mantena

For description see under Political Science. Core

***EP&E 367b/PLSC 248b, The Political Economy of Health Care** Peter Swenson

For description see under Political Science. Core

***EP&E 369a/PLSC 246a, Ethics and American Business** Prakash Sethi

Ethical norms and values as they are incorporated in business decisions in the United States. Corporate culture and reward systems that influence ethical concerns; corporate responses to societal pressures to protect individuals and groups; emerging trends in corporate social responsibility, shareholder activism, and civil society organizations; changes in core concepts of economic efficiency and profitability. SO Core

***EP&E 381a/PLSC 120a, Ethics in the Age of Globalization and Multinational Corporations** Prakash Sethi

Multinational corporations and their impact—both positive and negative—on national cultures, ethical norms, business practices, and political governance structures in the host countries. Attempts by corporations, civil society organizations, and national, multilateral, and international political entities to ameliorate the negative side effects of globalization while supporting efforts toward continued economic growth. SO Core

***EP&E 389b/PLSC 234b^c, The Politics, Law, and Economics of Affirmative Action**

Ian Shapiro

For description see under Political Science. Core

***EP&E 390a/PLSC 212a, Democracy and Sustainability** Michael Fotos

For description see under Political Science.

***EP&E 395b/PLSC 333b^c, Non-Domination as a Political Ideal** Ian Shapiro

For description see under Political Science.

***EP&E 410b/PLSC 304b, Business Ethics** Charles Ellis

Current ethical problems facing business leaders. Visible and invisible factors that make ethical decisions complex and difficult to analyze. Anticipating ethical dilemmas; framing decisions and gathering information; the difficulties of taking appropriate, timely action.

***EP&E 413a/ECON 470a, Topics in American Economic History** Melinda Miller

For description see under Economics. Core

***EP&E 425b/PLSC 181b/SAST 342b, South Asia in World Politics** Elizabeth Hanson

For description see under Political Science.

***EP&E 435a, Luck and Justice** Christopher Lebron

The relations among luck, responsibility, and social justice. Questions surrounding kinds of luck, justification, rational agency, and blame. The problem of assigning responsibility for outcomes over which an individual has no direct control. SO

***EP&E 440b, Nonviolence and Political Power in the Twentieth Century**

Jonathan Schell

A study of nonviolent movements in the twentieth century. Topics include Gandhi in India, Solidarity in Poland, the fall of the Soviet Union, and the democracy movements of the late twentieth century. Consideration of democratic government, nuclear deterrence, and changes in the character of war and political power itself. Readings from case histories and from the works of such authors as Hobbes, Clausewitz, Mao Zedong, Hannah Arendt, Max Weber, and Václav Havel. SO Core

*EP&E 443b/PLSC 240b, **Public Schools and Public Policy** John Bryan Starr

For description see under Political Science.

*EP&E 444a/CGSC 451a/PHIL 451a^G, **Violence and Human Dignity** Stephen Darwall

For description see under Philosophy.

*EP&E 445b/PHIL 453b^G, **Contemporary Kantian Ethics** Sonny Elizondo

For description see under Philosophy.

*EP&E 447a/PLSC 412a, **Global Journalism, National Identities** James Sleeper

For description see under Political Science.

*EP&E 448a/ECON 466a, **Economics of Aging** Douglas McKee

For description see under Economics.

*EP&E 452a/PLSC 319a, **Theory and Practice in Recent Bioethics** David Smith

Justice as a theme in bioethics. Issues of justice in neuroethics and in care for the dying.
SO

*EP&E 458b, **Egalitarianism** Christopher Lebron

The concept of equality in normative political theory explored through contemporary philosophical texts. Reasons why oppressed, marginalized, and systematically disadvantaged groups express their claims in terms of equality; racial inequality as a case study. SO

*EP&E 459a/HUMS 325a/PLSC 284a^G, **Modern Liberty** Bryan Garsten

For description see under Political Science.

*EP&E 460b, **Ethical Leadership** Danilo Petranovich

The relations among character, ethics, and leadership. Types of leadership in both public and private sectors of society; the effects over time of holding power. Focus on the role of business leaders, including entrepreneurs, managers, and financiers. Readings from both classic and contemporary studies across disciplines. SO

*EP&E 461b/PLSC 310b^G, **Borders** Paulina Ochoa Espejo

For description see under Political Science.

INDIVIDUAL RESEARCH AND SENIOR ESSAY COURSES

*EP&E 471a or b, **Directed Reading and Research** Steven Wilkinson

For individual reading and research unrelated to the senior essay. Students must obtain the signature of the faculty member supervising their independent work on an Independent Study Form (available from the Ethics, Politics, and Economics registrar's office). This form must be submitted to the director of undergraduate studies at the time the student's class schedule is submitted.

*EP&E 491a or b, **The Senior Essay** Steven Wilkinson

A one-term senior essay. The essay should fall within the student's area of concentration. If no appropriate seminar is offered in which the essay might be written, the student, in consultation with the director of undergraduate studies, should choose an appropriate member of the faculty to supervise the senior essay.

Students must obtain the signature of the faculty member supervising their independent work on an Independent Study Form (available from the Ethics, Politics, and

Economics registrar's office). This form must be submitted to the director of undergraduate studies at the time the student's class schedule is submitted.

***EP&E 492a and 493b, The Yearlong Senior Essay** Steven Wilkinson

A two-term senior essay. The essay should fall within the student's area of concentration. The student, in consultation with the director of undergraduate studies, should choose an appropriate member of the faculty to supervise the senior essay.

Students must obtain the signature of the faculty member supervising their independent work on an Independent Study Form (available from the Ethics, Politics, and Economics registrar's office). This form must be submitted to the director of undergraduate studies at the time the student's class schedule is submitted.

GRADUATE AND PROFESSIONAL SCHOOL COURSES OF INTEREST TO UNDERGRADUATES

Some graduate and professional school courses are open to qualified undergraduates and may be of interest to EP&E majors (e.g., courses in the Schools of Nursing, Forestry & Environmental Studies, Management, and Public Health). Permission to enroll is required from the instructor as well as the appropriate representative of the graduate or professional program. Note that not all professional school courses yield a full course credit in Yale College. (See "Courses in the Yale Graduate and Professional Schools" in chapter II, section K.)

Ethnicity, Race, and Migration

Director of undergraduate studies: Alicia Schmidt Camacho, 108 HGS, 432-7756, alicia.camacho@yale.edu; erm.yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF ETHNICITY, RACE, AND MIGRATION

Professors Rolena Adorno (*Spanish & Portuguese*), Ned Blackhawk (*History, American Studies*), Alicia Schmidt Camacho (*American Studies*), Hazel Carby (*African American Studies, American Studies*), Michael Denning (*American Studies, English*), John Mack Faragher (*History, American Studies*), Inderpal Grewal (*American Studies, Women's, Gender, & Sexuality Studies*), Dolores Hayden (*Architecture, American Studies*), Jonathan Holloway (*History, African American Studies*), Matthew Jacobson (*American Studies, African American Studies, History*), Gilbert Joseph (*History*), Kenneth Kidd (*School of Medicine*), Benedict Kiernan (*History*), Jennifer Klein (*History*), Mary Lui (*American Studies, History*), Enrique Mayer (*Anthropology*), Stephen Pitti (*History, American Studies*), Jeremy Seekings (*Global Affairs*) (*Visiting*), Jing Tsu (*East Asian Languages & Literatures*), Michael Veal (*Music, African American Studies*), Laura Wexler (*American Studies, Women's, Gender, & Sexuality Studies*)

Associate Professor Terri Francis (*Film Studies, African American Studies*)

Assistant Professors Jafari Allen (*Anthropology, African American Studies*), Rene Almeling (*Sociology*), GerShun Avilez (*English, African American Studies*), Zareena Grewal (*American Studies*), Albert Laguna (*American Studies*), Vida Maralani (*Sociology*), Paige McGinley (*Theater Studies*), Alyssa Mt. Pleasant (*History*), Justin Neuman

(*English*), Ato Kwamena Onoma (*Political Science*), Birgit Brander Rasmussen (*American Studies*), Sara Shneiderman (*Anthropology*), Edwidge Tamalet-Talbayev (*French*)

Senior Lecturer Geetanjali Singh Chanda (*Women's, Gender, & Sexuality Studies*)

Lecturers Oluseye Adesola (*African Studies*), Jasmina Beširević-Regan (*Sociology*), Alexandra Dufresne (*Political Science*), Demetra Kasimis (*Humanities*), Mikaela Rogozen-Soltar (*Middle East Studies*)

The program in Ethnicity, Race, and Migration enables students to engage in an interdisciplinary, comparative study of forces that have created a multicultural, multiethnic, and multiracial world. The major emphasizes familiarity with the intellectual traditions and debates surrounding the concepts of indigeneity, ethnicity, nationality, and race; grounding in both the history of migration and its contemporary manifestations; and knowledge of and direct engagement with the cultures, structures, and peoples formed by these migrations.

Prospective majors should consult the director of undergraduate studies early in their academic careers to discuss an individual plan of study. Enrollment in the major requires permission of the director of undergraduate studies prior to the beginning of the fall term of the junior year.

The major for the Classes of 2013 and 2014 Students in the Class of 2013 must fulfill the requirements of the Ethnicity, Race, and Migration major that were in place when they entered the major, as described in previous editions of this bulletin. Students in the Class of 2014 may also fulfill the requirements of the major that were in place when they entered it, including the stipulation that Ethnicity, Race, and Migration may only be taken as a second major. Alternatively, students in the Class of 2014 may fulfill the requirements for the major as described below for the Class of 2015 and subsequent classes.

Requirements of the major for the the Class of 2015 and subsequent classes Students must complete twelve term courses in Ethnicity, Race, and Migration, including the senior requirement. These twelve must include ER&M 200, an introductory course on the issues and disciplines involved in the study of ethnicity, race, and migration. Students interested in the major should take this course early in their studies, preferably during the freshman or sophomore year in preparation for more advanced work in the junior seminar. In the junior year, all majors are required to take ER&M 300, Comparative Ethnic Studies. This junior seminar introduces majors to scholarship in ethnic studies, postcolonial studies, and cultural studies.

Distributional requirements In order to acquire a comparative sense of ethnicity, race, and migration, students are expected to take at least two courses in each of two distinct geographic areas. To gain familiarity with global movements of people within and across national borders, majors must take at least one course that examines historical or contemporary migrations. Students must also demonstrate evidence of interdisciplinary work related to ethnicity, race, and migration in at least two departments or academic fields.

Area of concentration In consultation with the director of undergraduate studies, each student defines an area of concentration consisting of five term courses, not including the

senior essay or project. Advanced work in the foreign language related to a student's area of concentration is advised. Courses applied toward the area of concentration may also be used to fulfill the major's distributional requirements.

As a multidisciplinary program, Ethnicity, Race, and Migration draws on the resources of other departments and programs in the University. Students are encouraged to examine the offerings of other departments in both the humanities and the social sciences, interdisciplinary programs of study housed in the MacMillan Center and elsewhere, and residential college seminars for additional relevant courses. The stated area of concentration of each student determines the relevance and acceptability of other courses. Students are also encouraged to engage in community-based learning opportunities.

Senior requirement The senior requirement has two components. In the fall term, all majors take the senior colloquium (ER&M 491) on theoretical and methodological issues. Students may choose to complete the requirement by writing a senior essay in the senior project seminar (ER&M 492) during the spring term. Alternatively, students may take an upper-level ER&M seminar and write a senior essay of thirty to thirty-five pages in addition to completing all course requirements. This seminar may be taken during either the fall or spring term. Majors planning to undertake an independent senior project must submit a proposal signed and approved by a faculty adviser to the director of undergraduate studies during the fall term.

Term abroad Because of the major's emphasis on international and transnational work, students are encouraged to undertake a term abroad. They should consult with the director of undergraduate studies to identify courses from study abroad programs that may count toward the major.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Specific courses required ER&M 200, 300

Distribution of courses 5 courses in area of concentration; at least 2 courses in each of 2 geographic areas; at least 1 course on historical or contemporary migrations; at least 2 interdisciplinary courses from different departments or fields

Senior requirement Senior colloq (ER&M 491); senior essay or project in upper-level sem or in ER&M 492

REQUIRED COURSES

ER&M 200a, Introduction to Ethnicity, Race, and Migration

Alicia Schmidt Camacho

Historical roots of contemporary ethnic and racial formations and competing theories of ethnicity, race, and migration. Cultural constructions and social practices of race, ethnicity, and migration in the United States and around the world. HU, SO

***ER&M 300b, Comparative Ethnic Studies** Birgit Brander Rasmussen

Introduction to the methods and practice of comparative ethnic studies. Examination of racial formation in the United States within a transnational framework. Legacies of

colonialism, slavery, and racial exclusion; racial formation in schools, prisons, and citizenship law; cultural politics of music and performance; social movements; and postcolonial critique. (Formerly ER&M 232.) SO

ELECTIVES WITHIN THE MAJOR

ER&M 219a/HIST 219a^G/JDST 200a^G/MMES 149a/RLST 148a^G, History of the Jews and Their Diasporas to Early Modern Times Ivan Marcus

For description see under History.

***ER&M 236a/ENGL 344a, Global Fictions** Justin Neuman

For description see under English Language & Literature.

***ER&M 260a/AMST 274a, American Captivity Narratives** Birgit Brander Rasmussen

For description see under American Studies.

ER&M 264a/SOCY 134a/WGSS 110a, Sex and Gender in Society Rene Almeling

For description see under Sociology.

***ER&M 270b/HIST 358Jb/LAST 356b, History of Mexico since Independence**

Gilbert Joseph

For description see under History.

***ER&M 271b/AFST 447b^G/EP&E 271b/PLSC 447b^G, The Rwandan Genocide in Comparative Context** David Simon

For description see under Ethics, Politics, & Economics.

ER&M 278b/AFAM 178b/AFST 188b/HSAR 378b, From West Africa to the Black Americas: The Black Atlantic Visual Tradition Robert Thompson

For description see under History of Art.

ER&M 282b/AMST 272b/HIST 183b/WGSS 272b, Asian American History, 1800 to the Present Mary Lui

For description see under American Studies.

ER&M 283a/SOCY 183a, Urban America Marcus Hunter

For description see under Sociology.

***ER&M 303b/AMST 343b, Muslim Diasporas in America** Zareena Grewal

For description see under American Studies.

***ER&M 304a/CHNS 251a/HIST 308a/HUMS 448a/LITR 265a, China in the World** Jing Tsu

For description see under East Asian Languages & Literatures.

***ER&M 307b/AMST 422b/HIST 156Jb, Writing Tribal Histories** Ned Blackhawk

For description see under History.

ER&M 308a/AMST 288a/HIST 134a^G, American Indian Law and Policy

Ned Blackhawk

For description see under History.

- *ER&M 311b/AMST 311b, Latina/o New Haven** Alicia Schmidt Camacho
 Introduction to the field of Latina/o studies, with a focus on community-based research in New Haven. Training in interdisciplinary methods of social research, including oral history, interviews, archival research, cultural analysis, and social documentation. Students design collaborative research projects. SO
- ER&M 313b/AFST 180b^c, Nigeria and Its Diaspora** Oluseye Adesola
 For description see under African Studies.
- *ER&M 322a/AMST 325a/HIST 155Ja, Natives and Newcomers in Early America**
 Alyssa Mt. Pleasant
 For description see under American Studies.
- *ER&M 323a/AMST 322a/WGSS 371a, Gender, Family, and Cultural Identity in Asia and the United States** Geetanjali Singh Chanda
 For description see under Women's, Gender, & Sexuality Studies.
- *ER&M 327a/MMES 311a/WGSS 327a, Constructing the Self: From Autobiography to Facebook** Geetanjali Singh Chanda
 For description see under Women's, Gender, & Sexuality Studies.
- *ER&M 337b/LITR 257b, Literature, Ethics, and Globalization** Karin Gosselink
 For description see under Literature.
- *ER&M 342a/HIST 372Ja/LAST 372a, Revolutionary Change and Cold War in Latin America** Gilbert Joseph
 For description see under History.
- *ER&M 343a/AFAM 339a/AMST 339a/LITR 272a, Caribbean Fiction** Hazel Carby
 For description see under African American Studies.
- *ER&M 348a/AMST 404a/HIST 185Ja, Latina/o Histories** Stephen Pitti
 Survey of two hundred years of Mexican American, Puerto Rican, Central American, and Cuban American history in the United States. Transnational politics; legacies of European colonialism; labor history; the rise of ethnic nationalism. HU
- *ER&M 362a/GLBL 384a/SOCY 363a, Genocide and Ethnic Conflict**
 Jasmina Beširević-Regan
 For description see under Sociology.
- *ER&M 366b/ANTH 463b^c/SAST 419b^c, Ethnicity, Indigeneity, Mobility**
 Sara Shneiderman
 For description see under Anthropology.
- *ER&M 382a/AMST 284a, Introduction to Latino Studies** Albert Laguna
 A critical overview of themes and issues that have shaped the experiences of Latino/a populations in the United States, within an interdisciplinary and hemispheric framework. Topics include U.S.–Latin American relations; the history of ethnic labels; the formation of transnational communities and identities; the politics of language and bilingualism; race, class, and ethnicity; and gender and sexuality. HU

***ER&M 383b/AMST 283b, The Latina/o Novel** Albert Laguna

Aesthetic strategies that have been used to represent Latinos and Latinas in novels; the political stakes of narrative aesthetics. Ethnicity as a historical category and an analytic paradigm in literary studies. Narrative strategies through which Latino/a authors have represented ethnicity and identity. HU

***ER&M 389b/AFAM 389b/ENGL 371b/WGSS 389b, Black Sexuality in Literature and Popular Culture** GerShun Avilez

For description see under African American Studies.

***ER&M 397a/PLSC 397a/RSEE 205a/SLAV 205a^c, Language, Nationalism, and Ethnic Conflict in the Balkans** Robert Greenberg

For description see under Slavic Languages & Literatures.

***ER&M 399a/AFAM 327a/AMST 373a/ENGL 339a/WGSS 336a, American Literary Nationalisms** GerShun Avilez

For description see under African American Studies.

***ER&M 411b/AMST 437b^c, Recording Vernacular Musics** Michael Denning

For description see under American Studies.

***ER&M 419b/SOCY 319b, Ethnography of the African American Community**
Elijah Anderson

For description see under Sociology.

***ER&M 421a/AMST 421a/HIST 109Ja, The American Gulf Coast** Ryan Brasseaux

For description see under American Studies.

***ER&M 422a/AMST 320a, Latino New York** Albert Laguna

The historical presence of Latinas and Latinos in New York City from the late nineteenth century to the present. Differences and similarities among Puerto Rican, Mexican, Cuban, and Dominican communities in the context of New York City history. Complex cultural dynamics as illustrated in novels, poetry, music, and film. HU

***ER&M 423b/AMST 329b, Cuban America** Albert Laguna

The history and cultural production of the Cuban diaspora in the United States from the nineteenth century to the present. The course uses periodicals, essays, novels, film, music, and television to track the historical, political, and cultural evolution of Cuban American communities, with an eye toward the future. HU

***ER&M 447b/AMST 409b/HIST 163Jb, Northeastern Native America, 1850 to the Present** Alyssa Mt. Pleasant

For description see under American Studies.

***ER&M 460b/AMST 360b, Mexicans and Mexican Americans since 1848**
Stephen Pitti

A survey of Mexican and Mexican American politics and culture in the United States from 1848 to the present. Topics include migration, political activism, racialization, citizenship, and social class. Not to be taken after ER&M <286>. WR, HU

INDIVIDUAL RESEARCH AND SENIOR ESSAY COURSES

*ER&M 471a and 472b, Individual Reading and Research for Juniors and Seniors

Alicia Schmidt Camacho

For students who wish to cover material not otherwise offered by the program. The course may be used for research or for directed reading. In either case a term paper or its equivalent is required. Students meet regularly with a faculty adviser. To apply for admission, students submit a prospectus signed by the faculty adviser to the director of undergraduate studies.

*ER&M 491a, The Senior Colloquium: Theoretical and Methodological Issues

Alicia Schmidt Camacho

A research seminar intended to move students toward the successful completion of their senior projects, combining discussions of methodological and theoretical issues with discussions of students' fields of research.

*ER&M 492b, The Senior Essay or Project Alicia Schmidt Camacho

Independent research on a one-term senior essay or project.

Film Studies

Director of undergraduate studies: J. D. Connor, 559 LORIA, 432-8225, jd.connor@yale.edu; www.yale.edu/filmstudiesprogram

FACULTY ASSOCIATED WITH THE PROGRAM OF FILM STUDIES

Professors *Dudley Andrew (*Comparative Literature, Film Studies*), Hazel Carby (*African American Studies, American Studies*), *Francesco Casetti (*Humanities, Film Studies*), *Katerina Clark (*Comparative Literature, Slavic Languages & Literatures*), Michael Denning (*American Studies, English*), *John Mack Faragher (*History*), *Aaron Gerow (*East Asian Languages & Literatures, Film Studies*), Inderpal Grewal (*Women's, Gender, & Sexuality Studies*), Benjamin Harshav (*Comparative Literature*), *David Joselit (*History of Art*), Stathis Kalyvas (*Political Science*), *Thomas Kavanagh (*French*), *John MacKay (*Chair*) (*Film Studies, Slavic Languages & Literatures*), *Millicent Marcus (*Italian*), Donald Margulies (*Adjunct*) (*English, Theater Studies*), Giuseppe Mazzotta (*Italian*), Kobena Mercer (*History of Art, African American Studies*), Christopher L. Miller (*African American Studies, French*), *Charles Musser (*American Studies, Film Studies*), Alexander Nemerov (*History of Art*), *Brigitte Peucker (*German, Film Studies*), Joseph Roach (*English, Theater Studies*), *Michael Roemer (*Adjunct*) (*Art, American Studies*), John Szwed (*Emeritus*) (*African American Studies*), Alan Trachtenberg (*Emeritus*), *Katie Trumpener (*Comparative Literature, English*), *Laura Wexler (*American Studies, Women's, Gender, & Sexuality Studies*)

Associate Professors *Murray Biggs (*Adjunct*) (*Theater Studies, English*), Moira Fradinger (*Comparative Literature*), *Terri Francis (*African American Studies, Film Studies*), Karen Nakamura (*Anthropology*)

Assistant Professors *J. D. Connor (*History of Art*), Zareena Grewal (*Ethnicity, Race, & Migration*), Brian Walsh (*English*), R. John Williams (*English*)

Senior Lecturers *John Crowley (*English*), *Ron Gregg (*Film Studies*)

Lecturers *Jonathan Andrews (*Art, Film Studies*), James Charney (*School of Medicine*), *Michael Kerbel (*American Studies*), *Marc Lapadula (*Film Studies*)

Critic *Sandra Luckow (*Art*)

Senior Lectors II Seungja Choi (*East Asian Languages & Literatures*), Risa Sodi (*Italian*)

Senior Lectors Krystyna Illakowicz (*Slavic Languages & Literatures*), Karen von Kunes (*Slavic Languages & Literatures*)

*Member of the Film Studies Committee.

The major in Film Studies focuses on the history, theory, criticism, and artistic creation of cinema and other moving-image media. Courses examine cinema's role as a unique modern art form and the contributions of moving-image media as cultural practices of enduring social significance. As an interdisciplinary program centered in the humanities, Film Studies offers students latitude in defining their course of study within the framework established by the Film Studies Committee. With this freedom comes the responsibility of carefully planning a coherent and well-focused program. Because of the special demands of Film Studies and the diversity of its offerings, potential majors are encouraged to consult the director of undergraduate studies early in their academic careers.

The Film Studies major consists of fourteen term courses, including the prerequisite. A maximum of one course taken Credit/D/Fail may count toward the major with permission of the director of undergraduate studies.

Prerequisite Students normally take FILM 150, Introduction to Film Studies, in their freshman or sophomore year. It is useful preparation, and in some cases a prerequisite, for many other courses in the major.

Required courses Students are required to take FILM 320, Close Analysis of Film, preferably during their sophomore year. They must also take FILM 312, Theory of Media, or FILM 333, Early Film Theory and Modernity, preferably by the end of their junior year. Students are encouraged to take both. In addition, students must devote two term courses, preferably upper-level courses, to the study of representative films from at least two different nations or cultures (for example, German expressionist cinema, Italian cinema, American comedy).

Students must take one term course on the creative process in film. Appropriate courses are listed under "Production Seminars," but other courses in art, theater studies, or creative writing may be substituted with the permission of the director of undergraduate studies.

Area of concentration With the help of the director of undergraduate studies in Film Studies, each student defines an area of concentration comprising six courses leading up to and including the senior requirement. The six courses should form a coherent program in which the study of film is integrated with a particular discipline (history of art, literature, philosophy, the social sciences) or area of investigation (film theory, production, race and gender, photography, national or regional cultures and their cinemas). The focus of the concentration might also be a given historical or theoretical problem drawn from two

areas, such as German expressionism in film and in art or narrative theory in film and in the novel. Students choosing a production-related concentration often start by completing ART 141, 142 by the end of their sophomore year, and continue with ART 341, 342 by the end of their junior year, to prepare for FILM 455, 456, or 483, 484 in their senior year. They must take at least seven critical studies courses in the major. FILM 150, 312, 320, 333, and the two required courses on national cinemas may be counted among the seven. Critical studies courses are defined as those not listed under “Production Seminars.” Students with a concentration in filmmaking should also take courses in screenwriting, and vice versa.

Senior requirement During the senior year, each student takes one or two senior-level seminars or the equivalent and submits a senior essay or senior project, which should represent a culmination of work in the major and in Yale College. For the student writing a senior essay, several options are possible. First, the student may enroll in two terms of relevant senior-level seminars (usually courses numbered in the 400s) and write a substantial term paper of twenty-five pages, double-spaced, for one of these courses. Second, the student may do independent research on a yearlong senior essay (FILM 491, 492). This option is intended for students with clearly defined topics that do not relate closely to a senior-level seminar. During the first two weeks of the first term of senior year, a petition for permission to do independent research should be submitted to the director of undergraduate studies in the form of a brief prospectus, approved by the proposed faculty adviser to the essay. Such research receives two terms of credit; the product of a two-term research essay is a work of at least fifty pages. Third, the senior requirement may be completed by combining one single-term senior-level seminar with one term of an independent research project (FILM 491 or 492), resulting in a paper of thirty-five pages. Whichever option is chosen, the essay should be written on a topic informed by the student’s area of concentration. In researching and writing the essay, the student should consult regularly with the seminar instructor, supplying preliminary drafts as appropriate, and may consult with other faculty members as well.

Students who wish to complete a senior project as an alternative to an essay petition the Film Studies Committee for approval of their project at the end of the junior year. Projects might include writing a screenplay or producing a video. Students electing such an alternative should note that the project must be undertaken and accomplished over two terms. A limited number of students making films or videos are admitted to either the Advanced Fiction Film Workshop (FILM 483, 484) or the Documentary Film Workshop (FILM 455, 456), and receive three credits for their projects (two credits for FILM 483, 484 or 455, 456, and one for FILM 493 or 494). Such a choice effectively commits students to one extra course in addition to the fourteen courses required for the major, because FILM 493 or 494 does not count toward the fourteen required courses when taken in conjunction with FILM 483, 484 or 455, 456. Students may undertake a production project outside the workshops if (1) the Film Studies Committee approves their petition, (2) they have found a primary adviser qualified and willing to provide the necessary supervision, and (3) they have identified the equipment necessary to execute the project. Such students may count FILM 493 and 494 toward the fourteen courses required for the major.

Majors graduating in December must submit their senior essays or senior projects to the director of undergraduate studies by December 7; those graduating in May, by April 26. A

second reader assigned by the director of undergraduate studies participates in evaluating the essay or project. In order to graduate from Yale College, a student majoring in Film Studies must achieve a passing grade on the senior essay or senior project.

Admission to senior-level seminars is at the instructor's discretion, but the Film Studies program will ensure that every senior major gains admission to the required number of seminars.

The intensive major Students of substantial accomplishment and commitment to film studies are encouraged to pursue the intensive major. Students in the intensive major complete a senior project in production and also write a senior essay on an unrelated topic. The intensive major in Film Studies is intended for students who are not pursuing two majors. Students must request approval from the Film Studies Committee at the end of their junior year by submitting a proposal that outlines their objectives and general area of study.

All majors Study of relevant foreign languages is urged for all Film Studies majors. Students considering graduate work should become proficient in French or another modern language. Those choosing to study film in relation to a foreign culture must have good listening and reading abilities in that language.

Film Studies draws on the resources of many other departments and programs in the University. Students are encouraged to examine the offerings of other departments in both the humanities and the social sciences, as well as residential college seminars, for additional relevant courses. The stated area of concentration for each student normally determines the relevance and acceptability of other courses.

REQUIREMENTS OF THE MAJOR

Prerequisite FILM 150

Number of courses 14 term courses, incl prereq and senior req

Distribution of courses 6 courses in area of concentration; 2 courses in different national cinemas; 1 production course; if concentration is production-related, at least 7 critical studies courses

Specific courses required FILM 320; FILM 312 or 333

Senior requirement 2 terms of senior-level sems, or 2 terms of senior essay (FILM 491, 492), or 1 term of each; or 2 terms of senior project (FILM 455, 456, or 483, 484)

Intensive major Both senior essay and senior project

REQUIRED COURSES

FILM 150a, Introduction to Film Studies Ron Gregg

A survey of film studies concentrating on theory, analysis, and criticism. Students learn the critical and technical vocabulary of the subject and study important films in weekly screenings. Prerequisite for the major. WR, HU

FILM 312a^c/HUMS 216a/LITR 354a, Theory of Media Francesco Casetti

Introduction to key issues in media studies. Relationships between commodity, artwork, and networks of exchange; media and public sphere; the analysis of radio and television; alternative or counter-hegemonic conceptions of media; and the viability of the concept "media" itself. HU

***FILM 320b/HSAR 490b, Close Analysis of Film** J. D. Connor

Ways in which traditional genres and alternative film forms establish or subvert convention and expectation and express thematic and ideological concerns. The balancing of narrative containment and excess, as well as action and image. Use of body and voice, space and music. Examples include films by Lang, Bresson, Ozu, and Hitchcock. Prerequisite: FILM 150. HU

FILM 333b/HUMS 375b/LITR 351b, Early Film Theory and Modernity

Francesco Casetti

Introduction to film theory from its beginnings to c. 1930, including its emphasis on the spectator's experience. Ways in which early theory highlighted characteristics of modern life such as speed, economy, contingency, and excitation. The role of national identity in defining topics of theoretical research explored through comparison of American and European debates. HU

NATIONAL CINEMAS

FILM 240b/LITR 143b, World Cinema John MacKay

For description see under Literature.

***FILM 241b/PLSH 246b, Polish Communism and Postcommunism in Film**

Krystyna Illakowicz

For description see under Slavic Languages & Literatures.

***FILM 311a/AMST 301a/ENGL 299a, East Asia in U.S. Literature and Film**

R. John Williams

For description see under English Language & Literature.

***FILM 313b/HIST 319b/SAST 324b, India on Film** Shailaja Paik

For description see under South Asian Studies.

***FILM 329a/ANTH 338a/SAST 372a^c, Himalaya through Film and Text** Mark Turin

For description see under South Asian Studies.

FILM 334b/HSAR 324b^c, Art and Industry in Contemporary Hollywood

J. D. Connor

For description see under History of Art.

***FILM 436a/AFAM 461a/FREN 411a/LITR 263a, Novel and Film in the Francophone Colonial and Postcolonial World** Christopher L. Miller

For description see under French.

***FILM 448a/JAPN 271a, Japanese Cinema after 1960** Aaron Gerow

For description see under East Asian Languages & Literatures.

***FREN 255a, French Cinema** Thomas Kavanagh

FILM THEORY, VISUAL MEDIA, AND SPECIAL TOPICS

***FILM 045a/THST 099a, Dance on Film** Emily Coates

For description see under Theater Studies.

***FILM 099a/LITR 099a, Film and the Arts** Dudley Andrew

A study of cinema as it developed into a significant art form, including its interactions with fiction, theater, and painting. Focus on André Bazin's reflections on cinema in response to Chaplin, Welles, and Cocteau, as well as to writers such as Faulkner, Sartre, and Malraux. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU RP Fr sem

***FILM 270b/AFAM 200b, The Filmworks of Spike Lee** Terri Francis

Survey of Spike Lee's films and writings, in the contexts of African American cultural movements and American independent films. HU

***FILM 305a/LITR 361a, History and Theory of Animation** Aaron Gerow

Survey of the history and theory of animation. Examples from around the world, from various traditions, and from different periods. HU

***FILM 323a, The Avant-Garde Film** Terri Francis

Study of the history and aesthetics of American avant-garde films from the 1940s to the present. HU

***FILM 324a/AMST 402a/ANTH 302a/WGSS 380a, Gender and Sexuality in Media and Popular Culture** Laura Wexler, Inderpal Grewal

For description see under Women's, Gender, & Sexuality Studies.

***FILM 327a/ANTH 252a, Introduction to Visual Anthropology** Karen Nakamura

For description see under Anthropology.

***FILM 355b/ENGL 411b, Shakespeare on Film** Brian Walsh

For description see under English Language & Literature.

***FILM 370a^G/AFAM 242a, African American Cinema** Terri Francis

A survey of African American cinema from Oscar Micheaux's *Within Our Gates* (1919) to Julie Dash's *Daughters of the Dust* (1991) and beyond. Topics include the concept of a black aesthetic, the relationship between commercial and independent filmmaking practices, and the question of genre. HU

***FILM 375b/AMST 375b/WGSS 375b, LGBTQ Cinema** Ron Gregg

An introduction to queer film history. Focus on LGBTQ representation in Hollywood and experimental film from its beginning to the present, placed in social and political context. Topics include the impact of censorship, codes used to connote homosexuality, and how gay and antigay politics have affected representation. HU

FILM 407b/THST 357b, The Cinema of War Murray Biggs

A study of the effects of military actions on combatants, civilians, and those left behind. Emphasis on films from or about the two world wars, with samples from Vietnam, Iraq, and other theaters. HU

***FILM 409b^G/LITR 311b^G/RUSS 311b^G, Montage, Collage, and Politics** John MacKay

Monuments of early Soviet film and their relationship to political-aesthetic debates surrounding montage and collage practice. Theories of montage; montage practices across the arts; twentieth-century conceptions of political art; debates about montage/collage practice and avant-gardism since World War II. HU

***FILM 410b/GMAN 406b/LITR 350b, Theatricality in Film** Brigitte Peucker
 Examination of the multiple implications of theatricality in and for the cinema. Theatricality as excess; the appropriation of theatrical modes for film; theatricality as modernist self-reflexivity; performance and the relation of theatricality to subjectivity (performing the self); ritual and reenactment in film; theatricality and the real; the material image. HU

***FILM 411b/LITR 380b, The Films of Alfred Hitchcock** Brigitte Peucker
 An examination of Hitchcock's career as a filmmaker from *Blackmail* to *Frenzy*, with close attention to the wide variety of critical and theoretical approaches to his work. Topics include the status of the image; the representation of the feminine and of the body; spectatorship; painterliness and theatricality; generic and psychoanalytic issues. HU

***FILM 427a/AMST 319a, American Documentary Films** Michael Roemer
 For description see under American Studies.

***FILM 453a^c/AMST 365a, Media and U.S. Presidential Elections, 1892–2012**
 Charles Musser
 Changing media formations with which U.S. presidential campaigns have been pursued, focusing on audiovisual media at moments of fundamental transformation. From lantern shows to cinema in 1892 and 1896, from film to television in 1948 and 1952, and from cinema and DVDs to YouTube and Web 2.0 in 2004 and 2008. Uses of audiovisual media during the 2012 presidential campaign. HU

***FILM 454b^c/ANTH 402b^c, Ethnographic Filmmaking and Visual Field Methods**
 Karen Nakamura
 For description see under Anthropology.

***FILM 464a/ENGL 404a/LITR 464a, Film and Fiction** Dudley Andrew,
 David Bromwich
 For description see under Literature.

***FILM 469b/AMST 306b, The Films of Martin Scorsese** Michael Kerbel
 Close analysis of Scorsese's films, with attention to his themes and styles and to ways in which his works have assimilated literary and cinematic influences, reflected their eras, and influenced other directors. Scorsese's work examined in the context of film history, and of U.S. culture and history, from the 1960s to the present. HU RP

***LITR 480a/WGSS 452a, Topics in Literary Theory: Psychoanalysis in Literature and Film** Moira Fradinger
 For description see under Literature.

PRODUCTION SEMINARS

***FILM 455a and 456b, Documentary Film Workshop** Charles Musser
 A yearlong workshop designed primarily for Film Studies majors making documentaries as senior projects. Seniors in majors other than Film Studies admitted as space permits. RP

***FILM 483a and 484b/ART 442a and 443b, Advanced Fiction Film Workshop**
 Jonathan Andrews
 For description see under Art.

- ***ART 141a and 142b, The Language of Film Workshop** Michael Roemer
- ***ART 341a or b, Intermediate Fiction Film Workshop** Michael Roemer [F],
Jonathan Andrews [Sp]
- ***ART 342b, Intermediate Documentary Film Workshop** Sandra Luckow
- ***ENGL 461a, Writing for Film: Voice and Vision** John Crowley
- ***ENGL 468b/THST 327b, Advanced Playwriting Workshop** Donald Margulies
For description see under English Language & Literature.
- ***MUSI 325a, Fundamentals of Music, Multimedia Art, and Technology**
Stephen Gorbos
- ***THST 111b, Survey of Theater and Drama** Paige McGinley

INDIVIDUAL RESEARCH AND SENIOR ESSAY COURSE OR PROJECT

***FILM 471a or b, Independent Directed Study** J. D. Connor
For students who wish to explore an aspect of film studies not covered by existing courses. The course may be used for research or directed readings and should include one lengthy essay or several short ones as well as regular meetings with the adviser. To apply, students should present a prospectus, a bibliography for the work proposed, and a letter of support from the adviser to the director of undergraduate studies. Term credit for independent research or reading may be granted and applied to any of the requisite areas upon application and approval by the director of undergraduate studies.

***FILM 491a and 492b, The Senior Essay** J. D. Connor
An independent writing and research project. A prospectus signed by the student's adviser must be submitted to the director of undergraduate studies by the end of the second week of the term in which the essay project is to commence. A rough draft must be submitted to the adviser and the director of undergraduate studies approximately one month before the final draft is due. Essays are normally thirty-five pages long (one term) or fifty pages (two terms).

***FILM 493a and 494b, The Senior Project** J. D. Connor
For students making a film or video, either fiction or nonfiction, as their senior project. Senior projects require the approval of the Film Studies Committee and are based on proposals submitted at the end of the junior year. An interim project review takes place at the end of the fall term, and permission to complete the senior project can be withdrawn if satisfactory progress has not been made. For guidelines, consult the director of undergraduate studies. Does not count toward the fourteen courses required for the major when taken in conjunction with FILM 455, 456 or FILM 483, 484.

OTHER COURSES RELATED TO FILM

***ANTH 360b/MMES 111b, Representing Iran** Narges Erami
For description see under Anthropology.

***HSAR 467a, Art, Media, and Space** David Joselit

***HSAR 472b/AFAM 353b, Black British Art and Culture** Kobena Mercer
For description see under History of Art.

***LITR 120a, Introduction to Narrative** Barry McCrea, Moira Fradinger,
David Gabriel

***PHYS 101a or b, Movie Physics** Frank Robinson [F], Stephen Irons [Sp]

***SPAN 223b/LAST 223b, Spanish in Film: An Introduction to the New Latin American Cinema** Margherita Tórtora
For description see under Spanish.

Forestry & Environmental Studies

Program adviser: John Wargo, 124 KRN, 432-5123, john.wargo@yale.edu

The School of Forestry & Environmental Studies is primarily a graduate and professional program designed to train leaders to solve worldwide environmental problems and to provide new understanding of local and global environments through interdisciplinary research in the natural and social sciences. The School offers numerous courses to undergraduates in Environmental Studies, and undergraduates from any major can take courses in the School. Those undergraduates with significant interest should contact the School's undergraduate program adviser to discuss a joint degree program that allows Yale College students to earn both a bachelor's degree from Yale College and an M.E.M. degree from the School of Forestry & Environmental Studies in five years. For more information on the joint program, see the School's Web site at environment.yale.edu/academics/degrees/five-year. Most graduate-level courses are open to qualified undergraduates. These courses are listed in the bulletin of the School of Forestry & Environmental Studies and most also appear in the online bulletin of the Graduate School of Arts and Sciences.

Information about the programs of the School of Forestry & Environmental Studies may be found on the Web at environment.yale.edu. Most lectures and symposia are open to undergraduates.

***F&ES 221a/E&EB 230a/EVST 221a, Field Ecology** Linda Puth
For description see under Ecology & Evolutionary Biology.

F&ES 245b/EVST 245b/PLSC 146b, International Environmental Policy and Governance Benjamin Cashore
For description see under Environmental Studies.

F&ES 255b/EVST 255b/PLSC 215b, Environmental Politics and Law John Wargo
For description see under Environmental Studies.

***F&ES 260a^G/EVST 260a^G, Structure, Function, and Development of Vascular Plants**
Graeme Berlyn
For description see under Environmental Studies.

***F&ES 261a/EVST 261a/G&G 261a^G, Minerals and Human Health**

Catherine Skinner, Ruth Blake

For description see under Geology & Geophysics.

***F&ES 275b^G/EVST 275b, Ecosystems Patterns and Processes** Peter Raymond,
Mark Bradford

For description see under Environmental Studies.

***F&ES 285b/EVST 285b, Political Ecology: Nature, Culture, and Power**

Amity Doolittle

For description see under Environmental Studies.

***F&ES 290a/EVST 290a, Geographic Information Systems** Charles Tomlin

For description see under Environmental Studies.

F&ES 307b^G/EVST 307b, Organic Pollutants in the Environment Shimon Anisfeld

For description see under Environmental Studies.

***F&ES 344b^G/EVST 344b, Aquatic Chemistry** Gaboury Benoit

For description see under Environmental Studies.

F&ES 380a^G/ENAS 443a/ENVE 443a^G, Greening Business Operations

Thomas Graedel and staff

For description see under Environmental Engineering.

***F&ES 384a/ANTH 382a/EVST 345a, Environmental Anthropology** Michael Dove,
Carol Carpenter

For description see under Environmental Studies.

***F&ES 422a/ANTH 409a/EVST 422a, Anthropology of Climate Change, Past and Present** Michael Dove

For description see under Environmental Studies.

F&ES 441a/EVST 441a/G&G 440a^G/MCDB 317a, Methods in Geomicrobiology

Ruth Blake

For description see under Geology & Geophysics.

COURSES IN THE SCHOOL OF FORESTRY & ENVIRONMENTAL STUDIES

For listings and detailed descriptions of professional school courses, consult the bulletin of the School of Forestry & Environmental Studies, or see *environment.yale.edu*.

French

Director of undergraduate studies: Edwige Tamalet-Talbayev, Rm. 421, 82–90 Wall St., 432-4902, edwige.tamalet@yale.edu; language program director: Françoise Schneider, Rm. 313, 82–90 Wall St., 432-8855, francoise.schneider@yale.edu

FACULTY OF THE DEPARTMENT OF FRENCH

Professors R. Howard Bloch, Edwin M. Duval, Marie-Hélène Girard (*Visiting*), Alice Kaplan (*Chair*), Thomas Kavanagh, Christopher L. Miller, Maurice Samuels

Assistant Professors Thomas Connolly, Christopher Semk, Edwige Tamalet-Talbayev, Yue Zhuo

Senior Lecturer Maryam Sanjabi

Lecturers Jonathan Cayer, Diane Charney, Alyson Waters

Senior Lectors Ruth Koizim, Soumia Koundi, Matuku Ngame, Lauren Pinzka, Françoise Schneider, Constance Sherak

Lectors Kathleen Burton, Margaret Colvin, Audrey Hoffmann, Candace Skorupa, Vanessa Vysosias

The Department of French has two distinct but complementary missions: to provide instruction in the French language at all levels of competence, and to lead students to a broad appreciation and deep understanding of the literatures and cultures of France and other French-speaking countries.

The major in French is a liberal arts major, designed for those who wish to study one of the world's greatest and richest literatures in depth. The department offers courses devoted to authors, works, and literary and cultural movements that span ten centuries and four continents. The curriculum also includes interdisciplinary courses on relations between literature and other areas of study such as history, law, religion, politics, and the arts. Majors are encouraged to explore all periods and genres of literature in French, as well as a wide variety of critical approaches.

Excellent knowledge of a foreign language and a mature, informed appreciation of a foreign literature open doors to many professions. The French major provides ideal preparation for careers not only in academics but also in a wide range of fields from law and diplomacy to journalism and the arts. Recent graduates have gone on to selective law schools and graduate programs in French and comparative literature. Others work in primary and secondary education, business, government, and a variety of nongovernmental agencies and international organizations.

French can be taken either as a primary major or as one of two majors, in consultation with the director of undergraduate studies. Appropriate majors to combine with French might include, but are not limited to, African American Studies, African Studies, English, Film Studies, Global Affairs, History, History of Art, Humanities, Literature, Music, Philosophy, Political Science, Theater Studies, and Women's, Gender, and Sexuality Studies. (Regulations concerning the completion of two majors can be found in chapter II, section K, of this bulletin.)

Study abroad Students are encouraged to spend a term or a year abroad, for which appropriate course credit is granted. Summer study abroad may also, in some cases, receive course credit. Further information may be obtained from the Center for International and Professional Experience (cipe.yalecollege.yale.edu) and from Ruth Koizim, the study abroad adviser for the Department of French. The Kenneth Cornell Charitable Foundation provides some financial support for majors and prospective majors who undertake research projects related to their work in the major in France or a francophone country. Contact the director of undergraduate studies for details.

Prerequisites Candidates for the major should take two courses in the FREN 150–159 range, or a reasonable equivalent, during the freshman or sophomore year. Prospective majors are strongly encouraged to take at least one literature course numbered 170 or above before the end of the sophomore year.

The standard major The standard major consists of ten term courses numbered 160 or above, including a one-term senior essay (see below). At least four of these must be Group B courses numbered 200 or above. Students may count no more than three courses in the FREN 160–199 range and no more than two courses conducted in English (Group C) toward the major. With prior approval of the director of undergraduate studies, a maximum of four term courses taught outside the Yale Department of French but bearing directly on the student's principal interest may be counted toward the major. Up to two of these may be taken in other departments at Yale, and up to four may be taken as part of a Year or Term Abroad or summer study abroad program. However, the combined number of courses from other departments and from study abroad may not exceed four. (The director of undergraduate studies may grant exceptions to this limit for students who spend two academic terms in an approved study abroad program.) Relevant freshman seminars may count toward the major, with permission of the director of undergraduate studies.

The intensive major The intensive major is designed for students who wish to undertake a more concentrated study of literature in French. It is recommended for students considering graduate study in French or in comparative literature. The intensive major consists of twelve term courses numbered 160 or above, including a one-term or two-term senior essay (see below). At least five courses must be from Group B and numbered 200 or above. Stipulations for courses in the 160–199 range, courses conducted in English, and courses taken outside the department are identical to those for the standard major.

Senior requirement All majors must write a senior essay showing evidence of careful reading and research and substantial independent thought. Essays may be written in either French or English and must be prepared under the direction of a ladder faculty member in the Department of French. Students planning to pursue advanced work in French after graduation are encouraged to write their senior essay in French.

Students writing a one-term essay enroll in FREN 491 in the senior year. A one-term essay may be written in either the fall or the spring term and should be approximately thirty pages in length. A preliminary statement indicating the general area to be addressed and the name of the adviser must be submitted to the director of undergraduate studies by September 14 (fall-term essay) or November 9 (spring-term essay). A one-page prospectus and bibliography are due September 21 (fall term) or January 25 (spring term). A rough draft must be submitted to the adviser by November 2 (fall term) or March 29 (spring term). Two copies of the final essay are due in the department by November 30 (fall term) or April 22 (spring term).

Students electing a two-term essay for the intensive major must select their subject and adviser by the end of the junior year and enroll in FREN 493 and 494 during the senior year. The essay should be approximately sixty pages in length. A preliminary statement indicating the general area to be addressed and the name of the adviser must be submitted to the director of undergraduate studies by September 14. A one-page prospectus and

bibliography are due September 21. Students must submit an initial rough draft to their adviser by January 25 and a complete draft by March 29. Two copies of the final essay are due in the department by April 22.

All majors It is strongly recommended that all majors complete at least one term course in the FREN 170–179 sequence early in their studies. They are also encouraged to take as many advanced courses as possible in all historical periods from the Middle Ages to the present. Candidates for the major should consult the director of undergraduate studies as early as the beginning of the sophomore year and no later than the fall term of the junior year. Schedules must be approved and signed by the director of undergraduate studies. Students planning to study abroad or to petition for completion of two majors should contact the director of undergraduate studies during the sophomore year. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Special Divisional Major The department will support the application of qualified students who wish to pursue an interdisciplinary course in French studies. Under the provisions of the Special Divisional Major, students may combine courses offered by the French department with subjects elected from other departments. Close consultation with departmental advisers is required; candidates for a Special Divisional Major should consult the director of undergraduate studies in French by the fall term of the junior year. For further information about the Special Divisional Major see under that heading in this chapter.

Group A courses (FREN 110–159) This group consists of language courses that lead directly to courses counting toward the major. For further details, students should consult the Freshman Web site at yalecollege.yale.edu/content/french-o or see the director of undergraduate studies.

Group B courses (FREN 160–449, not including Group C courses) This group contains more advanced courses that are taught in French and count toward the major. Courses in the FREN 170–179 range are gateway courses that introduce students to the study of French and francophone literatures, societies, and cultures. Courses in the FREN 180–199 range are advanced language courses. Courses numbered 200–449 are advanced courses in literature and culture. The 200–299 range contains courses devoted to broad, general fields defined by century or genre; the 300–449 range contains courses devoted to specific topics within or across those general fields.

Group C courses This group comprises courses taught in English; readings may be in French or English. Two term courses from this group may be counted for credit toward the major.

Placement Proper placement is essential for productive language study. All students who have not yet taken French at Yale are expected to take the departmental placement test, with the following exceptions:

1. Students who have no previous knowledge of French whatsoever should attend pre-registration and sign up for FREN 110.
2. True beginners of French who are prospective majors are encouraged to enroll in FREN 125, for which there is no preregistration.

3. Students who received a score of 5 on the Advanced Placement examination in French, a score of 6 or 7 on the higher-level International Baccalaureate examination, or a grade of A or B on the GCE A-level examination should discuss their proper course placement with the director of undergraduate studies, who will be present during preregistration.

Please note that the departmental placement test is given only once a year, in the fall. Students who wish to begin taking French in the spring must take the test in the fall. Times and locations for the placement test will be posted on the departmental Web site, *french.yale.edu*. Results will be posted on the same Web site, outside 206 LC, and outside the French department offices, 82–90 Wall St., third floor. Preregistration will be held on Tuesday, August 28, from 2 to 4 p.m. For additional information about placement and preregistration, visit the departmental Web site.

REQUIREMENTS OF THE MAJOR

Prerequisites 2 courses numbered FREN 150–159 or equivalent

Number of courses *Standard major*—10 term courses numbered 160 or above; *Intensive major*—12 term courses numbered 160 or above

Distribution of courses *Standard major*—at least 4 courses in Group B numbered 200 or above; no more than 3 courses numbered FREN 160–199; no more than 2 courses conducted in English; *Intensive major*—same, plus 1 addtl Group B course numbered 200 or above

Substitution permitted With prior approval of DUS, up to 4 term courses outside French dept, as specified

Senior requirement *Standard major*—one-term senior essay in French or English (FREN 491); *Intensive major*—one-term (FREN 491) or two-term (FREN 493, 494) senior essay in French or English

GROUP A COURSES

Preregistration, which is required for all fall-term courses numbered from 110 to 159 (except FREN 125), is held on Tuesday, August 28, from 2 to 4 p.m. See *french.yale.edu* for details. *Preregistration is not required for spring-term courses.*

***FREN 110a, Elementary and Intermediate French I** Matuku Ngame and staff
Through extensive use of audio and video material, the course provides intensive training and practice in all the language skills, with an initial emphasis on listening and speaking. Emphasis on communicative proficiency, self-expression, and cultural insights. Mandatory weekly tests given on Mondays at 30-minute intervals from 5 to 8:30 p.m. To be followed by FREN 120. Conducted entirely in French. Daily classroom and laboratory attendance is required. For students with no previous experience of French. Preregistration required. Credit only on completion of FREN 120. L1 RP 1½ Course cr

***FREN 120b, Elementary and Intermediate French II** Matuku Ngame and staff
Continuation of FREN 110. To be followed by FREN 130. After FREN 110. L2 RP 1½ Course cr

***FREN 121a, Intermediate French** Matuku Ngame and staff

Designed for initiated beginners, this course develops all the language skills with an emphasis on listening and speaking. Activities include role playing, self-expression, and discussion of cultural and literary texts. Emphasis on grammar review and acquisition of vocabulary. Frequent audio and video exercises. Conducted entirely in French. Daily classroom attendance is required. Placement according to placement test score. Preregistration required. L2 RP 1½ Course cr

***FREN 125a, Intensive Elementary French** Constance Sherak

An accelerated course that covers in one term the material taught in FREN 110 and 120. Practice in all language skills, with emphasis on communicative proficiency. Admits to FREN 145. For students of superior linguistic ability. Conducted entirely in French. No preregistration required. L1–L2 RP 2 Course cr

FREN 130a or b, Intermediate and Advanced French I Ruth Koizim, Soumia Koundi, and staff

The first half of a two-term sequence designed to develop students' proficiency in the four language skill areas. Prepares students for further work in literary, language, and cultural studies, as well as for nonacademic use of French. Oral communication skills, writing practice, vocabulary expansion, and a comprehensive review of fundamental grammatical structures are integrated with the study of short stories, plays, novels, and films. Admits to FREN 140. Conducted entirely in French. After FREN 120, 121, or a satisfactory placement test score. Preregistration required for the fall term. L3 RP 1½ Course cr

FREN 140a or b, Intermediate and Advanced French II Soumia Koundi, Ruth Koizim, and staff

The second half of a two-term sequence designed to develop students' proficiency in the four language skill areas. Introduction of more complex grammatical structures. Films and other authentic media accompany literary readings from throughout the francophone world, culminating with the reading of a longer novel and in-class presentation of student research projects. Admits to FREN 150 or 151. Conducted entirely in French. After FREN 130 or a satisfactory placement test score. Preregistration required for the fall term. L4 RP 1½ Course cr

FREN 145b, Intensive Intermediate and Advanced French Constance Sherak

An accelerated course that covers in one term the material taught in FREN 130 and 140. Emphasis on speaking, writing, and the conversion of grammatical knowledge into reading competence. Admits to FREN 150 or 151. For students of superior linguistic ability. Conducted entirely in French. After FREN 120 or 125. No preregistration required. L3–L4 RP 2 Course cr

***FREN 150a, Advanced Language Practice I** Françoise Schneider and staff

An advanced language course intended to improve students' comprehension of spoken and written French as well as their speaking and writing skills. Modern fiction and nonfiction texts familiarize students with idiomatic French. Special attention to grammar review and vocabulary acquisition. After FREN 140, 145, or a satisfactory placement test score. May be taken after FREN 151. L5

FREN 151b, Advanced Language Practice II Françoise Schneider and staff

An advanced language course intended to improve students' comprehension of spoken and written French as well as their speaking and writing skills. Modern fiction and nonfiction texts familiarize students with idiomatic French. Emphasis on oral practice through debates and presentations on current events. After FREN 140, 145, or a satisfactory placement test score. May be taken independently of FREN 150. L5

GROUP B COURSES

Group B courses are conducted entirely in French. Courses numbered from 160 to 199 are open to students who have passed two courses in the FREN 150–159 range or the equivalent, and to others with consent of the department. Courses numbered from 200 to 449 are open to students who have passed a course in the FREN 170–175 range, or with permission of the instructor. Students who have taken a course at the 200 level or higher may not ordinarily take a 100-level course for credit, with the exception of advanced language courses numbered 185 or higher. Students may take 200-, 300-, and 400-level courses in any order. Courses in the 200–299 range are devoted to general fields; courses in the 300–449 range are devoted to specific topics.

***FREN 160a or b, Advanced Culture and Conversation** Lauren Pinzka and staff

Intensive oral practice designed to further skills in listening comprehension, speaking, and reading through the use of videos, films, fiction, and articles. Emphasis on contemporary French and francophone cultures. Prerequisites: FREN 150, 151, or a satisfactory placement test score, or with permission of the course director. May be taken concurrently with or after FREN 170. L5 RP

*Gateway Courses****FREN 170a or b, Introduction to the Study of Literature in French**

Marie-Hélène Girard, Lauren Pinzka, Maryam Sanjabi

Introduction to close reading and analysis of literary texts written in French. Works by authors such as Marie de France, Molière, Balzac, Hugo, Baudelaire, Césaire, and Duras. May not be taken after FREN 171. L5, HU

***FREN 171b, Introduction to the Study of Literature in French for Students of Directed Studies** Edwin M. Duval

An introduction to close reading and analysis of literary texts written in French, for current and former students of Directed Studies. Similar in content to FREN 170, but specifically designed to build on readings in DRST 001 and 002. Works by authors such as Du Bellay, Racine, Baudelaire, Flaubert, Proust, and Sartre. Prerequisites: DRST 001 or 002; FREN 150, or equivalent with permission of instructor and the director of undergraduate studies. May not be taken after FREN 170. L5, HU

***FREN 172a or b, French and Francophone Cultural History** Lauren Pinzka [F], Maryam Sanjabi [Sp]

An interdisciplinary introduction to French and francophone cultural history organized around a particular theme or topic. In the fall term, the theme is ways in which symbolic events, institutions, people, and places shaped French identity from 1789 to 1962. In the spring term, the topic is representations of the Orient in French literature from the seventeenth to twentieth centuries. L5, HU

Advanced Language Course

*FREN 195b, Advanced Writing Workshop Jonathan Cornillon

An advanced writing course for students who wish to work intensively on perfecting their written French. Frequent compositions of varying lengths, including creative writing, *rédactions* (compositions on concrete topics), and *dissertations* (critical essays). After FREN 150, 151, or a satisfactory placement test score. Recommended for prospective majors. L5

General Fields

*FREN 213b, Introduction to Medieval Literature Jonathan Cayer

An exploration of the literary genres, themes, and authors of medieval France from the twelfth century to the fifteenth. Special focus on love, marriage, and war. L5, HU

*FREN 215a/MMES 165a, Introduction to Maghreb Literature and Culture

Edwige Tamalet-Talbayev

An introduction to contemporary culture and francophone literature in the Maghreb (Algeria, Morocco, and Tunisia). Focus on relations between the Islamic world and the French colonial experience, on postindependence discourses, and on ethnic and gender issues. Authors and filmmakers include Allouache, Ben Jelloun, Ben Lyazid, Chraïbi, Djébar, Feraoun, Mellah, and Mimouni. L5, HU

*FREN 217a, The French Renaissance Edwin M. Duval

A survey of the literature of the French Renaissance, focusing on major authors, works, and literary movements in their historical and cultural contexts. Works include Rabelais's *Gargantua*, Marguerite de Navarre's *Heptaméron*, Ronsard's *Amours*, Du Bellay's *Regrets*, and Montaigne's *Essais*. L5, HU

*FREN 231b, Culture and Literature of Québec Jonathan Cayer

The development of the culture of Québec in the twentieth century. Analysis of novels, songs, essays, films, and cultural institutions. The transformation of the question of national identity. L5, HU

*FREN 232b, French Fiction since 1800 Yue Zhuo

Close reading of major French novels and novellas written from 1800 through the 1980s. Emphasis on the use of narrative voice and on stylistic innovations. Authors include Chateaubriand, Balzac, Flaubert, Proust, Sartre, Robbe-Grillet, and Duras. May not be taken for credit after FREN <240>. L5, HU

*FREN 255a, French Cinema Thomas Kavanagh

A broad cross-section of French films from Lumière to the present, placed in their relevant cultural and aesthetic contexts. Focus on French cinema's defining tension with film production in Hollywood and the United States, the dominant presence on the world market. L5, HU

Special Topics

*FREN 345a, The Prose Poem Thomas Connolly

An investigation of the *poème en prose*, from its beginnings as a response to the inadequacy of French verse forms through its emergence as an independent genre. Differences between the prose poem and prose, poetry, and poetic prose. L5, HU

***FREN 353a/JDST 386a, Jewish Identity and French Culture** Maurice Samuels
Notions of Jewish identity in France from the French Revolution to the present. Writers and filmmakers include Balzac, Finkelkraut, Memmi, Modiano, Némirovsky, Renoir, Sartre, and Zola. L5, HU

***FREN 362b, French Autobiography and Autofiction since 1910** Alice Kaplan
Autobiography and autofiction in twentieth- and twenty-first-century French literature. Ethical vs. artistic issues; questions of gender, national identity, and sense of place. Authors include Proust, Leiris, de Beauvoir, Sarraute, Duras, Modiano, Ernaux, Guibert, Carrère, and Houellebecq. Prerequisite: FREN 170 or equivalent. L5, HU

***FREN 366a/HSAR 251a, Art and Literature in Modern France** Marie-Hélène Girard
Aspects of the relationship between art and literature in France from the nineteenth century to the twenty-first; wit and humor through caricature and satirical literature. Focus on French history, culture, and media, using texts, prints, and audiovisual aids. L5, HU

SPECIAL TUTORIAL AND SENIOR COURSES

***FREN 470a and 471b, Special Tutorial for Juniors and Seniors**

Edwige Tamalet-Talbayev

Special projects set up by the student in an area of individual interest with the help of a faculty adviser and the director of undergraduate studies. Intended to enable the student to cover material not offered by the department. The project must terminate with at least a term paper or its equivalent and must have the approval of the director of undergraduate studies. Only one term may be offered toward the major, but two terms may be offered toward the bachelor's degree. For additional information, consult the director of undergraduate studies.

***FREN 491a or b, The Senior Essay** Edwige Tamalet-Talbayev

A one-term research project completed under the direction of a ladder faculty member in the Department of French and resulting in a substantial paper in French or English. For additional information, consult the director of undergraduate studies.

***FREN 493a and 494b, The Senior Essay in the Intensive Major**

Edwige Tamalet-Talbayev

A yearlong research project completed under the direction of a ladder faculty member in the Department of French and resulting in a paper of considerable length, in French or English. For additional information, consult the director of undergraduate studies.

GROUP C COURSES

Courses in this group are conducted in English; readings may be in French or English. Group C courses numbered above 100 are open to all students in Yale College.

***FREN 092a, French Poetry and the Invention of Modern Life** Thomas Connolly
An introduction to French poetry of the nineteenth and twentieth centuries. Ways in which French poetry has transformed ideas about love, death, the self, sexuality, the city, travel, painting, photography, film, architecture, and poetry itself. Readings and discussion in English. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem Tr

***FREN 342b/HUMS 250b/LITR 235b, French Literary Movements from Romanticism to Decadence** Yue Zhuo

A study of key texts, ideas, and events that shaped literary history in the nineteenth and early twentieth centuries, from romanticism, realism, and naturalism to Symbolism and Decadence. Literary works by Chateaubriand, Mme de Staël, Constant, Mérimée, Balzac, Baudelaire, Zola, Rimbaud, Mallarmé, Maupassant, Huysmans, and Proust. May not be taken after FREN <392>. HU Tr

***FREN 376b/AFAM 383b/AFST 476b, The Two Congos: Literature and Culture in the Heart of Africa** Christopher L. Miller

An interdisciplinary approach to two nations that share a name, a river, and elements of culture but that are divided by colonial heritage (one Belgian, one French). Focus on literature, with references to history, anthropology, art, politics, music, and sports. Views from outside the two countries (*Heart of Darkness*; *Tintin*; *The Poisonwood Bible*) and inside (E. Dongala, Sony Labou Tansi, H. Lopes, V. Y. Mudimbe, A. Mabanckou). The 1974 Ali-Foreman “Rumble in the Jungle” boxing match. Prerequisite: reading knowledge of French. HU

***FREN 397a/HUMS 362a/LITR 339a, French Theory from Sartre to Derrida** Yue Zhuo

A survey of French thought from the end of World War II to the present day, from existentialism and Marxism to structuralism and poststructuralism. Authors include Sartre, de Beauvoir, Barthes, Lévi-Strauss, Foucault, Bataille, Deleuze, Kofman, and Derrida. Readings and discussion in English. HU Tr

***FREN 411a/AFAM 461a/FILM 436a/LITR 263a, Novel and Film in the Francophone Colonial and Postcolonial World** Christopher L. Miller

A comparison of two media and their powers of representation. Contrasting depictions of the former French colonies in Africa, the Caribbean, and Asia in texts and films produced by “insiders” and “outsiders.” Discourse and imagery, political and cultural contexts, and emergence of new vernaculars. Works by Rouch, Zobel, Palcy, Duras, and Denis; focus on the novels and films of Sembene. Prerequisite: reading knowledge of French. HU

***FREN 422a/AFST 322a/LITR 321a/MMES 362a/WGSS 344a, Francophone Postcolonial Theory and Literature** Edwige Tamalet-Talbayev

An introduction to concepts and thinkers of francophone postcolonial theory. Key texts compared with their respective theories. Authors include Frantz Fanon, Edouard Glissant, Albert Memmi, Abdelkebir Khatibi, and Assia Djebar. May not be taken after FREN <412>. HU RP Tr

READING COURSE

***FREN 109a or b, French for Reading** Maryam Sanjabi

Fundamental grammar structures and basic vocabulary through the reading of texts in various fields (primarily humanities and social sciences, and others as determined by student interest). Intended for students who either need a reading knowledge of French for research purposes or are preparing for French reading examinations and who have had no (or minimal) prior study of French. No preregistration required. Conducted in English. Does not satisfy the language requirement.

Freshman Seminar Program

The Freshman Seminar program offers a diverse array of courses open only to freshmen and designed with freshmen in mind. Enrollment in seminars is limited to fifteen or eighteen students, depending on the nature of the course. Most seminars meet twice each week and do not, unless otherwise noted, presume any prior experience in the field. Students must apply and preregister for freshman seminars before the beginning of each term. To ensure that all applicants share an equal chance at enrolling in a seminar, students are admitted by lottery from among those who apply. Students who do not preregister may be considered for placement at the instructor's discretion if space is available. Application procedures and a complete list of courses may be found on line at yalecollege.yale.edu/content/freshman-seminar-program-2.

For a full description of each seminar, see the course listings of the originating department.

***AFAM 060b/HIST 016b, Significance of American Slavery** Edward Rugemer
For description see under African American Studies.

***AMST 002a, American Consumer Culture in the Twentieth Century**
Jean-Christophe Agnew

***AMST 004b, Narrations of Native America** Alyssa Mt. Pleasant

***ANTH 011b, Reproductive Technologies** Marcia Inhorn

***ANTH 012b, Exploring Sport, Society, and Culture** William Kelly

***ANTH 013b/AFAM 049b/WGSS 013b, Feminism, Race, Gender, and Sexuality**
Jafari Allen

For description see under Anthropology.

***APHY 050a/PHYS 050a, Science of Modern Technology** Daniel Prober
For description see under Applied Physics.

***APHY 060b/ENAS 060b/PHYS 060b, Energy Technology and Society** Paul Fleury
For description see under Applied Physics.

***ART 001a, Studies in Visual Biography** Jessica Helfand

***ART 002b, Paper** Siobhan Liddell and staff

***ASTR 030a, Search for Extraterrestrial Life** Hector Arce

***CLCV 002a/HUMS 095a, The Romans: A Cultural Introduction** Kirk Freudenburg
For description see under Classics.

***CPSC 079b, Digital Photorealism** Julie Dorsey

***ENGL 010b, Jane Austen** Stefanie Markovits

- *ENGL 012b, **Literary Cities: New York, Chicago, San Francisco** Wai Chee Dimock
- *ENGL 013b, **Forms of Communication and Intimacy** Jill Campbell
- *FILM 099a/LITR 099a, **Film and the Arts** Dudley Andrew
For description see under Film Studies.
- *FREN 092a, **French Poetry and the Invention of Modern Life** Thomas Connolly
- *HIST 010a, **Postwar America at Home: 1945–1960** Cynthia Russett
- *HIST 022a, **What History Teaches** John Gaddis
- *HIST 029a, **Liberalism and Conservatism in the Twentieth-Century United States**
Beverly Gage
- *HIST 030a, **Tokyo** Fabian Drixler
- *MCDB 050a, **Immunology and Contagion** Paula Kavathas
- *MUSI 003a, **Shakespeare and Music** Judith Malafronte
- *MUSI 004b, **Russian Music, 1836–1948** Patrick McCress
- *MUSI 005b, **Opera, Culture, Media** Gundula Kreuzer
- *MUSI 009a, **Jazz and Architecture** Michael Veal
- *NELC 001a/ARCG 001a, **Egypt and Northeast Africa: A Multidisciplinary Approach**
Colleen Manassa, John Darnell
For description see under Near Eastern Languages & Civilizations.
- *PHYS 095a, **Radiation and the Universe** Peter Parker
- *PORT 001b/LAST 001b/SPAN 050b, **Latin American Short Fiction** Paulo Moreira
For description see under Portuguese.
- *RLST 050b, **Islam and Modernity** Frank Griffel
- *RUSS 022a, **The Divine and the Human in Russian Fiction** Vladimir Alexandrov
For description see under Slavic Languages & Literatures.
- *SCIE 030a and 031b, **Current Topics in Science** Douglas Kankel
- *SOCY 041a, **Sociology of Social Control and Criminal Justice** Philip Smith
- *SPAN 060a, **Freshman Colloquium: Literary Studies in Spanish** Leslie Harkema
- *THST 099a/FILM 045a, **Dance on Film** Emily Coates
For description see under Theater Studies.

Gay and Lesbian Studies

(See under Women's, Gender, and Sexuality Studies.)

Gender Studies

(See under Women's, Gender, and Sexuality Studies.)

Geology and Geophysics

Director of undergraduate studies: David Evans, 210 KGL, 432-3127, david.evans@yale.edu; *earth.yale.edu*

FACULTY OF THE DEPARTMENT OF GEOLOGY AND GEOPHYSICS

Professors Jay Ague, David Bercovici (*Chair*), Ruth Blake, Mark Brandon, Derek Briggs, Peter Crane, David Evans, Alexey Fedorov, Debra Fischer, Jacques Gauthier, Thomas Graedel, Leo Hickey, Shun-ichiro Karato, Jun Korenaga, Mark Pagani, Jeffrey Park, Danny Rye, Brian Skinner, Ronald Smith, Elisabeth Vrba, John Wettlaufer

Assistant Professors Hagit Affek, William Boos, Kanani Lee, Maureen Long, Trude Storelvmo, Mary-Louise Timmermans, Nadine Unger, Zhengrong Wang

Lecturers Michael Oristaglio, Frank Robinson, Lawrence Schwartz, Catherine Skinner, Ellen Thomas

The Geology and Geophysics program prepares students for the application of scientific principles and methods to the understanding of Earth, the environment, and life on a regional and a planetary scale. Subjects range from the history of Earth and life to present-day environmental processes, integrating the study of Earth's deep interior, tectonic plates, oceans, atmosphere, climate, land surface, natural resources, and biota. The emphasis of the curriculum is on employing basic principles from the core sciences (physics, chemistry, biology) to further an understanding of Earth's past and present, and addressing issues relating to its future. Students gain a broad background in the natural sciences, and also select a specific track to focus their work on planetary or environmental phenomena of particular interest. The B.S. tracks emphasize hands-on research experience in fieldwork, in laboratories, or in computer modeling. While some graduates continue on to research, consulting, or industrial careers in Earth, environmental, and planetary sciences, the major's broad scientific training prepares students for a wide variety of other paths, including medicine, law, public policy, and teaching.

B.S. degree program Majors in the B.S. program choose from four tracks: atmosphere, ocean, and climate; environmental and energy geoscience; paleontology and geobiology; and solid Earth science. The tracks are suggested pathways to professional careers and major areas of research in geology and geophysics. Students may change tracks during their course of study with guidance from the director of undergraduate studies.

1. The atmosphere, ocean, and climate track provides a comprehensive understanding of the theory, observation, and prediction of the atmosphere-ocean-climate system. Topics range from past climate changes, including the ice ages, to present-day storms and weather, to forecasting climate change and global warming. The prerequisites are college-level chemistry (CHEM 112, 113; 114, 115; or 118), physics (PHYS 180, 181 and PHYS 165L, 166L), computing (ENAS 130 or equivalent), and mathematics through

differential equations (MATH 120 or ENAS 151, and ENAS 194). The major requirements consist of at least eleven term courses, for ten and one-half course credits, beyond the prerequisites, including either the senior essay or the senior thesis. To begin study of Earth processes, majors take an introductory course in G&G, with any accompanying laboratory, selected from G&G 100; 110 or 115, and 111L; 120; or 125 and 126L. A higher-level course in G&G can be substituted with the permission of the director of undergraduate studies. Six core courses, totaling five and one-half course credits, introduce students to Earth's climate system (G&G 140 and 141L), meteorology (G&G 322), physical oceanography (G&G 335), fluid mechanics (MENG 361), and statistics or linear algebra (STAT 230 or 238 or MATH 222). Three electives are chosen from topics in the environment and in processes that govern the atmosphere, ocean, and land surface; physics; and statistics. A list of suggested electives is available from the office of the director of undergraduate studies or on the departmental Web site (*earth.yale.edu*). At least one elective must be from G&G.

2. The environmental and energy geoscience track provides a scientific understanding of the natural and anthropogenic processes that shape the Earth-atmosphere-biosphere system, including energy and material flows among its components. It emphasizes comparative studies of past and current Earth processes to inform models of humankind's role within the environment's future. The prerequisites are broad and flexible and include college-level chemistry (CHEM 112, 113; 114, 115; or 118) and mathematics through multivariate calculus (MATH 120 or ENAS 151). Depending on their area of focus, students may choose a prerequisite in physics (PHYS 170, 171; 180, 181; or 200, 201), or they may choose cellular biology (BIOL 101 and 102, or MCDB <120>) and evolutionary biology (BIOL 103 and 104, or E&EB <122>, or G&G 125 and 126L). The major requirements consist of at least eleven term courses, for eleven course credits, beyond the prerequisites, including either the senior essay or the senior thesis. To begin study of the Earth system, majors take two introductory courses in G&G, with any accompanying laboratories, selected from G&G 100; 110 or 115, and 111L; 120; or 140 and 141L (G&G 125 and 126L may count toward this requirement if not selected as the evolutionary biology prerequisite). Higher-level courses in G&G can be substituted with the permission of the director of undergraduate studies. Four core courses are chosen from topics in general resource use and sustainability (G&G 205), the microbiology of surface and near-surface environments (G&G 255), fossil fuels and energy transitions (G&G 274), renewable energies (G&G 275), geochemical principles (G&G 301), climate physics (G&G 322), and satellite-based image analysis (G&G 362). Four electives chosen from Geology and Geophysics, Environmental Studies, Ecology and Evolutionary Biology, engineering, or related fields provide a broad approach to scientific study of the environment. A list of suggested electives is available from the office of the director of undergraduate studies or on the departmental Web site (*earth.yale.edu*). Electives may be chosen from the core courses, and at least two must be from G&G.
3. The paleontology and geobiology track focuses on the fossil record of life and evolution, geochemical imprints of life, and interactions between life and Earth. Topics range from morphology, function, relationships, and biogeography of the fossils themselves, through the contexts of fossil finds in terms of stratigraphy, sediment geochemistry, paleoecology, paleoclimate, and geomorphology, to analysis of the larger causes of

paleontological, geobiological, and evolutionary patterns. Integrative approaches are emphasized that link fossil evidence with the physical and chemical evolution of Earth. The prerequisites are college-level biology (BIOL 101–104; or MCDB <120> and E&EB <122>) and chemistry (CHEM 112, 113; 114, 115; or 118), and mathematics through multivariate calculus (MATH 120 or ENAS 151). The major requirements consist of at least thirteen term courses, for twelve course credits, beyond the prerequisites, including either the senior essay or the senior thesis. Students take G&G 110 or 115, and 111L, to gain geological and environmental context, and they are introduced to the fossil record and evolution in G&G 125 and 126L; higher-level courses in G&G can be substituted with the permission of the director of undergraduate studies. Four core courses give majors a comprehensive background in sedimentary rocks and rock correlation (G&G 230), the study of evolution (G&G 250), microbiology in past and present environments (G&G 255), and statistical data analysis as applied to the life sciences (STAT 101). Four electives selected from Geology and Geophysics, Ecology and Evolutionary Biology, Molecular, Cellular, and Developmental Biology, and related fields offer students flexibility in pursuing their specific interests. A list of suggested electives is available from the office of the director of undergraduate studies or on the departmental Web site (earth.yale.edu). At least one elective must be from G&G.

4. The solid Earth science track emphasizes an integrated geological, geochemical, and geophysical approach to the study of processes operating within Earth and their manifestation on the surface. It includes the structure, dynamics, and kinetics of Earth's interior and their impacts on our environment both in the long term (e.g., the evolution of the land surface) and in the short term (e.g., the causes for natural disasters such as earthquakes, tsunamis, and volcanic eruptions). Students acquire a fundamental understanding of the solid Earth system, both as it exists today and as it has evolved over geologic time scales. The prerequisites are college-level chemistry (CHEM 112, 113; 114, 115; or 118) and physics (PHYS 170, 171; 180, 181; or 200, 201), and mathematics through multivariate calculus (MATH 120 or ENAS 151). The major requirements consist of at least eleven courses, for eleven course credits, beyond the prerequisites, including either the senior essay or the senior thesis. To begin study of the Earth system, majors take two introductory courses in G&G, with any accompanying laboratories, selected from G&G 100; 110 or 115, and 111L; 120; 125 and 126L; or 140 and 141L. Higher-level courses in G&G can be substituted with the permission of the director of undergraduate studies. The core of the track consists of four courses chosen from topics in mantle dynamics, earthquakes, and volcanoes (G&G 201), mountain building and global tectonics (G&G 212), rocks and minerals (G&G 220), sedimentary rocks and processes (G&G 230), and geochemical principles (G&G 301). Students also select four electives in geology, geochemistry, geophysics, or related topics. A list of suggested electives is available from the office of the director of undergraduate studies or on the departmental Web site (earth.yale.edu). Electives may be chosen from core courses, and at least two must be from G&G.

B.A. degree program The B.A. degree in Geology and Natural Resources requires fewer upper-level courses than the B.S. degree. It may be more appropriate for students who wish to major in two separate Yale programs, who study geoscience in preparation for a career in law, business, government, or environmental fields, or who decide to pursue a

science major only after the freshman year. The prerequisites include mathematics (MATH 115), biology (BIOL 101 and 102, or MCDB <120>, or G&G 255), and chemistry (CHEM 103; 112, 113; 114, 115; or 118). The major requirements consist of at least nine term courses beyond the prerequisites. These include two courses in G&G numbered 100–150, with any accompanying laboratories; courses in natural resources (G&G 205) and geochemistry (G&G 301); and five additional courses at the 200 level or higher in Geology and Geophysics or related fields, approved by the director of undergraduate studies and including either the senior essay or the senior thesis. Course selections can be guided by any of the B.S. tracks described above.

Senior requirement Seniors in both degree programs must prepare either a senior essay based on one term of library, laboratory, or field research (G&G 492) or, with the consent of the faculty, a two-term senior thesis (G&G 490, 491), which involves innovative field, laboratory, or theoretical research. Students electing to do a senior thesis must first select a topic and obtain the consent of a faculty member to act as an adviser. They must then petition the faculty through the director of undergraduate studies for approval of the thesis proposal. The petition should be submitted by the end of the junior year. If the two-term senior thesis is elected, G&G 491 may count as an elective toward the major. A copy of each senior thesis or senior essay is made available on the departmental Web site (*earth.yale.edu*).

Geology and Geophysics majors may not employ the Credit/D/Fail option for their prerequisites or for courses in the major. With permission of the director of undergraduate studies, acceleration credits awarded on entrance for high scores on national or international examinations (e.g., AP subject tests) may be used to satisfy prerequisites, even if the student does not choose to accelerate. Higher-level courses may, with the permission of the director of undergraduate studies, be substituted for prerequisites and for specific required courses. Qualified juniors and seniors are encouraged to enroll in graduate courses, with the permission of the directors of graduate and undergraduate studies.

Practical experience In addition to prerequisites and required courses in Geology and Geophysics, candidates for the B.A. and B.S. degrees are strongly encouraged to gain practical experience in the Earth sciences. This can be done in two ways: (1) by attending a summer field course at another academic institution, or (2) by participating in summer research opportunities offered by the Department of Geology and Geophysics, by other academic institutions, or by certain government agencies and private industries. Consult the director of undergraduate studies or see the departmental Web site for further information.

REQUIREMENTS OF THE MAJOR

Prerequisites *B.A.* — MATH 115; BIOL 101 and 102, or MCDB <120>, or G&G 255; CHEM 103, or 112, 113, or 114, 115, or 118; *B.S.* — *All tracks* — CHEM 112, 113, or 114, 115, or 118; MATH 120 or ENAS 151; *Atmosphere, ocean, and climate track* — ENAS 130 or equivalent; ENAS 194; PHYS 180, 181, 165L, 166L; *Environmental and energy geoscience track* — physics (PHYS 170, 171, or 180, 181, or 200, 201) or biology (BIOL 101 and 102, or MCDB <120>); and BIOL 103 and 104, or E&EB <122>, or G&G 125 and 126L); *Paleontology and geobiology track* — BIOL 101–104, or MCDB <120> and E&EB <122>; *Solid Earth science track* — PHYS 170, 171, or 180, 181, or 200, 201

Number of courses *B.A.* – at least 9 courses beyond prereqs for letter grades (incl senior req); *B.S. – Atmosphere, ocean, and climate track* – at least 11 courses, for 10½ credits, beyond prereqs for letter grades (incl senior req); *Environmental and energy geoscience and solid Earth science tracks* – at least 11 courses beyond prereqs for letter grades (incl senior req); *Paleontology and geobiology track* – at least 13 courses, for 12 credits, beyond prereqs for letter grades (incl senior req)

Distribution of courses *B.A.* – 2 intro courses in G&G, with labs, as specified; 5 addtl courses at 200 level or higher in G&G or related fields; *B.S. – Atmosphere, ocean, and climate track* – 1 intro course in G&G, with lab, as specified; 3 electives as specified; *Environmental and energy geoscience and solid Earth science tracks* – 2 intro courses in G&G, with labs, as specified; 4 electives as specified; *Paleontology and geobiology track* – 4 electives as specified

Specific courses required *B.A.* – G&G 205, 301; *B.S. – Atmosphere, ocean, and climate track* – G&G 140, 141L, 322, 335; MENG 361; STAT 230 or 238 or MATH 222; *Environmental and energy geoscience track* – 4 from G&G 205, 255, 274, 275, 301, 322, 362; *Paleontology and geobiology track* – G&G 110 or 115, 111L, 125, 126L, 230, 250, 255, STAT 101; *Solid Earth science track* – 4 from G&G 201, 212, 220, 230, 301

Substitution permitted *All programs* – with DUS permission, higher-level courses for prereqs or required courses

Senior requirement *All programs* – senior essay (G&G 492) or, with permission of faculty, two-term senior thesis (G&G 490, 491)

[G&G 100a, Natural Disasters]

G&G 110a, Dynamic Earth Danny Rye, David Evans

An introduction to the processes that shape Earth's environment through the interactions of rocks, soils, the atmosphere, and the hydrosphere. Field trips and practical sessions in the properties of natural materials. Topics include evolution of landscapes; hydrologic and tectonic cycles; extreme geologic events such as earthquakes, floods, volcanism, and landslides; society's economic dependence on natural materials such as soils, minerals, and fossil fuels; and human influences on the natural environment. SC

G&G 111La, Dynamic Earth Laboratory and Field Methods David Evans, Danny Rye
Practical exercises in the laboratory and in the field to complement G&G 110 or 115. Identification of minerals and rocks; construction of geologic maps and cross sections to determine Earth-system processes and histories. Includes a field trip to the northern Appalachians during the October recess. After or concurrently with G&G 110, or after G&G 115. SC
½ Course cr

***G&G 115b/EVST 200b, Earth System Science** Jeffrey Park

A survey of geoscience. Interaction of lithosphere, hydrosphere, atmosphere, and Earth's deep interior; natural controls on environment and climate in past, present, and future; rocks, minerals, glaciers, earthquakes, and volcanoes; natural hazards and natural resources. (Formerly G&G 200) SC

G&G 120a/EVST 125a, Earth's Changing Climate John Wettlaufer, Mark Pagani

The science of contemporary climate change or "global warming." Historical and contemporary methods used by scientists to draw conclusions concerning Earth's complex

climate system and human influences on it, and to predict future climates. Risk assessment, response options. SC

***G&G 125b/E&EB 125b, History of Life** Derek Briggs, Leo Hickey

Examination of fossil and geologic evidence pertaining to the origin, evolution, and history of life on Earth. Emphasis on major events in the history of life, on what the fossil record reveals about the evolutionary process, on the diversity of ancient and living organisms, and on the evolutionary impact of Earth's changing environment. SC

G&G 126Lb, Laboratory for the History of Life Leo Hickey, Derek Briggs

A survey of the diversification of life using suites of fossils and related modern organisms drawn from critical evolutionary stages. Emphasis on direct observation and description of specimens, the solution of problems posed by the instructor, and the generation and testing of hypotheses by the students. To be taken concurrently with or following G&G 125. SC ½ Course cr

G&G 140a/EVST 201a, Atmosphere, Ocean, and Environmental Change

Ronald Smith

For description see under Environmental Studies.

***G&G 141La/EVST 202La, Laboratory for Atmosphere, Ocean, and Environmental Change** Ronald Smith

For description see under Environmental Studies.

G&G 201a, Mantle Dynamics, Earthquakes, and Volcanoes Jun Korenaga

Quantitative introduction to the dynamics of Earth's interior and surface manifestations such as plate tectonics, earthquakes, and volcanoes. Emphasis on understanding various geological phenomena through the framework of mantle convection in the cooling Earth. Discussion of how Earth's internal processes affect human environments in both the short and the long term. Weekly lab sessions provide students with hands-on problem-solving experiences in geophysics. Prerequisites: CHEM 112, 113, or 114, 115, or 118; MATH 120; PHYS 170, 171, or 180, 181, or 200, 201; or permission of instructor. QR, SC

***G&G 205b, Natural Resources and Their Sustainability** Jay Ague

The formation and distribution of renewable and nonrenewable energy, mineral, and water resources. Topics include the consequences of extraction and use; depletion and the availability of substitutes; and economic and geopolitical issues. Recommended preparation: introductory chemistry and geology. SC

***G&G 207b, The Science of Water** Kanani Lee

A study of water in its physical, chemical, biological, astronomical, geological, and environmental aspects. Topics include water's role in food and energy production, conservation and pollution, magnetic field generation, plate tectonics and volcanism, climate, and security. SC

G&G 211b/HIST 143b/HSBM 211b, Catastrophe and the Earth Sciences since 1850

William Rankin

For description see under History of Science, Medicine, and Public Health.

***G&G 212b, Global Tectonics** Mark Brandon

The architecture of continents and oceans; detailed geology of lithospheric plate margins and mountain chains. Examples of plate-interaction histories from the ancient geological

record emphasize the interdisciplinary approaches used to determine interlinked Earth-system processes involving the mantle, crust, hydrosphere, atmosphere, and biosphere. The course features a field trip during spring break. Prerequisite: one course in G&G (preferably 100, 110, or 115), or permission of instructor. Enrollment limited to 15. SC

G&G 220a, Petrology and Mineralogy Danny Rye

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. After one year of college-level chemistry; G&G 110 recommended. SC

[G&G 230a/ARCG 230a, Stratigraphy]

G&G 235a, Geomorphology and Surface Processes Mark Brandon

Introduction to geologic processes that shape the Earth's surface, including erosion and deposition caused by rivers, glaciers, wind, and waves. Interaction between these surface processes and the Earth's climate system.

***G&G 240a, Forensic Geoscience** Maureen Long, Hagit Affek

Approaches and technologies developed for geoscience that have been adapted and applied in criminal, environmental, historical, and archaeological investigations. Methods related to seismology, geophysics, geomorphology, geochemistry, and radiometric dating. Case studies include nuclear treaty verification, detection of unexploded ordnance and clandestine graves, military history, soil and groundwater contamination, archaeological controversies, art and antiquities fraud, and narcotics provenance. SC

G&G 247b/AMTH 247b/MATH 247b, Partial Differential Equations Igor Frenkel

For description see under Mathematics.

G&G 250a^c, Paleontology and Evolutionary Theory Elisabeth Vrba

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. After G&G 125 or a 100-level term course in biological sciences. SC

[G&G 255b/EVST 265b, Environmental Geomicrobiology]

***G&G 261a^c/EVST 261a/F&ES 261a, Minerals and Human Health**

Catherine Skinner, Ruth Blake

Study of the interrelationships between Earth materials and processes and personal and public health. The transposition from the environment of the chemical elements essential for life. After one year of college-level chemistry or with permission of instructor; G&G 110 recommended. SC

G&G 274a, Fossil Fuels and Energy Transitions Michael Oristaglio, Brian Skinner

The origins, geologic settings, exploration, distribution, and extraction of fossil fuels as finite Earth resources. Energy use today; transitions to future renewable resources. Topical issues include peak oil, deep-water exploration, carbon sequestration, and shale gas. Prerequisites: high school chemistry, mathematics, and Earth science. Recommended preparation: G&G 110 or 205. SC

***G&G 275b, Renewable Energy** Ronald Smith, Lawrence Schwartz

Introduction to renewable energy, including physical principles, existing and emerging technologies, and interaction with the environment. Energy demand; transmission and storage; generation by hydroelectric, wind, solar, biofuel, and geothermal sources, as well as waves and tidal generation. Includes field trips to conventional, hydroelectric, and wind power facilities in Connecticut. Prerequisites: high school physics, chemistry, and mathematics; college-level science, engineering, and mathematics recommended. SC

G&G 280a, Organic Geochemistry Mark Pagani

Introduction to organic geochemistry and its applications in environmental reconstruction. Basic concepts of molecular chemistry and biochemistry, compound-specific carbon and hydrogen isotope distributions, and ancient temperature and carbon dioxide reconstruction. Prerequisite: CHEM 114 or equivalent. SC

G&G 300b^c, Mineral Deposits Brian Skinner

Introduction to formation and distribution of mineral deposits. Recommended preparation: G&G 110, 115, or 220. SC

G&G 301a, Introduction to Geochemistry Mark Pagani

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. After CHEM 115 or 118, and MATH 115; G&G 220 recommended. QR, SC

[G&G 308b^c, The Global Carbon Cycle]**G&G 310b^c, Isotope Geochemistry** Zhengrong Wang

Fundamental principles of stable and radiogenic isotope geochemistry. Emphasis on applications to specific geologic problems, including petrogenesis, geochronology, geothermometry, surface processes, hydrology, and biogeochemistry. Prerequisites: CHEM 115, MATH 120, and PHYS 171 or equivalents, or with permission of instructor. QR, SC RP

G&G 312a, Structure and Deformation of the Lithosphere Mark Brandon

An introduction to the origin and structure of the lithosphere and continental and oceanic crust. Topics include what controls the solid versus fluid behavior of rocks during deformation, and what controls the character and motion of tectonic plates. Laboratory exercises and field trips. QR, SC

[G&G 313a^c, Invertebrate Paleontology: Evolving Form and Function]**G&G 315b^c, Paleobotany** Leo Hickey

The evolutionary history of plants through geological time, the origin and diversification of their major lineages and of plant communities, and the interaction of plants and their physical environment. Laboratory exercises involve the study of fossil and modern plants. Prerequisite: one course from E&EB <122>, 160, 246, G&G 125, or 230; or permission of instructor. SC

G&G 319a^c, Introduction to the Physics and Chemistry of Earth Materials

Kanani Lee, Shun-ichiro Karato

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. After CHEM 115, MATH 120, and PHYS 181, or equivalents. QR, SC

G&G 322a^c, Physics of Weather and Climate Trude Storelvmo

The climatic system; survey of atmospheric behavior and climatic change; meteorological measurements and analysis; formulation of physical principles governing weather and climate with selected applications to small- and large-scale phenomena. After PHYS 181 and MATH 120 or equivalents. QR, SC

G&G 323b^c, Climate Dynamics Trude Storelvmo

An introduction to climate dynamics. Special emphasis on phenomena controlled by large-scale interactions between the ocean and atmosphere, from El Niño to decadal climate variability. Topics include conceptual models of climate, general circulation of the atmosphere, ocean wind-driven and thermohaline circulation, abrupt climate changes, climate models by means of GCMs, and climate predictability. After PHYS 181, MATH 120 or equivalent, and one course in meteorology or physical oceanography; or with permission of instructor. QR, SC

G&G 333a^c, Paleogeography David Evans

Quantitative methods for measuring horizontal motions on Earth's surface. Histories of continental motions and supercontinents during the past three billion years. True polar wander. Study of the foundations of paleomagnetism, including experience with field sampling and laboratory data acquisition. Prerequisite: G&G 110, 115, 201, or 212; or permission of instructor. QR, SC

G&G 335a^c, Physical Oceanography Alexey Fedorov

An introduction to ocean dynamics and physical processes controlling large-scale ocean circulation, the Gulf Stream, wind-driven waves, tsunamis, tides, coastal upwelling, and other phenomena. Modern observational, theoretical, and numerical techniques used to study the ocean. The ocean's role in climate and global climate change. After PHYS 181 and MATH 120 or equivalents, or with permission of instructor. QR, SC

G&G 342a/PHYS 342a, Introduction to Earth and Environmental Physics

Steven Lamoreaux

For description see under Physics.

G&G 350b^c, Petrogenesis of Mountain Belts Jay Ague

The fundamental principles governing the formation of metamorphic and igneous rocks during mountain building. Topics include processes of heat and mass transfer in orogenic belts, generation of igneous rocks in continental and subduction settings, ultrahigh pressure and ultrahigh temperature metamorphism, spatial and temporal patterns of petrologic processes throughout geologic time, and pressure-temperature-time paths of metamorphic and igneous rocks. Prerequisites: G&G 220 or equivalent, MATH 120, and CHEM 115 or 118; or with permission of instructor. SC RP

G&G 355a, Extraordinary Glimpses of Past Life Derek Briggs

Study of exceptionally well-preserved fossil deposits (*lagerstaetten*) that contain non-mineralized animal skeletons and casts of the soft parts of organisms. Examples such as the Burgess Shale and Solnhofen limestones; what they can reveal about the history and evolution of life, ancient lifestyles, and environments, and preservational processes. After G&G 230. SC

***G&G 362b/ARCG 362b/EVST 362b, Observing Earth from Space** Ronald Smith

A practical introduction to satellite image analysis of Earth's surface. Topics include the spectrum of electromagnetic radiation, satellite-borne radiometers, data transmission and storage, computer image analysis, the merging of satellite imagery with GIS and applications to weather and climate, oceanography, surficial geology, ecology and epidemiology, forestry, agriculture, archaeology, and watershed management. Prerequisites: college-level physics or chemistry, two courses in geology and natural science of the environment or equivalents, and computer literacy. QR, SC

G&G 370b, Regional Perspectives on Global Geoscience Mark Brandon

Examination of the geological record of a specific region of the world. The region studied varies from year to year and is selected by interested students. Successful completion of the course earns priority eligibility status for attendance on a departmental field trip to the studied region. Prerequisite: G&G 110, 115, or 212. SC

***G&G 402b, Paleoclimates** Mark Pagani

A study of the dynamic evolution of Earth's climate. Topics include warm (the Cretaceous, the Eocene, the PETM, the Pliocene) and cold (the "snowball Earth") climates of the past, glacial cycles, abrupt climate changes, the climate of the past thousand years, and the climate of the twentieth century. After PHYS 181 and one course in meteorology or oceanography, or with permission of instructor. SC

***G&G 421b^c, Geophysical Fluid Dynamics** Mary-Louise Timmermans

Derivation of the equations of a geophysical fluid. Analysis of the most important dynamical phenomena common to all planetary atmospheres, oceans, and interiors, with emphasis on the roles of planetary rotation, gravitation, and thermal gradients. After or concurrently with MENG 361 or equivalent and one course in meteorology or oceanography, or with permission of instructor. QR, SC

G&G 440a^c/EVST 441a/F&ES 441a/MCDB 317a, Methods in Geomicrobiology

Ruth Blake

A laboratory-based course providing interdisciplinary practical training in geomicrobiological methods including microbial enrichment and cultivation techniques; light, epifluorescence, and electron microscopy; and molecular methods (DNA extraction, PCR, T-RFLP, FISH). Prerequisite: college-level chemistry. SC

G&G 450b^c, Deformation of Earth Materials Shun-ichiro Karato

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, electrical conductivity, and chemical reaction. Prerequisites: CHEM 115, MATH 120, and PHYS 181, or equivalents. QR, SC

G&G 456a^c, Introduction to Seismology Maureen Long

Earthquakes and seismic waves, P and S waves, surface waves and free oscillations. Remote sensing of Earth's deep interior and faulting mechanisms. Prerequisites: MATH 120, 222, and PHYS 181, or equivalents. QR, SC

G&G 470b, Cloud Physics and Dynamics Trude Storelvmo

Basic concepts of cloud microphysics, cloud dynamics, and precipitation. Principles of cloud modeling; field observations of clouds. Prerequisites: MENG 361 or G&G 322 or 323; MATH 230 and 247, or PHYS 301; or equivalents with permission of instructor. SC

***G&G 487a or b, Individual Study in Geology and Geophysics** David Evans

Individual study for qualified undergraduates under faculty supervision. To register for this course, each student must submit a written plan of study, approved by the adviser, to the director of undergraduate studies. May be taken more than once for credit. ½ Course cr

***G&G 488a and 489b, Research in Geology and Geophysics** David Evans

Individual study for qualified juniors and seniors under faculty supervision. To register for this course, each student must submit a written plan of study, approved by the adviser, to the director of undergraduate studies.

***G&G 490a and 491b, Research and Senior Thesis** David Evans

Two terms of independent library, laboratory, field, or modeling-based research under faculty supervision. To register for this course, each student must submit a written plan of study, approved by a faculty adviser, to the director of undergraduate studies by the end of the junior year. The plan requires approval of the full G&G faculty.

***G&G 492a or b, The Senior Essay** David Evans

One term of independent library, laboratory, field, or modeling-based research under faculty supervision. To register for this course, each student must submit a written plan of study, approved by a faculty adviser, to the director of undergraduate studies at the beginning of the term in which the essay is to be written.

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Courses in the Graduate School are open to undergraduates with permission of the instructor and the director of graduate studies. Descriptions of graduate courses are available at the office of the director of undergraduate studies.

Germanic Languages and Literatures

Director of undergraduate studies: Paul North, 323 WLH, 432-6401, p.north@yale.edu;
language director: Theresa Schenker, 325 WLH, 432-0783, theresa.schenker@yale.edu

FACULTY OF THE DEPARTMENT OF GERMANIC LANGUAGES AND LITERATURES

Professors Rüdiger Campe (*Chair*), Carol Jacobs, Rainer Nägele, Brigitte Peucker,
Henry Sussman (*Visiting*)

Associate Professor Kirk Wetters

Assistant Professor Paul North

Lecturer William Whobrey

Senior Lector II Marion Gehlker

Senior Lector Howard Stern

Lectors Chrissy Hosea, Theresa Schenker

The major in German is a liberal arts major whose aim is to provide competence in the German language and an understanding of German literature and culture in the context of European civilization. Although by no means restricted to prospective teachers or graduate students in German, the major provides background for professional work in these pursuits.

Prerequisite Students choosing the major should have completed GMAN 110 and 120 or have received equivalent credit through advanced placement or study abroad.

The major The major consists of eleven term courses, for a total of twelve course credits, including GMAN 130, 140, and 150; one course from the German Modernities series, GMST 180–189; two introductory courses in German literature numbered GMAN 171–179 and conducted in German; and the senior essay. All courses in the major must be taken for a letter grade. The remaining courses to fulfill the major are chosen from Group B (conducted in German), up to two courses from Group C (conducted in English), one additional language course from Group A numbered 160 or above, and, with prior approval of the director of undergraduate studies, up to two term courses taken outside the department but bearing directly on the German cultural context.

Senior requirement for the standard major (one-term senior essay) Seniors in the standard German major enroll in GMAN 492, a guided senior essay tutorial course. Students meet on a biweekly basis with the director of undergraduate studies and staff, and work under the direction of a faculty adviser. The culmination of the tutorial is an essay of approximately thirty pages that gives evidence of careful reading and substantial independent thought. The essay may be written in either English or German, although only native speakers are encouraged to write an essay in German. A preliminary statement indicating the general area to be dealt with and the choice of adviser should be submitted to the director of undergraduate studies by September 7; a three-page prospectus and bibliography are due by September 28. A rough draft must be submitted to the adviser by November 2. The completed essay, due on December 10, is graded jointly by the adviser and a designated faculty reader.

The intensive major (two-term senior essay) The intensive major is designed for students who wish to undertake a more extensive project of research and writing during their senior year. Requirements for the intensive major are the same as for the standard major, except that the intensive major requires twelve term courses (totaling thirteen course credits) beyond the prerequisite, of which two are devoted to the preparation of the senior essay (GMAN 492 and 493). This essay, written under the direction of a faculty adviser, should be between sixty and seventy-five pages in length and should be presented no later than April 23 of the senior year. The second term of essay preparation is undertaken

independently, without tutorial support. The essay is graded jointly by the adviser and a designated faculty reader.

Group A courses Courses in Group A (GMAN 110–169) include elementary, intermediate, and advanced language courses. Only one advanced language course at the level of 160 and above may count toward the major.

Group B courses Courses in Group B (GMAN 171 and above) are advanced courses and count toward the major. Readings are in German, and the language of instruction is usually German.

Group C courses Courses in Group C are conducted in English with texts in translation. Only two term courses from this group may count toward the major.

Candidates for the major in German should consult the director of undergraduate studies.

Summer study and study abroad Students may take Intermediate German or German for Reading during the summer in New Haven and/or Berlin. For information, contact the director of undergraduate studies or the language coordinator. Students are urged to consider the Year or Term Abroad program, for which appropriate course credit toward the major is granted. Such study is valuable not only for achieving comfortable fluency in German, but also for gaining firsthand knowledge of the German cultural context. The department offers diverse opportunities for study abroad and a scholarship program for summer courses at German universities. Members of the faculty advise and consult with all students wishing to plan study in Germany. Students who have been approved to study abroad and who receive financial aid from Yale are eligible for aid while abroad. For information about the Year or Term Abroad program, see chapter II of this bulletin.

German Studies In addition to the major in German literature, there is also a major in German Studies, an interdisciplinary study of the cultural, historical, and political life of the German-speaking peoples. See German Studies in the text below.

Placement A written placement examination will be administered before the first day of classes in the fall term, followed by a five-minute oral interview; see cls.yale.edu/placement-testing for the time and location. Students wishing to take the placement exam in January should sign up with the language director by December 12, 2012. Students may also consult with the director of undergraduate studies or the language director for advice about placement and about language study. Regardless of previous German study, students without a score of 5 on the German Advanced Placement test must take the departmental placement exam in order to enroll in any course above GMAN 110 or 125.

REQUIREMENTS OF THE MAJOR

Prerequisites GMAN 110 and 120, or equivalent

Number of courses 11 term courses, totaling 12 course credits, beyond prereq (incl senior essay) for letter grades

Specific courses required GMAN 130, 140, 150; 2 from Group B courses numbered 171–179; 1 from GMST 180–189

Distribution of courses No more than 1 advanced lang course; no more than 2 Group C courses; with DUS approval, 2 term courses outside dept

Substitution permitted With DUS approval, courses taken on Year or Term Abroad for other courses in major

Senior requirement Senior essay tutorial (GMAN 492)

Intensive major 12 term courses, totaling 13 course credits, beyond prereq for letter grades, incl two-term senior essay (GMAN 492 and 493)

GROUP A COURSES

GMAN 110a or b, Elementary German I Staff

A beginning course in spoken and written German that combines oral practice and cultural awareness with a solid foundation in grammar and vocabulary. Listening comprehension through online audio exercises and in-class video clips. Topics include family and school life, German-speaking countries, short literary readings by Hesse, Goethe, and Wondratschek, popular music, and the feature film *Lola rennt*. Tutors are available for extra help or for advanced practice. To be followed by GMAN 120. Enrollment limited to 14 per section. Credit only on completion of GMAN 120. L1 RP 1½ Course cr

GMAN 120a or b, Elementary German II Staff

Continuation of GMAN 110. Topics include German history, the environment, multicultural Germany, Austria, and Switzerland, popular music, a soap opera, and the feature film *Das schreckliche Mädchen*. Listening comprehension through online audio exercises and in-class video clips. Students read poems by Goethe and Jandl and short stories by Bichsel, Brecht, and Kafka. Tutors are available for extra help or for advanced practice. To be followed by GMAN 130. Enrollment limited to 14 per section. L2 RP 1½ Course cr

GMAN 125a, Intensive German I Howard Stern

Intensive training in speaking, reading, writing, and comprehending the language. Focus on the mastery of formal grammar. For beginning students of superior linguistic ability. L1–L2 RP 2 Course cr

GMAN 130a or b, Intermediate German I Staff

Builds on and expands knowledge acquired in GMAN 120. A content-based class that helps students improve their oral and written linguistic skills and their cultural awareness through texts and audiovisual materials relating to German literature, culture, history, and politics. Topics include German universities, Berlin or Frankfurt, Germany before and after the Berlin Wall, and interpersonal relationships. Course materials include online listening comprehension exercises, poems and short stories by Kafka, Brecht, Kästner, Schneider, and Kaschnitz, popular and classical music, and feature films. Tutors are available for extra help or for advanced practice. After GMAN 120 or according to placement examination. Followed by GMAN 140. Enrollment limited to 14 per section. L3 RP 1½ Course cr

GMAN 140a or b, Intermediate German II Staff

Continuation of GMAN 130. Topics include multicultural Germany, globalization, pacifism, and music and politics. Readings include fiction and nonfiction texts by Celan, Kaminer, and Einstein and a full-length novel. Tutors are available for extra help or for advanced practice. After GMAN 130 or according to placement examination. Normally followed by GMAN 150 or, with permission of the director of undergraduate studies, by GMAN 171. Enrollment limited to 14 per section. L4 RP 1½ Course cr

GMAN 145b, Intensive German II Howard Stern

Continuation of GMAN 125. Focus on speaking, writing, and the conversion of grammatical knowledge into reading competence for literary and scholarly purposes. Prerequisite: GMAN 125. L3–L4 RP 2 Course cr

GMAN 150a or b, Advanced German I Staff

An advanced language course intended to improve students' proficiency in aural and reading comprehension, as well as in speaking and writing. Discussion of literary texts by major German authors. Emphasis on vocabulary expansion with specialized grammatical review and a focus on stylistic development in students' writing. Recommended for students planning to use the language practically and as preparation for higher-level courses in both language and literature. After GMAN 140 or 145. For entering students with a score of 5 on the German Advanced Placement test, or according to results of the placement examination. L5

GMAN 160b, German Culture, History, and Politics in Text and Film Marion Gehlker

An advanced language course focusing on improving upper-level language skills through the discussion of selected aspects of German culture, politics, and history in literary and nonliterary texts and film. Topics include the Weimar Republic, youth movements, social democracy, *Vergangenheitsbewältigung*, and postwar developments. Frequent oral and written assignments; emphasis on vocabulary building. After GMAN 140, 145, or 150. L5

***GMAN 162a, Contemporary German Culture** Marion Gehlker

Analysis and discussion of current social and cultural trends. Topics drawn from newspapers, films, TV series, cabaret, short literary texts, and talks. Focus on oral and written production to improve upper-level linguistic skills. Prerequisite: GMAN 150, or with permission of instructor. May not be taken for credit after GMAN <168>. HU

GROUP B COURSES

Courses in this group are open to students who have successfully completed GMAN 150 or the equivalent. Conducted in German with readings in German, unless otherwise indicated.

***GMAN 171b, Introduction to German Prose Narrative** Paul North and staff

Study of key authors and works of the German narrative tradition, with a focus on the development of advanced reading comprehension, writing, and speaking skills. Readings from short stories, novellas, and at least one novel. Writings by exemplary storytellers of the German tradition, such as Goethe, Kleist, Hebel, Hoffmann, Stifter, Keller, Kafka, Mann, Musil, Bachmann, and Bernhard. L5

***GMAN 172a, Introduction to German Theater** Paul North, Rüdiger Campe

An advanced language course that addresses key authors and works of the German theatrical tradition. Refinement of skills in reading comprehension, writing, and speaking. Authors include Lessing, Goethe, Schiller, Kleist, Büchner, Hebbel, Wedekind, Brecht, and Müller. L5, HU

***GMAN 340a^G, The Manesse Codex and Middle High German Poetry**

William Whobrey

Examination of the Manesse Codex, an illuminated fourteenth-century manuscript that contains a rich collection of Middle High German poetry (1170–1300). Topics include the visualization of courtly love and the role of the knight; Gothic paleography; the role of antiquarian collections in the later Middle Ages; related manuscripts and reconstructed sources; modern editions; and the poetry and poets in their historical and cultural contexts. Recommended preparation: reading knowledge of German. HU

***GMAN 348a^G/HUMS 227a, Classicism and Beyond in German Literature**

Kirk Wetters

Modern literature's dependence on, and independence from, the inherited forms of classical antiquity. Case studies include Goethe's "Orphic Primal Words" and Hölderlin's "Pindar Fragments." Eighteenth- and nineteenth-century conceptions of artistic modernity; twentieth-century literary critical and philosophical discourses. Discussion in English. Recommended preparation: reading knowledge of German. HU

***GMAN 350b/GMST 350b/LITR 247b, Kafka's K's** Rainer Nägele

Study of two Kafka novels in which the hero is named only by the letter K. Critique of autobiographical implications; the reduction to the initial as a radical translation of any life into the literary. Discussion in English; readings in German. HU

GROUP C COURSES

Unless otherwise indicated, courses in this group are conducted in English with both readings and discussion in English. The courses are open to all students in Yale College.

***GMAN 191b/LITR 334b, Problems of Lyric** Howard Stern

For description see under Literature.

***GMAN 226a/GMST 226a/LITR 470a, Faust** Jan Hagens

For description see under Literature.

***GMAN 285b^G/GMST 285b/HUMS 303b, Science and Literature in Modernism**

Rüdiger Campe

Modernist writing as it developed in science and in literature from 1880 to 1930, with emphasis on Austrian and German works from the turn of the century. Strategies of observing, describing, writing, and narrating. HU Tr

***GMAN 308b^G/LITR 439b^G, Rilke and Yeats** Carol Jacobs

Close readings of individual works by Rainer Maria Rilke and William Butler Yeats, with an eye to the theoretical implications of their writings. HU Tr

***GMAN 361a/GMST 361a/HUMS 255a, Visions of the End and Representations of Transcendence** Kirk Wetters

The end as a formal feature of narrative and temporal forms, and as an opening to an uncertain beyond. The complex relation between finality and transcendence in Goethe's *Faust II*, Mahler's symphonic works, twentieth-century German and Austrian literature (Broch, Ransmayr, Sebald), and Beckett's *Endgame*. Discussion in English; readings in German or English. HU Tr

***GMAN 406b/FILM 410b/LITR 350b, Theatricality in Film** Brigitte Peucker

For description see under Film Studies.

DUTCH COURSES***DUTC 110a, Elementary Dutch I** Chrissy Hosea

The basic grammar of Dutch. Intensive practice in listening, speaking, reading, and writing in everyday contexts. Introduction to the society and culture of the Netherlands and Flanders (Belgium). Credit only on completion of DUTC 120. Course includes students from Cornell University via videoconference. L1 1½ Course cr

***DUTC 120b, Elementary Dutch II** Chrissy Hosea

Continuation of DUTC 110, with a focus on improving the four language skills. Further study of Dutch grammar and vocabulary through a variety of media, including television and radio. The society, culture, and habits of Dutch-speaking peoples in the Netherlands and Belgium. To be followed by DUTC 130. Prerequisite: DUTC 110 or equivalent. Course includes students from Cornell University via videoconference. L2 1½ Course cr

DUTC 130a, Intermediate Dutch I Chrissy Hosea

Increased use of authentic Dutch texts to expand proficiency in the language and familiarity with the culture. Discussions, compositions, television shows, and contact with native speakers improve control of grammatical structures and vocabulary. Prerequisite: DUTC 120 or equivalent. L3 1½ Course cr

***DUTC 140b, Intermediate Dutch II** Chrissy Hosea

Use of authentic Dutch texts to expand proficiency in the language and familiarity with the culture. Focus on Dutch cultural themes that reflect students' interests and fields of study. Readings include a novel and news articles on current events. Prerequisite: DUTC 130. L4

***DUTC 160b, Introduction to Dutch Culture and Society** Chrissy Hosea

Study of contemporary Dutch culture and major events in Dutch history. Attention to cultural differences and their origins. Topics include Dutch art, exploration, and trade in the seventeenth century; modern immigration and Islam in Europe; water management and environmental issues in the Netherlands; and sex and drugs in Dutch political discourse. Readings and discussion in English. SO

READING COURSE***GMAN 100a and 101b, German for Reading** Staff

Students learn the skills with which to read German-language texts of any difficulty with some fluency. Study of syntax and grammar; practice in close reading and translation of fiction and expository prose in the humanities and sciences. Conducted in English. Does not satisfy the language distributional requirement. Cr/year only

SENIOR COURSES***GMAN 478a or b, Directed Readings or Individual Research in Germanic Languages and Literatures** Kirk Wetters and staff

Individual study under faculty supervision. Applicants must submit a prospectus and bibliography approved by the faculty adviser to the director of undergraduate studies. The student meets with the adviser at least one hour each week and takes a final examination

or writes a term paper. No credit granted without prior approval of the director of undergraduate studies.

***GMAN 492a and 493b, The Senior Essay Tutorial** Kirk Wetters, Paul North
Preparation of an original essay under the direction of a faculty adviser.

RELATED COURSES

***FREN 397a/HUMS 362a/LITR 339a, French Theory from Sartre to Derrida**
Yue Zhuo

For description see under French.

***GMST 182b/HUMS 400b/LITR 346b, Legacies of the Enlightenment** Kirk Wetters
For description see under German Studies.

***GMST 315a^G/HUMS 368a/LITR 431a, Systems and Their Theory** Henry Sussman
For description see under German Studies.

HIST 231b, War in Germany, 1648–2010 J. Adam Tooze

***HIST 235Jb/HUMS 331b, Existentialism and Dissent** Marci Shore
For description see under History.

HSAR 323a, Early Twentieth-Century Art Sebastian Zeidler

***HUMS 427b/LITR 348b, The Practice of Literary Translation** Peter Cole
For description see under Humanities.

LITR 300b^G/ENGL 300b, Introduction to Theory of Literature Paul Fry
For description see under Literature.

***LITR 306a, Poetry and Translation** Adriana Jacobs

***LITR 468a/GMST 365a^G/HUMS 261a, The Question of Form** Carol Jacobs
For description see under Literature.

***MUSI 467b, Mahler, Modernism, and the Symphony** James Hepokoski

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Courses in the Graduate School are open to undergraduates with permission of the instructor and of the directors of undergraduate and graduate studies. Course descriptions may be obtained from the office of the director of undergraduate studies.

German Studies

Director of undergraduate studies: Paul North, 323 WLH, 432-6401, p.north@yale.edu

FACULTY ASSOCIATED WITH THE MAJOR

Professors Seyla Benhabib (*Political Science*), David Cameron (*Political Science*), Rüdiger Campe (*German*), Paul Franks (*Judaic Studies*), Michael Friedmann (*Adjunct*) (*Music*), Timothy Guinnane (*Economics*), *Karsten Harries (*Philosophy*),

Carol Jacobs (*German*), Rainer Nägele (*German*), *Brigitte Peucker (*German, Film Studies*), Steven Smith (*Political Science*), Henry Sussman (*German*) (*Visiting*), J. Adam Tooze (*History*), Katie Trumpener (*Comparative Literature, English*), Christopher Wood (*History of Art*)

Associate Professor Kirk Wetters (*German*)

Assistant Professor Paul North (*German*)

*Member of the Advisory Committee for the program.

The major in German Studies offers an interdisciplinary approach to the study of the German cultural tradition in history, philosophy, the visual arts, music, film studies, politics, and culture, with a German-language requirement. The major draws on several departments and programs along with core courses in German Studies. It is particularly suited to students wishing to combine interests in German language and culture with intensive work in another discipline.

In German Studies, students have the freedom to develop a program of courses to meet their particular needs and interests. Through consultation with the director of undergraduate studies, each student is expected to define a focus of concentration within the major. Interested students should contact the director of undergraduate studies to begin planning their course of study.

Two majors The German Studies major is particularly well suited for students who wish to fulfill the requirements of two majors. For such students, the focus of concentration within the German Studies major often reflects or augments the other elected major.

Prerequisite Students choosing the German Studies major should have completed GMAN 110 and 120 or have received equivalent credit through advanced placement or study abroad.

The major The major consists of twelve term courses, for a total of thirteen course credits, including GMAN 130 and 140 or equivalent; GMAN 150; two courses from the German Modernities series, numbered GMST 180–189; one German literature course numbered GMAN 171–179; and the senior essay. The remaining five courses must include four term courses that together constitute a focus of concentration. One of the courses in the concentration, taken in the spring of the junior year, is designated as the junior seminar. Students in the standard major elect one additional advanced seminar in German literature or culture. Students in the intensive major complete a two-term senior essay instead of taking the additional advanced seminar. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Focus of concentration and junior seminar The junior seminar and three other term courses are chosen from inside or outside the department after consultation with the director of undergraduate studies. This cluster of courses constitutes a focus of concentration in a discipline or area of study related to the major; examples of areas of concentration are history, philosophy, Germanic languages and literatures, psychology, sociology, political and social theory, European studies, film studies, humanities, history of art, and music. During the spring term of the junior year, each student selects one seminar in the focus of concentration as the designated junior seminar. This seminar provides the student with

bibliographic and research skills that lay a foundation for work on the senior essay, and it culminates in the submission of a substantial term paper, ordinarily twenty-five pages.

Senior requirement for the standard major (one-term senior essay) Seniors in the standard German Studies major enroll in GMST 490, a guided senior essay tutorial course. Students meet on a biweekly basis with the director of undergraduate studies and staff, and work under the direction of a faculty adviser. The culmination of the tutorial is an essay of approximately thirty pages that gives evidence of careful reading and substantial independent thought. The essay may be written in either English or German, although only native speakers are encouraged to write an essay in German. Seniors typically write the essay during the fall term. A preliminary statement indicating the general area to be addressed and the choice of adviser should be submitted to the director of undergraduate studies by September 7, 2012; a three-page prospectus and a bibliography are due by September 28. A rough draft must be submitted to the adviser by November 9. The completed essay, due on December 10, is judged by the faculty adviser and a second reader.

Intensive major (two-term senior essay) Requirements for the intensive major are the same as for the standard major, except that the intensive major replaces one advanced seminar with a second term of the senior essay. In the fall term seniors in the intensive major enroll in GMST 491 and begin work on their project under the guidance and supervision of a faculty adviser. A significant portion of the research for the essay should involve materials in German. The essay may be written in either English or German, although only native speakers are encouraged to write an essay in German. A detailed prospectus, no longer than three pages, and a bibliography must be submitted to the director of undergraduate studies by October 22, 2012. The student must submit a draft of at least fifteen pages of the essay by December 7 to receive credit for the first term of the course. The second term, GMST 492, is devoted to completing the essay, which should be substantial (between fifty and sixty pages); the completed essay must be submitted by April 23, 2013. The senior essay is judged by the faculty adviser and a second reader.

Study abroad Students are strongly encouraged to study in Germany for a summer, or for one or two terms on the Year or Term Abroad program. Appropriate course credit toward the major is granted for work in approved programs in Germany. Study abroad is valuable not only for achieving comfortable fluency in German, but also for gaining firsthand knowledge of the German cultural context. The department offers diverse opportunities for study abroad and a scholarship program for summer courses at German universities. Members of the faculty advise and consult with any students wishing to plan study in Germany. Students who have been approved to study abroad and who receive financial aid from Yale are eligible for aid while abroad. For information about the Year or Term Abroad program, see chapter II of this bulletin.

REQUIREMENTS OF THE MAJOR

Prerequisites GMAN 110 and 120, or equivalent

Number of courses 12 term courses, totaling 13 course credits, beyond prereq (incl senior req) for letter grades

Specific courses required GMAN 130, 140, 150; 2 courses numbered GMST 180–189; 1 course numbered GMAN 171–179

Distribution of courses 4 term courses constituting a focus of concentration, 1 of them the junior sem; 1 addtl advanced sem in German lit or culture

Substitution permitted With DUS approval, courses taken on Year or Term Abroad for other courses in major

Senior requirement Senior essay (GMST 490)

Intensive major Two-term senior essay (GMST 491, 492), instead of 1 addtl advanced sem

GERMAN MODERNITIES

*GMST 182b/HUMS 400b/LITR 346b, **Legacies of the Enlightenment** Kirk Wetters
Kant's question "What is Enlightenment?" traced through literature, philosophy, theory, and the arts. Classic theories through the mid-twentieth century from works by Rousseau, Voltaire, Nietzsche, Spengler, Schmitt, Weber, Adorno, Heidegger, Habermas, Foucault, and Derrida. Theoretical work is paired with literature, art, and film. HU

*GMST 183a/HUMS 268a/LITR 336a, **Childhood and Memory in Modern Literature**

Henry Sussman

The motif of childhood examined through memoirs, literary treatments, philosophical meditations, principles of psychoanalysis, and research on memory. Authors include Benjamin, Proust, Hoffmann, Keller, Woolf, Musil, Rousseau, Bergson, Freud, Bartlett, and Neisser. HU RP

GERMAN LITERATURE AND CULTURE

*GMST 226a/GMAN 226a/LITR 470a, **Faust** Jan Hagens

For description see under Literature.

*GMST 285b/GMAN 285b^c/HUMS 303b, **Science and Literature in Modernism**

Rüdiger Campe

For description see under Germanic Languages & Literatures.

*GMST 319a/LITR 210a/RUSS 325a, **Modernist Berlin, Petersburg, and Moscow**

Katerina Clark, Roman Utkin

For description see under Slavic Languages & Literatures.

*GMST 350b/GMAN 350b/LITR 247b, **Kafka's K's** Rainer Nägele

For description see under Germanic Languages & Literatures.

*GMST 361a/GMAN 361a/HUMS 255a, **Visions of the End and Representations of Transcendence** Kirk Wetters

For description see under Germanic Languages & Literatures.

ADVANCED COURSES

*GMST 293b^c/HUMS 316b, **Illegitimacy** Kirk Wetters

Theoretical exploration of legitimacy as a fundamental historical, legal, and political concept; works by Weber, Schmitt, Blumenberg, and Luhmann. Literary readings on illegitimacy in the specific sense "born out of wedlock"; authors include Shakespeare, Goethe, Kleist, Dostoevsky, and Gide. Discussion in English; readings in German or English. HU, SO

*GMST 315a^G/HUMS 368a/LITR 431a, **Systems and Their Theory** Henry Sussman
Conceptual systems that have, since the outset of modernity, furnished a format and platform for rigorous thinking at the same time that they have imposed on language the attributes of self-reflexivity, consistency, repetition, purity, and dependability. Texts by Kant, Hegel, Bergson, Kafka, Proust, and Borges. HU

*GMST 355a/HUMS 365a, **The Concept of Time** Paul North
The historical formation of the concept of time, a fundamental idea in the humanities and sciences. The benefits and pitfalls of the specifically modern plan to ground thought and being in a theory of time. Texts in German intellectual history by Kant, Husserl, Heidegger, and Einstein, with reference to Marcel Proust's novel *In Search of Lost Time*. HU

*GMST 365a^G/HUMS 261a/LITR 468a, **The Question of Form** Carol Jacobs
For description see under Literature.

SENIOR COURSES

*GMST 479a or b, **Directed Readings or Individual Research in German Studies**
Kirk Wetters and staff

Individual study under faculty supervision. Applicants must submit a prospectus and bibliography approved by the faculty adviser to the director of undergraduate studies. The student meets with the adviser at least one hour each week and takes a final examination or writes a term paper. No credit granted without prior approval of the director of undergraduate studies.

*GMST 490a or b, **The Senior Essay for the Standard Major** Kirk Wetters and staff
Preparation of a one-term senior essay, typically during the fall term, under the supervision of a member of the faculty.

*GMST 491a and 492b, **The Senior Essay for the Intensive Major** Kirk Wetters,
Paul North
Preparation of a two-term senior essay under the supervision of a member of the faculty.

RELATED COURSES

*FILM 409b^G/LITR 311b^G/RUSS 311b^G, **Montage, Collage, and Politics** John MacKay
For description see under Film Studies.

*FILM 410b/GMAN 406b/LITR 350b, **Theatricality in Film** Brigitte Peucker
For description see under Film Studies.

*FREN 397a/HUMS 362a/LITR 339a, **French Theory from Sartre to Derrida**
Yue Zhuo
For description see under French.

*GMAN 308b^G/LITR 439b^G, **Rilke and Yeats** Carol Jacobs
For description see under Germanic Languages & Literatures.

*GMAN 348a^G/HUMS 227a, **Classicism and Beyond in German Literature**
Kirk Wetters
For description see under Germanic Languages & Literatures.

***HIST 235Jb/HUMS 331b, Existentialism and Dissent** Marci Shore

For description see under History.

***HSAR 401a or b, Critical Approaches to Art History** Kishwar Rizvi [F],
Robert Nelson [Sp]

***HUMS 427b/LITR 348b, The Practice of Literary Translation** Peter Cole

For description see under Humanities.

***LITR 334b/GMAN 191b, Problems of Lyric** Howard Stern

For description see under Literature.

***MUSI 467b, Mahler, Modernism, and the Symphony** James Hepokoski

PHIL 126b, Introduction to Modern Philosophy from Descartes to Kant

Kenneth Winkler

PHIL 178a, Introduction to Political Philosophy Thomas Pogge

SOCY 151a/HUMS 302a/PLSC 290a, Foundations of Modern Social Theory

Sadia Saeed, Emily Erikson

For description see under Sociology.

Global Affairs

Director of undergraduate studies: Sean Smith, 138 Rosenkranz Hall, 432-3418;
jackson.yale.edu/ba-degree

FACULTY ASSOCIATED WITH THE PROGRAM OF GLOBAL AFFAIRS

Professors Julia Adams (*Sociology*), Elizabeth Bradley (*Public Health*), John Gaddis (*History*), Jeffrey Garten (*School of Management*), Raymond Guiteras (*Global Affairs*) (*Visiting*), Jacob Hacker (*Political Science*), Oona Hathaway (*Law School*), Jolyon Howorth (*Global Affairs, Political Science*) (*Visiting*), Stathis Kalyvas (*Political Science*), Paul Kennedy (*History*), Murray Leibbrandt (*Global Affairs*) (*Visiting*), James Levinsohn (*Director*) (*Global Affairs, School of Management*), Catherine Panter-Brick (*Global Affairs, Anthropology*), W. Michael Reisman (*Law School*), Susan Rose-Ackerman (*Political Science, Law School*), Kenneth Scheve (*Political Science*), Peter Schott (*School of Management*), Ian Shapiro (*Political Science*), J. Adam Tooze (*History*), Aleh Tsyvinski (*Economics*), Christopher Udry (*Economics*), Steven Wilkinson (*Political Science*), Elisabeth Wood (*Political Science*), Ernesto Zedillo (*Center for the Study of Globalization*)

Associate Professors Patrick Cohrs (*History*), Thad Dunning (*Political Science*), Susan Hyde (*Political Science*), Kaveh Khoshnood (*Epidemiology & Public Health*), Ellen Lust (*Political Science*), Michael McGovern (*Anthropology*), Jennifer Ruger (*Public Health*)

Assistant Professors Costas Arkolakis (*Economics*), David Atkin (*Economics*), Lorenzo Caliendo (*School of Management*), Ana De La O (*Political Science*), Lloyd Grieger (*Global Affairs, Sociology*), Daniel Keniston (*Economics*), Jason Lyall (*Political Science*), Nikolay Marinov (*Political Science*), Nuno Monteiro (*Political Science*), Nancy Qian (*Economics*), Thania Sanchez (*Global Affairs, Political Science*), Tariq Thachil (*Political Science*), Jeremy

Wallace (*Global Affairs, East Asian Studies*) (*Visiting*), Jessica Weiss (*Political Science*), Jonathan Wyrzten (*Sociology*)

Senior Lecturers Cheryl Doss (*Economics*), Charles Hill (*MacMillan Center*), Michael Moore (*Global Affairs*)

Lecturers Jasmina Beširević-Regan (*Sociology*), Harry Blair (*Political Science*), Michael Boozer (*Economics*), Pia Rebello Britto (*Global Affairs, Child Study Center*), Leslie Curry (*Public Health*), Robert Hopkins (*Global Affairs*), Matthew Kocher (*Political Science*), Jean Krasno (*Political Science*), Douglas McKee (*Economics*), Jonathan Schell (*Global Affairs*), Michael Skonieczny (*Public Health*), Sean Smith (*Global Affairs, Political Science*)

Senior Fellows Thomas Graham, Mario Mancuso, Stanley McChrystal, Rakesh Mohan, John Negroponte, Stephen Roach, Emma Sky

The Global Affairs major, administered by the Jackson Institute for Global Affairs, prepares Yale students for global citizenship and leadership by enhancing their understanding of the world around them. Students in this interdisciplinary major develop expertise in contemporary global affairs that is informed by the social sciences. Most Global Affairs courses are also open to nonmajors.

The Global Affairs major offers two tracks. The international development track focuses on economic development and poverty, including global public health, in all but the world's wealthiest countries. The international security track focuses on international relations, foreign policy, and diplomacy and includes topics relevant to national and human security. All majors are required to take a core course in each track and complete at least five additional courses in a single track.

Students interested in applying to the Global Affairs major are encouraged to consider the introductory economics and foreign language requirements early in their course planning (see below). Students apply to the Global Affairs major in the fall of the sophomore year. The number of students accepted into the major is limited, and selection is competitive. For application information, visit the Jackson Institute Web site at jackson.yale.edu/ba-degree. Students interested in receiving the call for applications to the major should sign up for the Jackson Institute's electronic mailing list.

Requirements of the major Introductory courses in microeconomics (ECON 108, 110, or 115) and macroeconomics (ECON 111 or 116) are required for both tracks. During the junior year, all majors are required to take two core courses: GLBL 225, Approaches to International Development, and GLBL 275, Approaches to International Security. Students must complete GLBL 121, Applied Quantitative Analysis, prior to taking GLBL 225. Majors also take one research design course, in either qualitative or quantitative research methods, approved by the director of undergraduate studies.

Majors in the international development track take intermediate microeconomics (ECON 121 or 125) and four electives in their area of concentration. Those in the international security track take five electives in their area of concentration. Electives must be chosen from an approved group of courses in Global Affairs, History, Political Science, Economics, and other social science departments. For information about which courses qualify as electives within each track, see the Jackson Institute Web site (jackson.yale.edu/ba-degree).

Language requirement Global Affairs majors are required to demonstrate advanced proficiency in one modern language other than English by the time of their graduation. This requirement is normally met by the completion of one course at the L5 level.

Senior requirement In the fall term of the senior year, majors must complete a capstone project in GLBL 499. For the project, small groups of students each form a policy task force that works on a specific problem relevant to global affairs and presents the task force's findings and recommendations to a real-world client. Clients may include government agencies, nongovernmental organizations and nonprofit groups, and private sector organizations in the United States and abroad.

Study abroad The Jackson Institute recommends that students interested in the Global Affairs major study abroad in the sophomore year. Global Affairs majors who choose to study abroad in the junior year should consult the director of undergraduate studies to devise a course of study.

Internships Students in the major are encouraged to take a summer internship in the field of global affairs after their junior year. The Jackson Institute's Career Development Office can help students find appropriate internships.

REQUIREMENTS OF THE MAJOR

Number of courses 12 (incl senior req; excluding lang req)

Specific courses required *Both tracks*—ECON 108, 110, or 115; ECON 111 or 116; GLBL 121, 225, 275; *International development track*—ECON 121 or 125

Distribution of courses *Both tracks*—1 term course in research methods; *International development track*—4 approved electives; *International security track*—5 approved electives

Language requirement Advanced ability (L5) in 1 modern lang other than English

Senior requirement Senior capstone project in GLBL 499

INTRODUCTORY COURSE

GLBL 101a, Gateway to Global Affairs James Levinsohn

Introduction to critical thinking about current international issues. Guest lecturers lead a series of modules, each on a global affairs topic in their area of expertise. Students learn to frame policy questions and write policy memos while examining competing points of view. Topics vary from year to year. SO

REQUIRED COURSES

GLBL 121a, Applied Quantitative Analysis Lloyd Grieger

Mathematical fundamentals that underlie analytical approaches in public policy and the social sciences. Development of mathematical skills in areas such as linear functions, single and multiple variable differentiation, exponential functions, and optimization. Statistical approaches include descriptive statistics, principles of sampling, hypothesis tests, simple linear regression, multiple regression, and models for analyzing categorical outcomes. QR

***GLBL 225b, Approaches to International Development** Daniel Keniston

The unique set of challenges faced by households in developing countries, and the economic theories that have been developed to understand them. Health, education, and discrimination against women in the household; income generation, savings, and credit; institutions, foreign aid, and conflict. Recent econometric techniques applied to investigate the underlying causes of poverty and the effectiveness of development programs. Enrollment limited to Global Affairs majors. Prerequisite: GLBL 121. SO

***GLBL 275a, Approaches to International Security** Thania Sanchez

Introduction to leading theoretical explanations for inter- and intrastate conflict; focus on issues central to contemporary research. The origins, conduct, and outcomes of war; the determinants of military effectiveness; the uses and limits of state coercion; the rise of transnational terrorism; arms control; the laws of war. Enrollment limited to Global Affairs majors. SO

RESEARCH DESIGN

GLBL 185a/PLSC 342a, Cause and Effect: Research Methods Thad Dunning

For description see under Political Science.

ANTH 303a, Field Methods in Cultural Anthropology** Kamari Clarke**ECON 159a, Game Theory** Benjamin Polak**ECON 351b, Mathematical Economics: Game Theory** Johannes HornerPLSC 239b^c, Introduction to Experimental Methods in Political Science**

Alan Gerber

ELECTIVES WITHIN THE MAJOR

*International Development***GLBL 211a/ECON 211a/SAST 278a, Economic Performance and Challenges in India**

Rakesh Mohan

India's transition from being one of the poorest countries in the world to having one of the fastest-growing economies. Economic reform processes, trade and policy implications, and changes within the agriculture, industry, and service sectors. Prerequisites: introductory microeconomics and macroeconomics. SO

GLBL 234b/ECON 184b, International Economics Peter Schott

For description see under Economics.

***GLBL 312b/EAST 454b/ECON 474b, Economic and Policy Lessons from Japan**

Stephen Roach

An evaluation of Japan's continuing economic problems and of the possibility that these problems might spread to other economies. Currency pressures, policy blunders, bubbles, denial, and Japan's role in the global economic crisis of 2008; comparison between Japan's economy and other major economies; dangers to the global economy from a protracted postcrisis recovery period. Focus on policy remedies to avert similar problems in other countries. Prerequisite: a course in macroeconomics. SO

***GLBL 316b/ECON 462b/EP&E 228b/LAST 410b, The Economics of Human Capital in Latin America** Douglas McKee

For description see under Economics.

***GLBL 317a, Social Enterprise in Developing Economies II** Robert Hopkins

Summer research developed into a case-study project on a topic related to the use of social enterprise in regional economic development. Prerequisite: GLBL <315>.

GLBL 318a/EAST 338a/ECON 338a, The Next China Stephen Roach

Economic development in China since the late 1970s. Emphasis on factors pushing China toward a transition from its modern export- and investment-led development model to a pro-consumption model. The possibility of a resulting identity crisis, underscored by China's need to embrace political reform and by the West's long-standing misperceptions of China. Prerequisite: introductory macroeconomics. SO

***GLBL 319a/AFST 345a^G/PLSC 370a/SAST 343a, Political Economy of Natural Disasters** Jennifer Bussell

For description see under South Asian Studies.

***GLBL 323a/HLTH 325a, Methods and Ethics in Global Health Research**

Kaveh Khoshnood

Introduction to research methods in global health that recognize the influence of political, economic, social, and cultural factors. Quantitative, qualitative, and mixed-method approaches; ethical aspects of conducting research in resource-constrained settings; the process of obtaining human subjects' approval. Students develop proposals for short-term global health research projects conducted in resource-constrained settings. SO RP

***GLBL 324b/PLSC 451b, Social, Economic, and Political Dimensions of Development**

Jennifer Ruger

For description see under Political Science.

***GLBL 331a^G/ECON 454a, Evolution of Central Banking and Responses to Crises**

Rakesh Mohan

Changes in the contours of policy making by central banks since the turn of the twentieth century. Theoretical and policy perspectives as well as empirical debates in central banking. The recurrence of financial crises in market economies. Monetary policies that led to economic stability in the period prior to the collapse of 2007–2008. Prerequisite: ECON 122. SO

***GLBL 336a/EP&E 243a/LAST 423a/PLSC 423a, Political Economy of Poverty Alleviation** Ana De La O

For description see under Political Science.

***GLBL 339b/PLSC 383b^G, Political Parties in the Developing World** Tariq Thachil

For description see under Political Science.

International Security

GLBL 265b/HIST 133b/PLSC 174b, Strategic, Political, and Moral Dilemmas of the Nuclear Age Jonathan Schell

A chronological inquiry into the central questions raised by the invention, deployment, and use of nuclear weapons. Topics include the effects of nuclear weapons on the theory

and practice of war, nuclear deterrence, disarmament, proliferation, preemptive war, and the human capacity for self-extinction. HU, SO

GLBL 269a/PLSC 359a, Violence and Civil Strife Stathis Kalyvas

For description see under Political Science.

GLBL 281a/HIST 221a, Military History of the West since 1500 Paul Kennedy

For description see under History.

***GLBL 361b^c/PLSC 436b, Violence: State and Society** Matthew Kocher

Examination of large-scale violence, generally within sovereign states. Why violence happens, why it takes place in some locations and not others, why it takes specific forms (insurgency, terrorism, civilian victimization), what explains its magnitude (the number of victims), and what explains targeting (the type or identity of victims). SO

***GLBL 362b/MMES 282b/SOCY 339b^c, Imperialism, Insurgency, and State Building in the Middle East** Jonathan Wyrzten

For description see under Sociology.

***GLBL 364b/PLSC 149b^c, Economic Sanctions** Nikolay Marinov

For description see under Political Science.

***GLBL 366b/EP&E 252b/PLSC 401b, Promoting Democracy in Developing Countries**

Harry Blair

For description see under Political Science.

***GLBL 369a, Transatlantic Relations since 1989** Jolyon Howorth

The shifting relations between the United States and the European Union since the end of the Cold War. Root causes of convergence and divergence; political and security relations; economic and trade relations; sociocultural issues. SO

***GLBL 371a/PLSC 135a, U.S. National Security and the Media** Sean Smith

For description see under Political Science.

***GLBL 378a/PLSC 184a, The United Nations and the Maintenance of International Security** Jean Krasno

The evolution of the United Nations and its role in a post-Cold War international system both in preventive diplomacy, with its use of force for peacekeeping and peace enforcement, and in peace building. SO

***GLBL 384a/ER&M 362a/SOCY 363a, Genocide and Ethnic Conflict**

Jasmina Beširević-Regan

For description see under Sociology.

***MGRK 226a/HIST 251Ja, History of European Integration** Konstantina Maragkou,

Eirini Karamouzi

For description see under Hellenic Studies.

International Development and Security

***GLBL 245a/EP&E 280a/PLSC 151a^c, International Dimensions of Democratization**

Nikolay Marinov

For description see under Ethics, Politics, & Economics.

GLBL 247b/PLSC 128b, Development under Fire Jason Lyall

For description see under Political Science.

***GLBL 344b/PLSC 138b^G, International Institutions** Nikolay Marinov

For description see under Political Science.

DIRECTED RESEARCH AND SENIOR PROJECT COURSES

***GLBL 450a or b, Directed Research** Staff

Independent research under the direction of a faculty member on a special topic in global affairs not covered in other courses. Permission of the director of undergraduate studies and of the instructor directing the research is required.

***GLBL 499a, Senior Capstone Project** Sean Smith, Raymond Guiteras, and staff
Students work in small task-force groups and complete a one-term public policy project under the guidance of a faculty member. Clients for the projects are drawn from government agencies, nongovernmental organizations and nonprofit groups, and private sector organizations in the United States and abroad. Projects and clients vary from year to year. Fulfills the capstone project requirement for the Global Affairs major.

Global Health Studies

Program adviser: Kaveh Khoshnood, 405 LEPH, 785-2920, healthstudies@yale.edu

GLOBAL HEALTH STUDIES ADVISORY COMMITTEE

Julia Adams (*Sociology*), Elizabeth Bradley (*Public Health*), Sean Brotherton (*Anthropology*), Hannah Brueckner (*Sociology*), Cheryl Doss (*Global Affairs*), Robert Dubrow (*Public Health*), Jane Edwards (*Yale College Dean's Office*), Howard Forman (*School of Medicine*), Marcia Inhorn (*Anthropology*), Kaveh Khoshnood (*Public Health*), William Segraves (*Yale College Dean's Office*), Michael Skonieczny (*Public Health*), David Smith (*Social & Policy Studies*), Dieter Söll (*Molecular Biophysics & Biochemistry*), Christopher Udry (*Economics*), John Wargo (*Forestry & Environmental Studies*), John Warner (*History of Medicine*), Robert Wyman (*Molecular, Cellular, & Developmental Biology*)

Issues related to health are among the most important challenges facing societies, both domestically and globally. Finding solutions to health-related problems requires multidisciplinary comprehension of all dimensions of health, including biological and social determinants, economics and politics of health care systems and health care delivery, and ways in which health is understood by individuals, societies, and cultures. Yale College offers courses through an interdisciplinary health studies framework, bringing together the natural sciences, the social sciences, and the humanities.

To make the best possible use of institutional resources, students are encouraged to form a coherent plan of study in the area of global health. The advisory committee has identified the building blocks for such a plan, with a core of courses in four areas: global health, health care systems, research methodology, and the biological and social determinants of health. GLBL 323 and PSYC 235 are recommended research methods courses. All

students interested in this field need a working knowledge of statistics; STAT 100–106, 230 or higher, or PSYC 200 offer excellent preparation. Courses in the graduate and professional schools can sometimes fulfill the core areas. Students expand their program with elective courses from the wide range offered by Yale College.

Students should supplement their classroom experience with applications in the community, whether in the United States or abroad. Internships and research projects developed with the guidance of the faculty build on classroom work, and in some cases lead to senior theses and projects.

For information about the five-year B.A.-B.S./M.P.H. degree program offered jointly with the School of Public Health, see under Public Health.

HEALTH STUDIES COURSES

***HLTH 155b/MCDB 106b, Biology of Malaria, Lyme, and Other Vector-Borne Diseases** Alexia Belperron

For description see under Molecular, Cellular, & Developmental Biology.

***HLTH 325a/GLBL 323a, Methods and Ethics in Global Health Research**
Kaveh Khoshnood

For description see under Global Affairs.

RELATED COURSES

***ANTH 011b, Reproductive Technologies** Marcia Inhorn

***ANTH 114a, Introduction to Medical Anthropology** Sean Brotherton

***ANTH 234a, Disability and Culture** Karen Nakamura

***ANTH 357a^c, Anthropology of the Body** Sean Brotherton

***ANTH 427b, Topics in Medical Anthropology** Sean Brotherton

***ANTH 453a, Health Disparities and Health Equity** Catherine Panter-Brick

***ANTH 462b^c, Ethnographic Perspectives on Global Health** Marcia Inhorn

***E&EB 235a, Evolution and Medicine** Stephen Stearns

***E&EB 460b^c, Studies in Evolutionary Medicine I** Stephen Stearns and staff

***E&EB 461a^c, Studies in Evolutionary Medicine II** Paul Turner

ECON 170a, Health Economics and Public Policy Howard Forman

***ECON 462b/EP&E 228b/GLBL 316b/LAST 410b, The Economics of Human Capital in Latin America** Douglas McKee

For description see under Economics.

HIST 234a/SHM 235a, Epidemics and Society in the West since 1600
Frank Snowden

For description see under History.

HSHM 215a^G/HIST 140a, Public Health in America, 1793–2000 Naomi Rogers
For description see under History of Science, Medicine, and Public Health.

***HSHM 448b/HIST 151Jb/WGSS 448b, American Medicine and the Cold War**
Naomi Rogers
For description see under History of Science, Medicine, and Public Health.

***MCDB 103a or b, Cancer** Alexia Belperron and staff

***MCDB 150b^C, Global Problems of Population Growth** Robert Wyman,
Fabian Drixler

MCDB 240b, Biology of Reproduction Hugh Taylor, Mary Klein

***PLSC 248b/EP&E 367b, The Political Economy of Health Care** Peter Swenson
For description see under Political Science.

PLSC 257b, Bioethics and Law Stephen Latham

***PLSC 446b/EP&E 258b/SOCY 369b, Welfare States across Nations** Sigrun Kahl
For description see under Political Science.

PSYC 147a, Animal Models of Clinical Disorders Nelson Donegan

***PSYC 355a and 356b, Clinical Psychology in the Community** Kristi Lockhart

WGSS 120a, Women, Food, and Culture Maria Trumpler

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Qualified students may take graduate courses at the School of Public Health, subject to the restrictions on graduate and professional school enrollment described in chapter II, section K. A list of graduate and professional school offerings in areas related to health can be found on the Health Studies Web page at yalecollege.yale.edu/content/health-studies-1. Further information about these courses and other graduate offerings can be found in the School of Public Health bulletin.

Greek

(See under Classics and under Hellenic Studies.)

Health Studies

(See under Global Health Studies.)

Hebrew

(See under Near Eastern Languages and Civilizations.)

Hellenic Studies

Directors: Stathis Kalyvas, 115 Prospect Pl., 432-5386, stathis.kalyvas@yale.edu; John Geanakoplos, 30 Hillhouse Ave., 432-3397, john.geanakoplos@yale.edu; associate program chair: George Syrimis, 34 Hillhouse Ave., 432-9342, george.syrimis@yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF HELLENIC STUDIES

Professors John Geanakoplos (*Economics*), Stathis Kalyvas (*Political Science*)

Lecturers Konstantina Maragkou (*History*), George Syrimis (*Comparative Literature*)

Senior Lector Maria Kaliambou

Hellenic Studies is a program of the Council on European Studies. The core of the program is the teaching of modern Greek, supplemented with other courses and events related to the study of postantiquity Greece, as well as the society and culture of modern Greece and its interaction with the rest of Europe and the world. Related courses can be found in the listings of Anthropology, History, History of Art, Literature, Political Science, Religious Studies, and Russian and East European Studies. A major in Ancient and Modern Greek is described under Classics. Students who have an interest in postantiquity Greek language, society, or culture are advised to consult with the associate program chair of the Hellenic Studies program.

MGRK 110a^c, Elementary Modern Greek I Maria Kaliambou

An introduction to modern Greek, with emphasis on oral expression. Use of communicative activities, graded texts, written assignments, grammar drills, audiovisual material, and contemporary documents. In-depth cultural study. Credit only on completion of MGRK 120. L1 1½ Course cr

MGRK 120b^c, Elementary Modern Greek II Maria Kaliambou

Continuation of MGRK 110. Prerequisite: MGRK 110. L2 1½ Course cr

MGRK 130a, Intermediate Modern Greek I Maria Kaliambou

Further development of oral and written linguistic skills, using authentic readings and audiovisual materials. Continued familiarization with contemporary Greek culture. Prerequisite: MGRK 120 or equivalent. Course includes students from Cornell University via videoconference. L3 1½ Course cr

MGRK 140b, Intermediate Modern Greek II Maria Kaliambou

Further development of listening, speaking, reading, and writing skills in modern Greek. Presentation of short research projects related to modern Greece. Prerequisite: MGRK 130 or equivalent. Course includes students from Cornell University via videoconference. L4 1½ Course cr

MGRK 202b/CLCV 214b/HUMS 278b/LITR 225b/WGSS 337b, The Poetry of C. P.*Cavafy** George Syrimis

The interactions of gender, sexuality, and nationalism in the poetry of C. P. Cavafy (1863–1933). Questions of biography, representation, disclosure, and evasion; Cavafy's aestheticism. Ways in which Cavafy simultaneously appeals to and resists prevailing notions of writing, desire, language, the classical tradition, and modernity. His contributions to understandings of the twentieth-century history and politics of Greek and gay identity. HU Tr

***MGRK 217a/CLCV 210a/HUMS 273a/LITR 150a, Receptions of Odysseus in Literature and Drama** George Syrimis

The reception of the Homeric figure Odysseus in ancient literature and in twentieth-century novels, film, and theater. Focus on the traditions of Rome, Greece, Ireland, and the Caribbean. Reincarnations of Odysseus as a modernist figure, a postcolonial subject, and an existentialist hero. HU Tr

***MGRK 226a/HIST 251Ja, History of European Integration** Konstantina Maragkou, Eirini Karamouzi

The influence of the Marshall Plan and the Cold War in the making of postwar Europe, with a focus on how these developments affected the European integration process. The antecedents and evolution of European integration from its origins to the Treaty of Maastricht. Greece used as a case study. HU

***MGRK 228b/HIST 239Jb/MMES 143b, Twentieth-Century Greek-Turkish Relations** Konstantina Maragkou

Survey of relations between Greece and Turkey during the twentieth century, with emphasis on the two countries' intertwined national histories, selected issues of contention, and the periods of detente. HU

***MGRK 230a/HIST 205Ja, Greece in the Twentieth Century** Konstantina Maragkou, Eirini Karamouzi

The history of modern and contemporary Greece. Recent political developments, economic and cultural aspects, and international relations. HU

***MGRK 450a and 451b, Senior Seminar in Modern Greek Literature** George Syrimis

A senior seminar in modern Greek literature for students with advanced proficiency in modern Greek. May be offered toward the major in Ancient and Modern Greek. L5

***MGRK 481a and 482b, Independent Tutorial** Staff

For students with advanced language skills in modern Greek who wish to engage in individual study or concentrated reading and research on material not otherwise offered in courses. Applicants submit a detailed project proposal to the language studies coordinator. The student must meet with the instructor for at least one hour each week, and the work must terminate in a term paper or its equivalent.

Hindi

(See under South Asian Studies.)

History

Director of undergraduate studies: Steven Pincus, 216 HGS, 432-1355, steven.pincus@yale.edu; history.yale.edu

FACULTY OF THE DEPARTMENT OF HISTORY

Professors Jean-Christophe Agnew, Abbas Amanat, Yom Tov Assis (*Visiting*), Ned Blackhawk, David Blight, Daniel Botsman, Paul Bushkovitch, George Chauncey, John Demos (*Emeritus*), Carlos Eire, Laura Engelstein (*Chair*), John Mack Faragher, Antonia Finnane (*Visiting*), Paul Freedman, Joanne Freeman, John Gaddis, Beverly Gage, Glenda Gilmore, Bruce Gordon, Robert W. Gordon, Valerie Hansen, Robert Harms, Jonathan Holloway, Matthew Jacobson, Gilbert Joseph, Donald Kagan, Paul Kennedy, Daniel Kevles, Benedict Kiernan, Jennifer Klein, Naomi Lamoreaux, Bentley Layton, Mary Lui, Joseph Manning, Ivan Marcus, John Matthews, John Merriman, Joanne Meyerowitz, Peter Perdue, Steven Pincus, Stephen Pitti, Cynthia Russett, Lamin Sanneh, Marc Saperstein (*Visiting*), Tanika Sarkar (*Visiting*), Stuart Schwartz, Frank Snowden, Timothy Snyder, Harry Stout, William Summers, J. Adam Tooze, Francesca Trivellato, John Warner, Anders Winroth, Jay Winter, John Witt, Keith Wrightson

Associate Professors Bruno Cabanes, Patrick Cohrs, Naomi Rogers, Edward Rugemer, Marci Shore

Assistant Professors Paola Bertucci, Fabian Drixler, Alejandra Dubcovsky, Mariola Espinosa, Crystal Feimster, Daniel Magaziner, Alan Mikhail, Alyssa Mt. Pleasant, William Rankin, Paul Sabin, Eliyahu Stern, Bruno Strasser, Jenifer Van Vleck, G. Charles Walton

Senior Lecturers Annping Chin, Becky Conekin, Bettyann Kevles, Stuart Semmel, Karolyn Smardz Frost

Lecturers Adel Allouche, Jay Gitlin, Ryan Irwin, María Jordán, George Levesque, Konstantina Maragkou, William Metcalf, Jonathan Schell, Rebecca Tannenbaum

Unless designated by a star, courses in History are open to all students in Yale College. Unstarred courses, however, are liable to be limited in their enrollment (“capped”) at the beginning of the term, depending on the number of teaching assistants available.

A student who declares a History major is assigned an adviser from among the departmental faculty. The adviser is available throughout the year for consultation about courses and the major. At the beginning of each term, students majoring in History must have their departmental adviser approve and sign their schedules. It is possible for students to change advisers provided they obtain the written consent of the new adviser.

The major History is the study of ways in which human activities in the past have shaped the contours of the present. Historians ask not only how the contemporary world came to be the way it is, but also why societies have changed and developed over time. Yale’s History department offers a wide range of courses that pursue these kinds of questions not only about the United States and Europe, but also about Latin America, East Asia, South Asia, Southeast Asia, Africa, and the Middle East. History majors learn how to read a variety of

texts critically and analytically and then to write about them in engaging ways. The History major is thus an excellent preparation for careers in many fields, including law, medicine, journalism, public policy, consulting, business, and the arts.

Prerequisite The prerequisite for the major is two term courses in history. Courses completed in fulfillment of the prerequisite may be applied toward the requirements of the major.

Selection of courses The Department of History strongly urges each student to devise a program of study that, while meeting individual interests and needs, also achieves a balance between diversification and specialization. Exposure to a variety of areas of history is desirable first because only wide-ranging experience can give students confidence in having discovered their own true interests and aptitudes. Equally important, studying various times and societies, including preindustrial ones, prevents provincialism and provides the comparative knowledge essential to a clearer understanding of the area chosen for specialization. Finally, the department assumes that all students understand the vital importance of studying the historical traditions from which their society has developed. One cannot expect to understand another culture without a firm historical grasp of one's own.

To help students organize their course selection, the History department has developed suggested programs of study based on specific themes. Information about these thematic pathways is available on the departmental Web site (history.yale.edu). The combination of the History major's distributional requirements and thematic pathways familiarizes students with a variety of regions and epochs while also allowing them to pursue individual areas of interest.

Requirements of the major Twelve terms of history are required, which may include the two terms taken as prerequisites. Included in these twelve terms must be: (a) two terms of United States or Canadian history (courses in the colonial period may fulfill this requirement); (b) two terms of European or British history (courses in Greek and Roman, Byzantine, and Russian history may fulfill this requirement); (c) three terms of African, Asian, Latin American, or Middle Eastern history.

Two of these seven terms must be courses in preindustrial history, and they must be chosen from two of the geographical categories listed above. Preindustrial history courses are so marked at the end of their course descriptions. Students may use the same courses to count toward both geographical and preindustrial requirements. Only in rare cases will the director of undergraduate studies consider petitions from History majors seeking geographical or chronological credit outside of a History course's primary designation.

Two departmental seminars are required and are normally taken during the sophomore or junior year, although students are encouraged to take more than two seminars. (See below under Departmental Seminars for information about pre-enrollment.) Students must choose departmental seminars from two different geographical distribution categories. Sophomores contemplating a junior term abroad are urged to consider taking at least one seminar in the sophomore year. Residential college seminars that count toward the History major do not fulfill the departmental seminar requirement. During senior year, each student must complete a senior departmental essay written under the guidance of a member of the faculty. Juniors may choose their senior essay advisers on line beginning in March.

Credit toward the major is given only for courses included in the History listing below and in the History course listings included in Online Course Information. All courses in History of Science, Medicine, and Public Health count automatically toward the History major.

Library orientation The History department requires all majors to complete a ninety-minute introductory research session selected from the workshops for historians offered by the Yale University Library. Several library workshops are offered at the beginning of each term. Students should register on the Web at www.library.yale.edu/instruction/hist. For questions students should contact the director of undergraduate studies.

Placement in advanced courses With a few exceptions, chiefly departmental seminars, history courses are automatically open to freshmen. Courses for the major must be taken at Yale, except with prior permission of the director of undergraduate studies.

Senior departmental essay History is more than past events; it is also the discipline of historical inquiry. As a discipline, it uses many techniques, but its basic method is the collection and careful evaluation of evidence and the written presentation of reasonable conclusions derived from that evidence. To experience history as a discipline, a student must grapple at first hand with the problems and rigors involved in this kind of systematic investigation and exposition. The Department of History therefore requires each student majoring in History to present a historical essay on a subject of the student's choice to the department in the senior year. The range of acceptable topics is wide, but most essays fall into two categories. The first involves the study of a limited problem through research in accessible source materials. The second is a critical assessment of a significant historical controversy or historiographical issue. Whatever topic the student elects, the essay must be interpretive and analytical, not only narrative and descriptive.

In choosing the subject of the senior essay, students should be aware that lack of foreign language expertise is not necessarily a bar to researching a topic in the history of a non-English-speaking area. Many translated materials exist, and for some areas of the world (chiefly Africa, Asia, and Latin America) diaries, letters, and newspapers composed by missionaries, businessmen, and diplomats writing in English are available. Many of these sources are held in Yale's extensive archival collections; others are available on microfilm.

Seniors receive course credit for satisfactory completion of their departmental essays by enrolling in HIST 495 and 496. They must also complete a library research workshop for the senior essay. Students should register for the workshop on the Web at www.library.yale.edu/instruction/hist.

REQUIREMENTS OF THE MAJOR

Prerequisites 2 term courses in hist

Number of courses 12 term courses (incl prereqs and senior essay)

Distribution of courses 2 courses in hist of U.S. or Canada, 2 in hist of Europe or Britain, 3 in hist of Africa, Asia, Latin America, or Middle East; 2 of preceding must be pre-industrial in different geographical areas; at least 2 departmental sems in 2 different geographical distribution categories, as specified

Substitution permitted Relevant course approved by DUS

Other Library research workshop

Senior requirement Senior essay (HIST 495 and 496)

History courses numbered 001 to 099 are freshman seminars, with enrollment limited to 18. Courses numbered 100 to 199 are in the history of the United States or Canada; those in the 200s, Europe and Britain; and those in the 300s, the rest of the world. Courses numbered in the 400s address global topics; students must apply to the director of undergraduate studies in History to count a 400-level course toward a particular geographical distribution category. Lecture courses are subject to capping at the beginning of each term.

FRESHMAN SEMINARS

Enrollment in these seminars is limited to freshmen. Preregistration is required; see under Freshman Seminar Program.

***HIST 010a, Postwar America at Home: 1945–1960** Cynthia Russett

Ways in which American culture took shape in the years after World War II. Focus on domestic culture and society during the years when unprecedented prosperity vied with fears of Armageddon. WR, HU Fr sem

***HIST 016b/AFAM 060b, Significance of American Slavery** Edward Rugemer

For description see under African American Studies.

***HIST 022a, What History Teaches** John Gaddis

An introduction to the discipline of history. History viewed as an art, a science, and something in between; differences between fact, interpretation, and consensus; history as a predictor of future events. Focus on issues such as the interdependence of variables, causation and verification, the role of individuals, and to what extent historical inquiry can or should be a moral enterprise. WR, HU Fr sem

***HIST 029a, Liberalism and Conservatism in the Twentieth-Century United States**

Beverly Gage

American domestic politics from the New Deal through the presidency of Ronald Reagan, with a focus on the development of contemporary liberalism and conservatism. Presidents, policies, political thought, and the development of the state; social movements, dissenting thought, and grassroots organizing. HU Fr sem

***HIST 030a, Tokyo** Fabian Drixler

Four centuries of Japan's history explored through the many incarnations, destructions, and rebirths of its foremost city. Focus on the solutions found by Tokyo's residents to the material and social challenges of concentrating such a large population in one place. Tensions between continuity and impermanence, authenticity and modernity, and social order and the culture of play. HU Fr sem

LECTURE COURSES

HIST 106b/AMST 191b, The Formation of Modern American Culture, 1920 to the Present Matthew Jacobson

For description see under American Studies.

HIST 119b/AFAM 172b, The Civil War and Reconstruction Era, 1845–1877

David Blight

The causes, course, and consequences of the American Civil War. A search for the multiple meanings of a transformative event, including national, sectional, racial, constitutional, social, gender, intellectual, and individual dimensions. HU

HIST 120a/AMST 163a/EVST 120a/HSBM 204a, Introduction to Environmental History Paul Sabin

For description see under Environmental Studies.

HIST 122b/AMST 193b, Origins of U.S. Global Power Jenifer Van Vleck

Policies, strategies, and ideas that enabled the United States to become a world power. Manifest Destiny, expansion, and empire; American exceptionalism; nationalism and internationalism; capitalism and consumer culture; technological innovation; the relation between domestic politics and U.S. foreign policy, particularly with regard to race and gender; challenges and resistance to U.S. global power. Focus on the twentieth century, with introduction to critical moments in U.S. and international history during the seventeenth through nineteenth centuries. HU

HIST 127a/AMST 135a/WGSS 200a, U.S. Lesbian and Gay History George Chauncey

Introduction to the social, cultural, and political history of lesbians, gay men, and other socially constituted sexual minorities. Focus on understanding categories of sexuality in relation to shifting normative regimes, primarily in the twentieth century. The emergence of homosexuality and heterosexuality as categories of experience and identity; the changing relationship between homosexuality and transgenderism; the development of diverse lesbian and gay subcultures and their representation in popular culture; religion and sexual science; generational change and everyday life; AIDS; and gay, antigay, feminist, and queer movements. HU

HIST 129b/AMST 111b/RLST 111b/WGSS 111b, Sexuality and Religion

Kathryn Lofton

For description see under Religious Studies.

HIST 131a/AMST 131a, American Politics and Society, 1900–1945 Beverly Gage

The social, political, and economic changes that transformed American society from the turn of the twentieth century through World War II. Progressive, radical, and conservative politics; war and society; the New Deal and federal social policy; race and the long civil rights movement; consumerism, business, and labor; immigration and urban development. HU

HIST 132b/AMST 132b/WGSS 132b, American Politics and Society, 1945 to the Present

Jennifer Klein

An introduction to political and social issues of modern America from the 1940s to the present: political economy, civil rights, class politics, and gender roles that defined postwar America. Legacies of the New Deal as they played out after World War II; the origins, agenda, and ramifications of the Cold War; postwar suburbanization and its racial dimensions; migration and immigration; cultural changes; social movements of the Right and Left; Reaganism and its legacies; and the United States and the global economy. HU

HIST 133b/GLBL 265b/PLSC 174b, Strategic, Political, and Moral Dilemmas of the Nuclear Age Jonathan Schell

For description see under Global Affairs.

HIST 134a^G/AMST 288a/ER&M 308a, American Indian Law and Policy
Ned Blackhawk

Survey of the origins, history, and legacies of federal Indian law and policy during two hundred years of U.S. history. The evolution of U.S. constitutional law; political achievements of American Indian communities over the past four decades. HU

HIST 135b/ECON 182b, American Economic History Melinda Miller

For description see under Economics.

HIST 140a/HSHM 215a^G, Public Health in America, 1793–2000 Naomi Rogers

For description see under History of Science, Medicine, and Public Health.

HIST 141b/AMST 141b, The American West John Mack Faragher

The history of the American West as both frontier and region, real and imagined, from the first contacts between Indians and Europeans in the fifteenth century to the multicultural encounters of the contemporary Sunbelt. Students work with historical texts and images from Yale's Western Americana Collection. HU

HIST 143b/G&G 211b/HSHM 211b, Catastrophe and the Earth Sciences since 1850
William Rankin

For description see under History of Science, Medicine, and Public Health.

HIST 144a/AMST 176a/EVST 206a/HSHM 206a/HUMS 323a, Science and Technology in the United States Daniel Kevles

For description see under History of Science, Medicine, and Public Health.

HIST 152a/ARCH 385a/PLSC 279a/SOCY 149a, New Haven and the American City
Alan Plattus, Elihu Rubin

For description see under Political Science.

HIST 169b, Early National America Joanne Freeman

An introduction to America's first decades as a nation. Topics include the creation of a national politics, partisan conflict in the states and on a national level, the logistics of democratic politicking, and changes in American society and culture. HU PreInd

HIST 170a/AMST 270a, Women in America from the Colonial Period to 1900
Rebecca Tannenbaum

Survey of the history of women and gender roles from the English settlement of the North American coast to 1900. Emphasis on work and family roles, social and political movements, and regional, racial, and cultural variation. HU

HIST 183b/AMST 272b/ER&M 282b/WGSS 272b, Asian American History, 1800 to the Present Mary Lui

For description see under American Studies.

HIST 184a/AFAM 160a/AMST 160a, Slavery and Abolition in Atlantic History, 1500–1888 Edward Rugemer, Alejandra Dubcovsky

The history of peoples of African descent throughout the Americas, from the first African American societies of the sixteenth century through the century-long process of emancipation. HU

***HIST 187b/AFAM 162b/AMST 162b, African American History from Emancipation to the Present** Jonathan Holloway

For description see under African American Studies.

HIST 205a/CLCV 205a, Introduction to Ancient Greek History Donald Kagan

For description see under Classics. PreInd

HIST 210a/HUMS 380a, The Early Middle Ages, 284–1000 Anders Winroth

Major developments in the political, social, and religious history of western Europe from the accession of Diocletian to the feudal transformation. Topics include the conversion of Europe to Christianity, the fall of the Roman Empire, the rise of Islam and the Arabs, the “Dark Ages,” Charlemagne and the Carolingian renaissance, and the Viking and Hungarian invasions. HU PreInd

HIST 211b/HUMS 381b, The Birth of Europe, 1000–1500 Paul Freedman

Europe during the central and late Middle Ages, from the feudal revolution to the age of discoveries. Europe as it came to be defined in terms of national states and international empires. The rise and decline of papal power, church reform movements, the Crusades, contacts with Asia, the commercial revolution, and the culture of chivalry. HU PreInd

HIST 215b^G/HUMS 322b/RLST 283b, Reformation Europe, 1450–1650 Carlos Eire

Examination of a series of religious revolutions in Europe between 1400 and 1650. The causes and nature of the reformations that changed the religious, political, social, and economic landscapes of early modern Europe and shaped the course of Western civilization as a whole. HU PreInd

HIST 217a/CLCV 206a, Introduction to Roman History: The Republic

William Metcalf and staff

For description see under Classics. PreInd

HIST 218b/CLCV 207b, The Roman Empire John Matthews

For description see under Classics. PreInd

HIST 219a^G/ER&M 219a/JDST 200a^G/MMES 149a/RLST 148a^G, History of the Jews and Their Diasporas to Early Modern Times Ivan Marcus

A broad introduction to the history of the Jews from biblical beginnings until the European Reformation and the Ottoman Empire. Focus on the formative period of classical rabbinic Judaism and on the symbiotic relationships among Jews, Christians, and Muslims. Jewish society and culture in its biblical, rabbinic, and medieval settings. Counts toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies. HU RP PreInd

HIST 221a/GLBL 281a, Military History of the West since 1500 Paul Kennedy

A study of the military history of the West since 1500, with emphasis on the relationship between armies and navies on the one hand, and technology, economics, geography, and the rise of the modern nation-state on the other. The coming of airpower in its varied manifestations. Also meets requirements for the Air Force ROTC program. HU

***HIST 222a/JDST 263a^G/NELC 159a/WGSS 225a, Marriage and Kinship in Medieval Near East** Eve Krakowski

For description see under Judaic Studies.

HIST 226a^G/HUMS 422a/NELC 326a/RLST 158a^G, Jesus to Muhammad: Ancient Christianity to the Rise of Islam Stephen Davis

For description see under Religious Studies. PreInd

HIST 229a, Nineteenth-Century Britain Stuart Semmel

British politics, society, and culture in a period of constitutional reform, industrial development, social dislocation, imperial expansion, and cultural criticism. HU

HIST 231b, War in Germany, 1648–2010 J. Adam Tooze

The rise and fall of modern militarism in Germany. Individual battles, soldiers, and weapons discussed within a broader context of the justification and regulation of state violence. Germany as a European battlefield, and as a nation that has perhaps come closest to drawing a final, concluding line under its military history. HU

HIST 232b, British History since 1900 Jay Winter

A survey of twentieth-century British history. Imperialism, liberal reform, World Wars I and II, the rise of labor, family life, popular culture, the European question, Thatcher and Blair, national identity, and the debate over national decline. HU

HIST 234a/HSHM 235a, Epidemics and Society in the West since 1600

Frank Snowden

A study of the impact of epidemic diseases such as bubonic plague, cholera, malaria, and AIDS on society, public health, and the medical profession in comparative and international perspective. Topics include popular culture and mass hysteria, the mortality revolution, urban renewal and rebuilding, sanitation, the germ theory of disease, the emergence of scientific medicine, and debates over the biomedical model of disease. HU

HIST 237a/HUMS 285a/RSEE 390a/RUSS 241a, Russian Culture: The Modern Age

John MacKay, Paul Bushkovitch

For description see under Russian & East European Studies.

HIST 238b, Origins of the British Empire Steven Pincus

Exploration of why Britain was able to transform itself during the seventeenth and eighteenth centuries from a minor offshore archipelago into the world's greatest power. Focus on changes both within Britain and in North America, the West Indies, and South Asia. The British Empire situated in relation to other empires; the virtually simultaneous creation of a British Empire in India and loss of an empire in North America; the American Revolution as part of a British imperial crisis. HU PreInd

HIST 246a, Food and Cuisine Paul Freedman

The history of food and culinary styles from prehistory to the present, with a particular focus on Europe and the United States. How societies gathered and prepared food. Changing taste preferences over time. The influence of consumers on trade, colonization, and cultural exchange. The impact of colonialism, technology, and globalization. The current food scene and its implications for health, the environment, and cultural shifts. HU

HIST 251a, Early Modern England: Politics, Religion, and Society under the Tudors and Stuarts Keith Wrightson

An introduction to the development of English society in the sixteenth and seventeenth centuries—a period of social, political, economic, and cultural transition, and one that

provided the immediate context of early British settlement in North America and the literature of the English Renaissance. HU PreInd

HIST 255b, The Experience of War in the Twentieth Century Bruno Cabanes

An overview of the history of war in the modern era. Examination of the actors, forms of violence, ideological stakes, and memories of modern war. Topics include World Wars I and II, the experience of captivity, the Vietnam War and the culture of trauma, women at war, and genocide and ethnic cleansing. HU

HIST 261a/PLSC 176a, The Cold War John Gaddis

The Cold War from beginning to end, viewed from the perspective of all its major participants, with emphasis on recently released Soviet, East European, and Chinese sources. Counts toward either European or U.S. distributional credit within the History major, upon application to the director of undergraduate studies. HU, SO

HIST 263a, Eastern Europe to 1914 Timothy Snyder

Eastern Europe from the medieval state to the rise of modern nationalism. The Ottoman Empire, the Polish-Lithuanian Commonwealth, the Hapsburg monarchy, and various native currents. Themes include religious diversity, the constitution of empire, and the emergence of secular political ideologies. HU

HIST 264b, Eastern Europe since 1914 Timothy Snyder

Eastern Europe from the collapse of the old imperial order to the enlargement of the European Union. Main themes include world war, nationalism, fascism, and communism. Special attention to the structural weaknesses of interwar nation-states and postwar communist regimes. Nazi and Soviet occupation as an age of extremes. The collapse of communism. Communism after 1989 and the dissolution of Yugoslavia in the 1990s as parallel European trajectories. HU

HIST 269b^c/JDST 286b^c/RLST 230b^c, Holocaust in Historical Perspective

Marc Saperstein

A survey of the major historical issues raised by the Holocaust, including the roots of Nazism; different theoretical perspectives and ways of accounting for genocide; the behavior of perpetrators, victims, and bystanders; and problems of representation. HU

HIST 273a, Europe in the Age of Total War, 1914–1945 Jay Winter

A survey of European history that addresses the two world wars and the transformation of European society and culture between 1914 and 1945. HU

HIST 275a, Revolutionary France, 1789–1871 John Merriman

Dimensions of political, social, and economic change in France during its most turbulent period. The causes and impact of the revolutions of 1789, 1830, 1848, and 1871; demographic change and large-scale industrialization; shifting political elites, republican and socialist alternatives to monarchy, and urbanization. HU

HIST 276b, France since 1871 John Merriman

The emergence of modern France since the Paris Commune of 1871 and the beginnings of the Third Republic. The social, economic, political, and cultural transformation of France; the impact of France's revolutionary heritage, of industrialization, and of the dislocation wrought by two world wars and decolonialization; and the political response of the Left

and the Right to changing French society, including the impact of immigration and the emergence and challenges of the European Union. One discussion section conducted in French; students in this section may count the course toward the French major. HU

HIST 281a/HUMS 228a/RLST 268a^c, Christian Mysticism, 1200–1700 Carlos Eire
For description see under Religious Studies. PreInd

HIST 303a, Japan's Modern Revolution Daniel Botsman
A survey of Japan's transformation over the course of the nineteenth century from an isolated, traditional society on the edge of northeast Asia to a modern imperial power. Aspects of political, social, and cultural history. HU

HIST 307b, The Making of Japan's Great Peace, 1550–1850 Fabian Drixler
Examination of how, after centuries of war in Japan and overseas, the Tokugawa shogunate built a peace that lasted more than 200 years. Japan's urban revolution, the eradication of Christianity, the Japanese discovery of Europe, and the question of whether Tokugawa Japan is a rare example of a complex and populous society that achieved ecological sustainability. HU PreInd

***HIST 308a/CHNS 251a/ER&M 304a/HUMS 448a/LITR 265a, China in the World**
Jing Tsu
For description see under East Asian Languages & Literatures.

HIST 315a/HUMS 421a, History of Traditional China to 1600 Valerie Hansen
A survey of Chinese history from the introduction of oracle bone writing in c. 1200 B.C. to A.D. 1600, and the effects of the discovery of the New World on China. Use of philosophical, religious, and literary texts in translation as well as archaeological and art-historical evidence. WR, HU PreInd

HIST 316b/EAST 320b, History of China, 1550 to the Present Peter Perdue
Fall of the Ming and rise of the Qing dynasty. Political, economic, and cultural changes in China compared to those in East Asia and the rest of the world. China's first Republic and the impact of foreign imperialism and communism. The People's Republic of China under Mao Zedong and Deng Xiaoping; Taiwan from Chiang Kai-shek to the independence movement. Globalization, environmental stress, and human rights issues in historical perspective. HU

HIST 323b, Southeast Asia since 1900 Benedict Kiernan
Comparative colonialism, nationalism, revolution, and independence in modern Southeast Asia. Topics include Indonesia and the Dutch, Indochina under French rule, the United States in the Philippines and Vietnam, Buddhism in Burma and Thailand, communist and peasant movements, and the Cambodian revolution and its regional repercussions. HU

HIST 340a/AFST 340a, Africa in the Era of the Slave Trade Robert Harms
Examination of the tumultuous changes experienced by African societies during the era of the Atlantic slave trade, approximately 1450–1850. Focus on the complex interaction between the internal dynamics of African societies and the impact of outside forces. HU PreInd

HIST 344b, The Ottoman, Safavid, and Mughal Empires Gagan Sood

History of the Ottoman, Safavid, and Mughal empires, and the plural, Islamicate societies over which they claimed sovereignty, from their origins to their decline and dissolution. Focus on the formation and character of the imperial polities. HU PreInd

HIST 348b^c/MMES 441b, Empire, Nationalism, and Revolution in the Modern

Middle East Abbas Amanat

A survey of the Middle East and its transformation from the age of Islamic empires to modern nation-states; the political, economic, and cultural challenge of the West; nationalism, ideology, and autocracy in the Arab world, Iran, and Turkey; religion, modernity, and social protest; the Arab-Israeli conflict and the United States; the Islamic revolution; and ethnicity, gender, and identity in the contemporary Middle East. HU

HIST 360a/MMES 171a/NELC 402a, The Islamic Near East from Muhammad to the Mongol Invasion Adel Allouche

For description see under Near Eastern Languages & Civilizations. PreInd

HIST 361a/LAST 361a, History of Brazil Stuart Schwartz

Brazilian history from European contact to the reestablishment of civilian government in the 1990s. Focus on the multiethnic nature of Brazilian society, the formation of social and political patterns, and the relationship of people to the environment. HU

DEPARTMENTAL SEMINARS

Juniors majoring in History must take at least two departmental seminars from two different geographical areas. Seminars on the history of the United States or Canada are numbered 100J to 199J; seminars on Britain and Europe are 200J to 299J; and seminars numbered 300J to 399J cover the rest of the world. Seminars numbered in the 400s address global topics; students must apply to the director of undergraduate studies in History to count a 400-level seminar toward a particular geographical distribution category. Each departmental seminar aims to acquaint students in a substantial and professional way with the literature of a period in history; to train them as far as possible in the use of primary source materials; to introduce them to problems of bibliography, historiography, and historical method; and to give them training in the writing of history. The relative importance of these objectives in any particular seminar depends on its subject matter, the previous preparation of its students, and the availability of materials.

Each term prospective junior History majors should apply for departmental seminars for the following term using the online seminar preregistration site. Preregistration begins after midterm in the fall for seminars offered in the spring term, and after spring recess for seminars offered in the subsequent fall term. Accelerated students holding junior status must notify the undergraduate History administrator in 237 HGS, 432-1359, by October 12 in the fall and by March 22 in the spring in order to be eligible to preregister for the following term's seminars. All students who wish to preregister must declare their major beforehand.

In September and in January, application for admission should be made directly to the instructors of the seminars, who will admit students to remaining vacancies in their seminars. Priority is given to applications from juniors, then seniors, majoring in History, but

applications are also accepted from qualified sophomores and from students majoring in other disciplines or programs. The department seeks wherever possible to accommodate students' preferences; for their part, students should recognize that limitations imposed by the size of seminars (normally fifteen students) make accommodation impossible in some instances. HIST 494 and residential college seminars that count toward the History major do not fulfill the departmental seminar requirement.

***HIST 109Ja/AMST 421a/ER&M 421a, The American Gulf Coast** Ryan Brasseaux
For description see under American Studies.

***HIST 115Ja/AFAM 349a/AMST 326a/WGSS 388a, Civil Rights and Women's Liberation** Crystal Feimster
For description see under African American Studies.

***HIST 117Jb, Refuge, Racism, and Religion in African Canadian History**
Karolyn Smardz Frost

The discovery, public memory, and commemoration of African Canadian history from the seventeenth century to the present. Enslavement under the French, First Nations, and British; the Underground Railroad; later migrations from the United States, the Caribbean, and sub-Saharan Africa. HU PreInd

***HIST 118Jb, History of Communication in America to 1790** Alejandra Dubcovsky
The role of communication in the history of early America, from Native American networks of trade and kinship, through the growth of America from the sixteenth through late eighteenth centuries, to the American Revolution and the development of the postal system. HU PreInd

***HIST 121Ja, Nationalism in U.S. Culture** Samuel Schaffer
Nationalism in American politics and culture from the early republic to the present. Topics include national identity and patriotism, the cult of George Washington, Manifest Destiny, Confederate and Union nationalism, world's fairs and imperialism, the Pledge of Allegiance, civil religion, assimilation, black nationalism, tourism, war monuments, and sports. HU

***HIST 123Ja, The Underground Railroad in African Canadian History**
Karolyn Smardz Frost

Canada's role as the main terminus of the Underground Railroad. Types of available evidence for exploring the history of the Underground Railroad, including genealogical and archaeological sources. Ways to identify, analyze, and interpret evidence for the African Canadian past. HU PreInd

***HIST 125Jb/AMST 456b, Making America Modern, 1880–1930**
Jean-Christophe Agnew

For description see under American Studies.

***HIST 126Ja/RLST 260a, Religion, War, and America** Harry Stout
For description see under Religious Studies.

***HIST 127Jb/WGSS 427b, Witchcraft in Colonial America** Rebecca Tannenbaum
The social, religious, economic, and gender history of British North America as manifested through witchcraft beliefs and trials. WR, HU PreInd

***HIST 128Jb/AMST 303b/RLST 307b, Classic American Histories** Harry Stout

For description see under Religious Studies.

***HIST 129Ja, Capitalism, Class, and Power in the Twentieth-Century United States**

Jennifer Klein

The development of U.S. capitalism from the late nineteenth to the twenty-first century. The roles of regionalism, race, and class power; effects of politics and government regulation; the continuum of free and coerced labor; indigenous communities; labor movements; the environment; ongoing struggles with the state. HU

***HIST 130Ja, Disasters in America** Andrew Horowitz

The political, social, cultural, economic, and environmental history of calamitous events, with a focus on the United States since the Civil War. The roles of government and community in the recovery process. Development of historical interpretation and writing skills. HU

***HIST 131Jb, Urban History in the United States, 1870 to the Present** Jennifer Klein

The history of work, leisure, consumption, and housing in American cities. Topics include immigration, formation and re-formation of ethnic communities, the segregation of cities along the lines of class and race, labor organizing, the impact of federal policy, the growth of suburbs, the War on Poverty and Reaganism, and post-Katrina New Orleans. WR, HU

***HIST 133Jb, The Creation of the American Politician, 1789–1820** Joanne Freeman

The creation of an American style of politics: ideas, political practices, and self-perceptions of America's first national politicians. Topics include national identity, the birth of national political parties, methods of political combat, early American journalism, changing conceptions of leadership and citizenship, and the evolving political culture of the early republic. WR, HU PreInd

***HIST 134Ja, Yale and America: Selected Topics in Social and Cultural History**

Jay Gitlin

Relations between Yale and Yale people – from Ezra Stiles and Noah Webster to Cole Porter, Henry Roe Cloud, and Maya Lin – and American society and culture. Elihu Yale and the global eighteenth century; Benjamin Silliman and the emergence of American science; Walter Camp, Dink Stover, and the all-American boy; Henry Luce and the information age; faith and ideology in postwar Yale and America. WR, HU RP

***HIST 135Ja, The Age of Hamilton and Jefferson** Joanne Freeman

The culture and politics of the revolutionary and early national periods of American history, using the lives, ideas, and writings of Thomas Jefferson and Alexander Hamilton as a starting point. Topics include partisan conflict, political culture, nation building, the American character, and domestic life. WR, HU PreInd

***HIST 139Jb, The American South, 1870 to the Present** Glenda Gilmore

A thematic approach to the history of the American South since Reconstruction. Focus on the political, social, and cultural history of a region that has undergone dramatic change. Topics include white supremacy and African American resistance; industrialization and labor activism; music and literature; the civil rights movement and the rise of the Republican South; and changing regional identity. HU

***HIST 140Ja/HSBM 422a, Cartography, Territory, and Identity** William Rankin
For description see under History of Science, Medicine, and Public Health.

***HIST 145Ja/HSBM 413a, Medical Imaging since 1895** Bettyann Kevles
For description see under History of Science, Medicine, and Public Health.

***HIST 148Ja/HSBM 455a/HUMS 312a/WGSS 460a, History of the Body: Science, Medicine, and the Arts** Paola Bertucci, Courtney Thompson
For description see under History of Science, Medicine, and Public Health.

***HIST 151Jb/HSBM 448b/WGSS 448b, American Medicine and the Cold War**
Naomi Rogers
For description see under History of Science, Medicine, and Public Health.

***HIST 155Ja/AMST 325a/ER&M 322a, Natives and Newcomers in Early America**
Alyssa Mt. Pleasant
For description see under American Studies. PreInd

***HIST 156Jb/AMST 422b/ER&M 307b, Writing Tribal Histories** Ned Blackhawk
Historical overview of American Indian tribal communities, particularly since the creation of the United States. Challenges of working with oral histories, government documents, and missionary records. WR, HU

***HIST 159Jb/HSBM 459b/HUMS 317b, Spies, Secrets, and Science** Paola Bertucci
For description see under History of Science, Medicine, and Public Health.

***HIST 161Jb, Communism and Anticommunism in the Twentieth-Century United States** Beverly Gage
The intertwined histories of domestic communism and anticommunism in the twentieth-century United States. Topics include McCarthyism, the communist relationship with the Soviet Union, civil liberties, Cold War culture, and communist activism. Focus on connections between foreign policy and domestic political culture, the effect of anticommunism on political and social reform movements, and questions of American exceptionalism. WR, HU

***HIST 163Jb/AMST 409b/ER&M 447b, Northeastern Native America, 1850 to the Present** Alyssa Mt. Pleasant
For description see under American Studies.

***HIST 168Jb, Quebec and Canada from 1791 to the Present** Jay Gitlin
The history of Quebec and its place within Canada from the Constitutional Act of 1791 to the present. Topics include the Rebellion of 1837, confederation, the Riel Affair, industrialization and emigration to New England, French-Canadian nationalism and culture from Abbé Groulx to the Parti Québécois and Céline Dion, and the politics of language. Readings include plays by Michel Tremblay and Antonine Maillet (in translation). WR, HU

***HIST 180Jb/EVST 443b, Energy in American History** Paul Sabin
Energy in U.S. history since the late nineteenth century, including fossil fuel, nuclear, hydroelectric, and renewable energy. Topics include the global quest for resources; changing national energy policies; relations between companies, workers, and communities; and political resistance to energy projects. Social, cultural, economic, and environmental transformations associated with energy production and consumption. WR, HU

- ***HIST 185Ja/AMST 404a/ER&M 348a, Latina/o Histories** Stephen Pitti
For description see under Ethnicity, Race, & Migration.
- ***HIST 200Ja^c/CLCV 406a, Athenian Imperial Democracy** Donald Kagan
For description see under Classics. PreInd
- ***HIST 201Ja/CLSS 444a^c, Documents of Roman History** William Metcalf
For description see under Classics.
- ***HIST 202Ja or Jb/CLSS 445a or b, Numismatics** William Metcalf
For description see under Classics.
- ***HIST 205Ja/MGRK 230a, Greece in the Twentieth Century** Konstantina Maragkou, Eirini Karamouzi
For description see under Hellenic Studies.
- ***HIST 206Jb, Cross-Cultural Middle Ages** Paul Freedman, Kristina Hosoe
The collisions and collaborations of different peoples in Europe and beyond between A.D. 400 and 1500. Focus on ways in which different medieval cultures interacted with and influenced each other through trade, military invasion, and religious conversion. HU
PreInd
- ***HIST 207Jb/CLCV 407b, Thucydides and the Peloponnesian War** Donald Kagan
For description see under Classics. PreInd
- ***HIST 215Jb, The Art of Biography** John Gaddis
A comparative examination of successful as well as unsuccessful biographies, intended to identify both principles and pitfalls. WR, HU
- ***HIST 220Ja, Grand Strategy and the Origins of the Second World War**
Paul Kennedy
A survey of the most important literature and debates concerning the coming of the Second World War in both Europe and the Pacific. Emphasis on the comparative approach to international history and on the interplay of domestic politics, economics, and strategy. Counts toward only European distributional credit within the History major. WR, HU RP
- ***HIST 221Ja, Memoirs of Twentieth-Century Europe** Laura Engelstein
Exploration of how men and women of twentieth-century Europe (including Russia) made sense of their lives in the context of war, revolution, and cultural conflict. Focus on first-person narratives, some by professional writers, others by ordinary people searching for personal and cultural identity. WR, HU
- ***HIST 222Jb, Russia and the Eurasian Steppe** Paul Bushkovitch
A study of Russia's interaction with the nomads of the Eurasian steppe. Topics include the Mongol invasion, the Mongol Empire in Asia and the Golden Horde, Islam, nomadic society, and the Russian state. Focus on conquest and settlement. May count toward either European or Asian distributional credit within the History major, upon application to the director of undergraduate studies. WR, HU PreInd
- ***HIST 223Ja, The Cultural History of the First World War** Bruno Cabanes
A survey of the cultural history of World War I. Topics include violence and its impact on soldiers and civilians, shell shock, women at war, literature and cinema, mourning, and memory. WR, HU

***HIST 224Jb, Europe and Empire, 1815–1991** Amanda Behm

European overseas expansion and colonial relationships in the nineteenth and twentieth centuries. Focus on British, French, Dutch, and German imperialism. Ideologies, strategies, and technologies that shaped the interactions of colonizers, settlers, and colonized populations; reasons why empires ended. HU

***HIST 232Ja/HUMS 443a/JDST 270a/MMES 342a/RLST 201a, Medieval Jews, Christians, and Muslims Imagining Each Other** Ivan Marcus

How members of Jewish, Christian, and Muslim communities thought of and interacted with members of the other two cultures during the Middle Ages. Cultural grids and expectations each imposed on the other; the rhetoric of otherness – humans or devils, purity or impurity, and animal imagery; and models of religious community and power in dealing with the other when confronted with cultural differences. May count toward either European or Middle Eastern distributional credit within the History major, upon application to the director of undergraduate studies. WR, HU RP PreInd

***HIST 234Jb, The First World War** Jay Winter

A survey of recent historical interpretations of the military, social, and cultural history of the war of 1914–18. WR, HU

***HIST 235Jb/HUMS 331b, Existentialism and Dissent** Marci Shore

Intellectual history of twentieth-century Europe, focusing on existentialist philosophy and its confrontation with Marxism in theory and with communist regimes in practice. WR, HU

***HIST 239Jb/MGRK 228b/MMES 143b, Twentieth-Century Greek-Turkish Relations**

Konstantina Maragkou

For description see under Hellenic Studies.

***HIST 245Ja, Decolonization in the Twentieth Century** Ryan Irwin

The growth and ideologies of modern imperialism, the patterns and nature of anticolonial protest, and the process and paradox of decolonization. French, British, and Belgian colonization in Africa; European and African reactions to the effects of imperialism; the growth of anticolonial nationalism; the impact of the Cold War; causes of decolonization. May count toward either European or African distributional credit within the History major, upon application to the director of undergraduate studies. WR, HU RP

***HIST 246Jb, Small Wars in the Age of Empire** Ryan Irwin

The “small wars” of empire in the late nineteenth and early twentieth centuries. British, French, American, and Russian imperialism; military challenges faced by the empires in Asia and Africa. Examination of the causes, means, methods, and results of these encounters. WR, HU

***HIST 251Ja/MGRK 226a, History of European Integration** Konstantina Maragkou, Eirini Karamouzi

For description see under Hellenic Studies.

***HIST 253Ja/LAST 253a, Dissidence and Control in Hapsburg Spain and Its New World Empire** María Jordán

Aspects of Spanish culture and society in the Golden Age (c. 1550–1650) that demonstrate discontent, dissidence, and suggestions for reform. Emphasis on the intersection

of historical and literary sources and the dynamic between popular and elite cultures. WR, HU PreInd

***HIST 255Jb, London and Modernity, 1880 to the Present** Becky Conekin

Aspects of modernity and the changing character of London as a metropolitan center from the late nineteenth century to the present. Social and economic development of the city, urban cultures, historical geography, sexuality, and the imperial and postimperial metropolis. WR, HU

***HIST 280Jb, Britain under George III** Stuart Semmel

British political culture in the age of the American and French revolutions. Topics include radicalism, loyalism, popular culture, print culture, gender, and nation. WR, HU PreInd

***HIST 300Jb, Islam in China** Valerie Hansen

The history of Islam in China, focusing on Gansu and Xinjiang in the northwest, from the earliest evidence of Muslims in the seventh and eighth centuries to the modern era. Emphasis on the analysis of primary sources in English. WR, HU RP

***HIST 310Ja, Visualizing Asia** Peter Perdue

Discussion of interactions between East Asia and Western countries in the modern period, using visual and textual sources. Images produced in East Asia and the West that portray international trade, war, social life, customs, and culture. How the societies imagined each other; political and economic effects of graphic media. Prerequisite: a course in Asian history. WR, HU

***HIST 311Jb/EAST 425b, Shanghai and the Chinese Century** Di Yin Lu

For description see under East Asian Studies.

***HIST 313Jb/EAST 427b, The Variety of Food Histories in East Asia** Akira Shimizu

For description see under East Asian Studies.

***HIST 318Ja/SAST 325a, Modern Indian History** Shailaja Paik

For description see under South Asian Studies.

***HIST 319Jb/FILM 313b/SAST 324b, India on Film** Shailaja Paik

For description see under South Asian Studies.

***HIST 327Ja, Navigating Life in Nineteenth-Century Japan** Fabian Drixler

A study of the joys and sorrows of life in nineteenth-century Japan. Topics include finding a mate, becoming a parent, making and keeping friends, seeing the world, and coping with bereavement. WR, HU

***HIST 346Ja^G/AFST 332a, Africa after Colonialism** Daniel Magaziner

Comparative analysis of decolonization and postcolonial states in selected African countries. Topics include negritude, Pan-Africanism, artistic approaches to the postcolonial experience, religious revival and cultural politics, and the global Cold War. HU

***HIST 347Ja^G/MMES 442a, From the Great Game to the Great Satan** Abbas Amanat

Encounters of Iran and its neighbors with Britain, Russia, and the United States since the nineteenth century. Special attention to Western imperial interests in the region and to indigenous forms of resistance to imperial hegemony. Topics include travel, diplomacy, war and hegemony, postcolonial sovereignty, the Cold War and regional power, and the Islamic Republic's demonizing of America. WR, HU

HIST 348Jb^c, Myth and Memory in the Persian *Book of Kings Abbas Amanat
Examination of Ferdowsi's *Shahnameh*, one of the greatest epic tragedies of all time, with emphasis on six major stories. Exploration of Persian political culture and historical memories over the course of a millennium since the work's composition. Discussion in English; texts available in English or in the original Persian. HU PreInd

***HIST 349Ja^c/AFST 331a, South African Apartheid and Its Afterlives**

Daniel Magaziner

Comparative study of South Africa's past and present, with a focus on apartheid's history and the ways in which it continues to affect the lives, livelihoods, and fates of South Africans today. Topics include economics, science, literary culture, violence, and memory. HU

***HIST 356Ja/SOCY 356a, History, Sociology, and Grand Narratives** Gagan Sood

For description see under Sociology.

***HIST 358Jb/ER&M 270b/LAST 356b, History of Mexico since Independence**

Gilbert Joseph

Modern Mexico from the wars of independence in the early nineteenth century to the present. Social, cultural, and economic trends and their relationship to political movements; particular emphasis on the Revolution of 1910 and the long shadow it has cast, and on patterns of relations with the United States. HU

***HIST 369Jb, Modern Caribbean History** Jennifer Lambe

Political and social history of the Caribbean region. Incursions from the outside world across time; the historical evolution of oppositional and radical currents within the Caribbean, such as anti-imperialism, radicalism, transnationalism, Marxism, and Pan-Africanism. Cuba, Jamaica, and Haiti as case studies. HU

***HIST 372Ja/ER&M 342a/LAST 372a, Revolutionary Change and Cold War in Latin America** Gilbert Joseph

Analysis of revolutionary movements in Latin America against the backdrop of the Cold War. Critical examination of popular images and orthodox interpretations. An interdisciplinary study of the process of revolutionary change and cold war at the grassroots level. WR, HU

***HIST 374Jb, The Confucian Tradition** Annping Chin

The sources, development, and practice of Confucian thought from the fifth century B.C.E. to the present. The relationship of Confucian-style scholarship to Chinese legal thought; Confucian learning and the institutionalization of education; rites and family relationships; reform thinking and reevaluation of the tradition; and the writing of history. HU PreInd

***HIST 384Jb/MMES 172b/NELC 403b, The Middle East between Crusaders and Mongols** Adel Allouche

The impact of the Crusades and the Mongol conquests on the Islamic Middle East. Political, social, and economic changes in the region from the eleventh century to the middle of the fourteenth. Emphasis on the rise of new dynasties as a result of changes in the ethnic mosaic of the Middle East. WR, HU PreInd

HIST 387Ja/AFST 487a, West African Islam: Jihad Tradition and Its Pacifist*Opponents** Lamin Sanneh

The impact of Islam on state and society, and the encounters of Muslim Africans first with non-Muslim societies in Africa and then with the modern West in the colonial and postcolonial periods. Focus on Muslim religious attitudes and responses to the secular national state and to the Western tradition of the separation of church and state. WR, HU

***HIST 398Jb/MMES 173b/NELC 404b, Mamluk Egypt** Adel Allouche

A study of the Mamluks, manumitted slaves initially imported to Egypt for military service who established their own rule over Egypt and Syria (1250–1517). Focus on the structure and workings of the Mamluk state. Military, political, economic, and social factors that contributed to the grandeur and, later, the decline of the Mamluk period in Egypt and its conquest by the Ottoman Turks. WR, HU PreInd

***HIST 411Jb, The Global 1960s** Jenifer Van Vleck

A comparative, transnational study of the social, political, and cultural upheavals that occurred during the 1960s, including decolonization, the African American freedom struggle, the Prague Spring, China's Cultural Revolution, and protest movements in the United States, eastern and western Europe, and Latin America. The "other" side of the 1960s—a decade that ended with the presidency of Richard Nixon and the ascendance of conservative regimes in numerous Western countries—and its representation in contemporary culture. May count toward geographical distributional credit within the History major for any region studied, upon application to the director of undergraduate studies. WR, HU

***HIST 415Ja/AMST 318a, Perspectives on World Poverty** Joanne Meyerowitz

Large-scale plans to end world poverty from 1960 to the present, from modernization to microcredit. Topics include the green revolution, population control, the "women in development" movement, and the New International Economic Order. Extensive work with primary sources. May count toward geographical distributional credit within the History major for any region studied, upon application to the director of undergraduate studies. HU

***HIST 425Jb, From White Slavery to Sex Trafficking** Jessica Pliley

The globalized migration of sex workers, from the origins of the anti-white slavery movement in the late nineteenth century to contemporary debates about sex work and sex trafficking. Focus on the United States in a transnational context. Questions of consent, coercion, agency, sexual recreation, gendered marketplaces, empire, and state policy. HU

***HIST 435Jb/HSBM 437b^c, The Global Crisis of Malaria** Frank Snowden

For description see under History of Science, Medicine, and Public Health.

WRITING TUTORIAL AND SENIOR ESSAY COURSES***HIST 494a or b, Individual Writing Tutorial** Steven Pincus

For students who wish, under the supervision of a member of the faculty, to investigate an area of history not covered by regular departmental offerings. The course may be used for research or for directed reading. It is normally taken only once. The emphasis of the tutorial is on writing a long essay or several short ones. To apply for admission, a student

should present the following materials to the director of undergraduate studies on the Friday before schedules are due: a prospectus of the work proposed, a bibliography, and a letter of support from the member of the faculty who will direct the tutorial. A form to simplify this process is available from the office of the director of undergraduate studies.

***HIST 495a or b and 496a or b, The Senior Essay** Robert Harms

There will be a mandatory senior essay meeting on Monday, September 3, 2012, in 114 SSS at 4 p.m.

Preparation of the required senior departmental essay under the supervision of a member of the faculty. Students expecting to graduate in May enroll in HIST 495a during the fall term and complete their essays in HIST 496b in the spring term. December graduates enroll in HIST 495b in the spring term and complete their essays in HIST 496a during the following fall term. Students planning to begin their essay in the second term should notify the senior essay director by December 7, 2012. Each student majoring in History must present a completed Statement of Intention, signed by a department member who has agreed to serve as adviser, to the undergraduate History administrator in 237 HGS no later than September 14, 2012 (for HIST 495a), or January 14, 2013 (for 495b). Blank statement forms are available in 237 HGS before the end of a student's junior year, and thereafter in the Senior Essay handbook. Students writing a senior essay must attend a library workshop for historians (www.library.yale.edu/instruction/hist). Students enrolled in HIST 495 submit to their advisers a prospectus of the essay and an annotated bibliography during the course of the term, and at least ten pages of the essay or a detailed outline of the entire project by December 3, 2012 (495a), or May 1, 2013 (495b). Those who meet these requirements receive a temporary grade of SAT, which will be changed to the grade received by the essay upon its completion. Failure to meet any requirement may result in the student's being asked to withdraw from HIST 495.

Students enrolled in HIST 496 must submit a completed essay to 211 HGS no later than 5 p.m. on April 1, 2013, in the spring term, or no later than 5 p.m. on December 3, 2012, in the fall term. Essays submitted after 5 p.m. will be considered as having been turned in on the following day. If the essay is submitted late without an excuse from the student's residential college dean, the penalty is one letter grade for the first day and one-half letter grade for each of the next two days past the deadline. No essay that would otherwise pass will be failed because it is late, but late essays will not be considered for departmental or Yale College prizes. All senior departmental essays will be judged by members of the faculty other than the adviser. In order to graduate from Yale College, a student majoring in History must achieve a passing grade on the departmental essay.

The essays should take the form of substantial articles, not longer than 12,500 words (approximately forty double-spaced typewritten pages), with the total word count given at the end of the essay. This is a maximum limit; there is no minimum requirement. Length will vary according to the topic and the historical techniques employed. Essays generally run between 10,000 and 12,500 words. The limitation on length is regarded as important because precision, clarity, and conciseness are essential to good historical writing. A brief evaluation of major sources is required. Consult the director of the senior essay course for details.

GRADUATE AND PROFESSIONAL SCHOOL COURSES OF INTEREST TO UNDERGRADUATES

Some graduate and professional school courses are open to qualified undergraduates with permission of the instructor and the director of graduate studies. (See chapter II, section K, for the number of such courses that students may offer toward the degree.) Course descriptions may be obtained from the office of the director of graduate studies.

History of Art

Director of undergraduate studies: Mimi Yiengpruksawan, 653 LORIA, 432-2682, mimi.yiengpruksawan@yale.edu; arthistory.yale.edu

FACULTY OF THE DEPARTMENT OF HISTORY OF ART

Professors Brian Allen (*Adjunct*), Carol Armstrong, Tim Barringer, Edward Cooke, Jr., David Joselit, Diana Kleiner, Kobena Mercer, Amy Meyers (*Adjunct*), Mary Miller, Robert Nelson, Jock Reynolds (*Adjunct*), Vincent Scully (*Emeritus*), Robert Thompson, Christopher Wood, Mimi Yiengpruksawan

Associate Professor Milette Gaifman

Assistant Professors J. D. Connor, Erica James, Jacqueline Jung, Joost Keizer, Kishwar Rizvi, Tamara Sears, Sebastian Zeidler

Lecturers Theresa Fairbanks-Harris, Jennifer Farrell, Karen Foster, Imogen Hart, Eleanor Hughes, Patricia Kane, Ian McClure, Barbara Mundy, Margaret Olin, Mollen Theodore, David Sensabaugh, Scott Wilcox

Art history is the study of all forms of art, architecture, and visual culture in their social and historical contexts. The History of Art major can serve either as a general program in the humanities or as the groundwork for more specialized training. Unless otherwise indicated, all courses in History of Art are open to all students in Yale College.

Requirements of the major Beginning with the Class of 2014, all majors must take two 100-level courses. Majors in the Class of 2013 are required to take one 100-level course. These are broad introductory surveys of the European, American, pre-Columbian, African, and Asian traditions. Prospective majors are encouraged to take the surveys as early in their course of study as possible. Students who have taken the Advanced Placement test in art history may be able to receive acceleration credit and should consult the director of undergraduate studies. Students are also required to take two seminars in History of Art, advanced courses numbered 402–497. (HSAR 498 and 499 are not considered seminars.) All majors must take HSAR 401, *Critical Approaches to Art History*, during either the fall or the spring term of the junior year.

Intermediate courses, usually lecture courses, are numbered 200–399. Majors must take at least one 200-, 300-, or 400-level course in each of the following four areas: (1) African, African American, Native American, pre-Columbian, Islamic, and Asian; (2) ancient and medieval; (3) Renaissance, baroque, and eighteenth century; (4) nineteenth- and

twentieth-century European and American. Students may propose an alternative distribution in the African, Asian, or pre-Columbian traditions. History of Art majors are encouraged to take a course in studio art, which may count toward the major.

On graduation, the student must have no fewer than twelve course credits in History of Art. Under certain circumstances, and only with permission of the director of undergraduate studies, two of the twelve courses may be taken in other departments. Normally, these substituted courses address subjects closely linked to art history, for instance, archaeology, history of religion, aesthetics, or visual culture. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

History of Art majors are urged to study foreign languages. Students considering graduate work should discuss with their advisers the appropriate language training for their field of interest. In history of art, students have traditionally taken German as the primary entry language for graduate study, but other languages may be equally necessary depending on area of specialization.

Senior essay The senior essay is a research paper written usually in one term (HSAR 499). Students choose their own topics, which may derive from research done in an earlier course. The essay is planned during the previous term in consultation with a qualified instructor or with the director of undergraduate studies. It is also possible to write a two-term senior essay, with permission of the director of undergraduate studies. Students wishing to write a two-term essay must submit a petition to the director of undergraduate studies and the prospective adviser, normally by the first week after spring break of the junior year.

Procedures The schedules of all majors must be approved and signed by the director of undergraduate studies. Students may consult the following members of the faculty about the major:

BK, K. Rizvi	MC, to be announced
BR, M. Gaifman	PC, D. Kleiner
CC, C. Wood	SY, M. Miller
DC, E. Cooke	SM, S. Zeidler
TD, R. Thompson	ES, M. Yiengpruksawan
JE, T. Sears	TC, T. Barringer

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 course credits

Distribution of courses *Class of 2014 and subsequent classes*—2 courses at 100 level; *Class of 2013*—1 course at 100 level; *All classes*—2 sems numbered 402–497; at least 1 course at 200, 300, or 400 level in each of 4 areas; 1 studio art course recommended

Specific course required HSAR 401

Substitution permitted With DUS permission, 2 related courses from other depts

Senior requirement Senior essay (HSAR 499)

HSAR 110b, Introduction to the History of Art: Global Decorative Arts

Edward Cooke, Jr.

Global history of the decorative arts from antiquity to the present. The materials and techniques of ceramics, textiles, metals, furniture, and glass. Consideration of forms, imagery, decoration, and workmanship. Themes linking geography and time, such as trade and exchange, simulation, identity, and symbolic value. HU

HSAR 112a, Introduction to the History of Art: Prehistory to the Renaissance

Milette Gaifman, Jacqueline Jung

Form as meaning in architecture, sculpture, and painting. Selected studies in these arts from prehistory to the Renaissance. Source readings in translation. HU

HSAR 142a/RLST 187a, Introduction to the History of Art: The Classical Buddhist**World** Mimi Yiengpruksawan

Buddhist art and architecture of India, Pakistan, Afghanistan, and Central Asia from earliest beginnings to the tenth century, and including Greco-Roman, Persian, and Islamic contact. HU

HSAR 143b/RLST 188b, Introduction to the History of Art: Buddhist Art and Architecture, 900 to 1600 Mimi Yiengpruksawan

Buddhist art and architecture of East Asia, Southeast Asia, and Tibet from the tenth century to the early modern period. Emphasis on cross-regional engagements including the impact of Islam. HU

HSAR 203b, Western Art and Science Carol Armstrong

Historical overview of the relationship between art and science in Europe and the United States from the Renaissance to the present. Comparison of the ways in which artists and scientists model the world according to the means and traditions at their disposal. Art and science as rival forms of knowledge about the physical world. HU

HSAR 221b/HUMS 220b/RUSS 220b, Russian and Soviet Art, 1757 to the Present

Molly Brunson

For description see under Slavic Languages & Literatures.

HSAR 234b/ARCG 221b^c/NELC 120b^c, Egyptomania Colleen Manassa, John Darnell

For description see under Near Eastern Languages & Civilizations.

HSAR 238a/ARCG 238a/NELC 107a, Buried Cities: Thera, Pompeii, and Herculaneum

Karen Foster

Study of three ancient cities buried by volcanic eruptions – Thera in c. 1530 B.C. and Pompeii and Herculaneum in A.D. 79 – with emphasis on their architecture, wall paintings, and small finds in cultural and historical context. HU

HSAR 239b^c/ARCG 239b/HUMS 252b/NELC 104b^c, Art of the Ancient Near East and Aegean Karen Foster

Introduction to the art and architecture of Mesopotamia, Egypt, and the Aegean, with attention to cultural and historical contexts. HU

HSAR 243b/ARCG 243b/CLCV 160b, Greek Art and Architecture Milette Gaifman

Monuments of Greek art and architecture from the late Geometric period (c. 760 B.C.) to Alexander the Great (c. 323 B.C.). Emphasis on social and historical contexts. HU

HSAR 250a/ARCG 170a/CLCV 170a, Roman Art: Empire, Identity, and Society

Diana Kleiner

Masterpieces of Roman art from the Republic to Constantine studied in their historical and social contexts. The great Romans and the monuments they commissioned – portraits, triumphal arches, columns, and historical reliefs. The concept of empire and imperial identity, politics and portraiture, the making and unmaking of history through art, and the art of women, children, freedmen, and slaves. HU

***HSAR 251a/FREN 366a, Art and Literature in Modern France** Marie-Hélène Girard

For description see under French.

HSAR 264a/HUMS 423a/MMES 124a, Byzantium, Constantinople, Istanbul

Robert Nelson

For description see under Humanities.

HSAR 272b, Sculptural Arts in Medieval Europe, 800–1500 Jacqueline Jung

Overview of the forms, meanings, and purposes of three-dimensional figural arts in Europe from the fourth through fifteenth centuries. Focus on works from northern Europe representing a variety of techniques, materials, scales, and functions. Examples include reliquaries, tomb effigies, portals, pulpits, altarpieces, public monuments, and devotional sculptures. HU

***HSAR 310b/HUMS 270b, Futurism: The Shock of the New** Amerigo Fabbri

For description see under Humanities.

HSAR 315a, Nineteenth-Century French Art Carol Armstrong

European art produced between the French Revolution and the beginning of the twentieth century. Focus on French painting, with additional discussion of Spanish, English, and German art. Some attention to developments in photography, printmaking, and sculpture. HU

HSAR 321a, Global Contemporary Art David Joselit

Global and transregional developments in visual arts from the mid-twentieth century to the present. Attention to differences masked by stylistic similarities. The effects of cultural revolution in the USSR and China, decolonization in Africa, and countercultural movements in Europe and America. The emergence of international networks and the possibility of an international style that closely follows worldwide liberalization of economic markets. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

HSAR 323a, Early Twentieth-Century Art Sebastian Zeidler

Modern art in Europe and America, c. 1880–1945. Topics include individual artists (Rodin, Brancusi), historical avant-gardes (Dadaism, surrealism), the transformation of traditional media such as painting and sculpture, and the invention of collage and photomontage. HU

HSAR 324b⁶/FILM 334b, Art and Industry in Contemporary Hollywood J. D. Connor

Changes in Hollywood narrative, form, and industrial structure from 1975 to the present. Ways in which media conglomeration and technologies such as video and digitalization affect genre and style. Films include *Jaws*, *Top Gun*, *Clueless*, *Twilight*, *Tootsie*, *Gladiator*, *Titanic*, and *Beauty and the Beast*. HU

HSAR 329b, Picasso and Matisse Sebastian Zeidler

An in-depth survey of two major modern painters: Picasso from the 1890s to *Guernica*, Matisse from neo-impressionism to the postwar years. Focus on historically informed visual analysis. HU

***HSAR 330b/SAST 273b, Place, Landscape, and Travel in South Asian Art**

Dipti Khera

For description see under South Asian Studies.

HSAR 378b/AFAM 178b/AFST 188b/ER&M 278b, From West Africa to the Black

Americas: The Black Atlantic Visual Tradition Robert Thompson

Art, music, and dance in the history of key classical civilizations south of the Sahara – Mali, Asante, Dahomey, Yorùbá, Ejagham, Kongo – and their impact on New World art and music, especially rock, blues, North American black painting of the past ten years, and black artists of Cuba, Haiti, and Brazil. HU

HSAR 379a/AFAM 112a, New York Mambo: Microcosm of Black Creativity

Robert Thompson

The rise, development, and philosophic achievement of the world of New York mambo and salsa. Emphasis on Palmieri, Cortijo, Roena, Harlow, and Colón. 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. HU

HSAR 381a^c/HUMS 416a/MMES 101a, Introduction to Islamic Art Kishwar Rizvi

The theory and practice of art-making in the Middle East, North Africa, and South Asia from the early years of Islam in the seventh century to the present. Illustrated manuscripts and the arts of calligraphy and ceramics as they pertain to the creation of an Islamic visual culture. HU

HSAR 383b/SAST 256b, Art of India, 300 B.C.–A.D. 1650 Tamara Sears

Introduction to the art and architectural history of the Indian subcontinent from the rise of the Mauryan Empire to the building of the Taj Mahal. The development of early Buddhist and Jain art and of Hindu temples and icons; the efflorescence of Islamic visual culture under the Mughal Empire. HU

***HSAR 401a or b, Critical Approaches to Art History** Kishwar Rizvi [F],

Robert Nelson [Sp]

A wide-ranging introduction to the methods of the art historian and the history of the discipline. Themes include connoisseurship, iconography, formalism, and selected methodologies informed by contemporary theory. HU

***HSAR 403a, Aspects of Connoisseurship and Conservation**

Theresa Fairbanks-Harris

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 study of age, damage, and restoration as they change works of art. General concepts of preservation and conservation. HU RP

***HSAR 420b/HUMS 211b, Monuments of Naples: City and Self** Mia Genoni

For description see under Humanities.

***HSAR 422b, Architecture, Identity, and Faith in Britain, 1851–1951** Ayla Lepine
Architectural, religious, and cultural movements in Britain from the Great Exhibition of 1851 to the Festival of Britain in 1951. Introduction to British architecture and theological discourse; revivalism, institution building, empire, and innovation; notions of holiness, the senses, gender, and ritual; reconciliation, conflict, memorialization, and debates about the afterlife. HU

***HSAR 438b, The Altarpiece in Northern Europe, 1250–1500** Jacqueline Jung,
Gregory Bryda
Medieval European altarpieces as dynamic multimedia installations with a twofold identity: ritual objects that rendered sacred teachings visible during mass, and works of art that prompted painters and carvers to create dazzling displays of visual splendor and technical bravura. HU

***HSAR 441b/ENGL 329b/LITR 402b, Picture Book to Graphic Novel**
Katie Trumpener, Ksenia Sidorenko
For description see under Literature.

***HSAR 442b, Art and War in Britain, 1652–1815** Eleanor Hughes
Relationships between the artistic sphere and the series of international conflicts that shaped British history from the Anglo-Dutch wars through the Napoleonic wars. Ways in which paintings, prints, drawings, sculpture, tapestries, architecture, theatrical displays, and music shaped responses to international conflict. The effects of war on the course of British and European art. Focus on original works from the collections of Yale's art galleries. HU

***HSAR 443a/CLCV 266a/HUMS 466a, Classicism and Modernity** Milette Gaifman,
Tim Barringer
For description see under Humanities.

***HSAR 449b, Pre-Raphaelites: Victorian Avant-Garde** Tim Barringer
Pre-Raphaelitism as an avant-garde movement of the mid-nineteenth century in art and literature. Visual and literary works of the Pre-Raphaelite Brotherhood, their associates, and their followers placed in the cultural context of Victorian Britain. Review of broad arguments about modernity, the city, and the role of the image in an age of mechanical reproduction. The course coincides with the exhibition *Pre-Raphaelites: Victorian Avant Garde* at the National Gallery of Art in Washington, D.C., and includes a trip to view that exhibition. HU

***HSAR 457b, Minimal, Conceptual, and Land Art** Molleen Theodore
American artistic production of the 1960s and 1970s; focus on the modes of minimal, conceptual, and land art. Readings from the works of contemporary artists and critics. Issues of material, installation, presentation, reception, and collecting. Includes site visits to museums in New York and Connecticut. HU

***HSAR 463a/SAST 373a, Cross-Cultural Encounters in South Asian Art and History**
Dipti Khera
For description see under South Asian Studies.

***HSAR 466b, The Technical Examination of Art** Ian McClure

Introduction to methods used in the technical examination of works of art, including critical assessment of the information such methods provide. What technical examination can reveal about the materials and techniques used in a particular work's creation and about its subsequent history.

***HSAR 467a, Art, Media, and Space** David Joselit

The influence of new media, from the Internet to mobile phones, on the practice of art and on the experience of public and private space. Contemporary artists whose work bears the imprint of media; new media theory; the effects of media on both architecture and ordinary domestic space. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

***HSAR 471a/AFAM 346a, Black Atlantic Photography** Kobena Mercer

Introduction to the social and artistic history of photography in Black Atlantic contexts from the mid-nineteenth century to the present. Uses of the photographic image in shaping understandings of race relations and black identities. Codes and conventions by which photographs are evaluated in terms of truth, reflection, testimony, expressivity, and construction. HU

***HSAR 472b/AFAM 353b, Black British Art and Culture** Kobena Mercer

Introduction to black British visual artists and cultural theorists, with a focus on those of African, Caribbean, and South Asian descent. Postcolonial perspectives on diaspora identities and cross-cultural aesthetics in art, film, and photography from 1945 to the present. HU

***HSAR 488b, Buddhist Mandalas** Mimi Yiengpruksawan

Study of Buddhist mandalas, objects such as paintings, relief sculptures, sand works, engravings on stone, and textiles that represent graphically what is written in scripture. Examination of Indian, Japanese, and Tibetan mandalas and the texts on which they are based. Focus on the intersection of text and image in the material or visual representation of Buddhist discourse. HU

***HSAR 490b/FILM 320b, Close Analysis of Film** J. D. Connor

For description see under Film Studies.

***HSAR 498a or b, Independent Tutorial** Mimi Yiengpruksawan

For students who wish to pursue a subject in the history of art not otherwise covered by departmental offerings. May be used for research or directed reading under faculty supervision. A term paper or its equivalent and regular meetings with the adviser are required. To apply for admission, a student should present a prospectus and a bibliography, signed by the adviser, to the director of undergraduate studies. Enrollment limited to History of Art majors.

***HSAR 499a or b, The Senior Essay** Mimi Yiengpruksawan

Preparation of a research paper about thirty pages long under the direction of a qualified instructor. The essay is written in either the fall or the spring term of the senior year, though preferably in the fall term. Students write on subjects of their own choice. During the term before the essay is written, students plan the project in consultation with a qualified instructor or with the director of undergraduate studies. No student is permitted to

enroll in HSAR 499 without submitting a project statement, with the formal title of the essay and a brief description of the subject to be treated. The statement must be signed by the student's adviser and presented to the director of undergraduate studies before the student's schedule can be approved.

The student must submit a suitable project outline and bibliography to the adviser and the director of undergraduate studies early in the term. The outline should indicate the focus and scope of the essay topic, as well as the proposed research methodology; the bibliography should be annotated. Students must also complete a library research colloquium for the senior essay. For essays submitted in the fall term, the deadline for the outline is September 14; for those in the spring term, January 25. Senior essays written in the fall term are due on December 7; those in the spring term on April 26. Two copies must be submitted to the director of undergraduate studies. Failure to comply with any deadline will be penalized by a lower final grade. No late essay will be considered for a prize in the department. Permission may be given to write a two-term essay after consultation with an adviser and the director of undergraduate studies. Only those who have begun to do advanced work in a given area and whose project is considered to be of exceptional promise are eligible. The requirements for the one-term senior essay apply to the two-term essay, except that the essay should be from fifty to sixty pages in length.

GRADUATE COURSES

Courses in the Graduate School are open to undergraduates with permission of the instructor and of the director of graduate studies. Course descriptions are available in the History of Art office in the Jeffrey Loria Center, 190 York Street.

History of Science, Medicine, and Public Health

Director of undergraduate studies: Paola Bertucci, 300G HGS, 432-1397,
paola.bertucci@yale.edu; *hshm.yale.edu*

FACULTY ASSOCIATED WITH THE PROGRAM OF HISTORY OF SCIENCE, MEDICINE, AND PUBLIC HEALTH

Professors Daniel Kevles, Frank Snowden, William Summers, John Warner

Associate Professor Naomi Rogers

Assistant Professors Paola Bertucci, Mariola Espinosa, Joanna Radin, William Rankin

Senior Lecturers Bettyann Kevles, Rebecca Tannenbaum

Lecturer Sherwin Nuland

Affiliated Faculty Toby Appel (*Yale University Library*), Bruno Cabanes (*History*), Robert B. Gordon (*Geology & Geophysics*) (*Emeritus*), Veronica Grimm (*Classics*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Ann Hanson (*Classics*), Jennifer Klein (*History*), Michael McBride (*Chemistry*), Joanne Meyerowitz (*History*), Amy Meyers (*Yale Center for British Art*), Alan Mikhail (*History*), Sherwin Nuland (*School of Medicine*), Kevin Repp (*Yale University Library*), Cynthia Russett (*History*), Paul Sabin (*History*), Gordon Shepherd (*School of Medicine*), Jenifer Van Vleck (*History*)

History of Science, Medicine, and Public Health is an interdisciplinary program of study that explores the development of science, technology, medicine, and public health and their interactions with each other and with society. Its course offerings range broadly in topics and geographical scope, including the Scientific Revolution, the relationships of medicine and the media in modern America, the development of the physical, earth, and life sciences, the interplay of science, technology, and the state, and public health and epidemics in global perspective. Students in the major combine courses in History of Science, Medicine, and Public Health with courses from other relevant disciplines in the natural sciences, the social sciences, and the humanities.

The program offers students considering a career in medicine, public health, or other health care fields a way to combine the requirements of their professional training with a broad liberal arts education. It also provides excellent preparation for many other careers, including law, business, journalism, museum work, public policy, and government, in which a contextualized understanding of science, technology, and medicine is advantageous.

The major for the Classes of 2013 and 2014 Students in the Class of 2013 must fulfill the requirements of the major in History of Science, History of Medicine that were in place when they entered the major, as described in previous editions of this bulletin. Students in the Class of 2014 may also fulfill the requirements of the major in History of Science, History of Medicine that were in place when they entered it. Alternatively, students in the Class of 2014 may fulfill the requirements of the major in History of Science, Medicine, and Public Health as described below for the Class of 2015 and subsequent classes.

Requirements of the major for the Class of 2015 and subsequent classes The major in History of Science, Medicine, and Public Health requires twelve term courses, including the two-term senior requirement. Students select a pathway of seven courses that guides them through an area of specialization. The seven pathway courses must include two courses in History of Science, Medicine, and Public Health; one seminar numbered 100 or above in History of Science, Medicine, and Public Health or in History; one science course; and three electives chosen from relevant courses in any department.

The five standard pathways in the major are medicine and public health; global health; science, technology, and power; gender and sexuality; and arts and media. Students may also design customized pathways in consultation with the director of undergraduate studies. No later than the beginning of the junior year, students in the major must select a standard pathway or indicate that they wish to design their own.

Beyond the seven pathway courses, students must complete three additional electives in History of Science, Medicine, and Public Health. One of the electives must be a seminar, and one must be chosen from a pathway other than the one selected for the major. All courses for the major are chosen in collaboration with the student's adviser.

Senior requirement By the end of reading period in the spring term of the junior year, students choose whether they will work toward a yearlong or a one-term senior project. Yearlong senior projects are completed in HSHM 490, 491; one-term projects are completed in HSHM 492. Students who choose a one-term project must take an additional

seminar in History of Science, Medicine, and Public Health during the final term of the senior year. Distinction in the Major is awarded only to students who complete a yearlong senior project.

For both the one-term and yearlong senior projects, students select a project adviser, propose a tentative topic and title, and submit a proposal to the senior project director. The final product of the senior requirement may be a written essay or an alternative project such as a film, exhibition, catalog, atlas, or historical data reconstruction. In the case of an alternative project, the student must identify a second reader in addition to the adviser before the project is approved by the senior project director. Either the adviser or the second reader must be a member of the faculty in History of Science, Medicine, and Public Health. A written component to the senior project must illustrate sources and the intellectual significance of the project. For more details about requirements and deadlines, majors should consult the HSHM Senior Project Handbook; copies are available from the senior project director and on the program's Web site (*hshm.yale.edu*).

Credit/D/Fail Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Distribution of courses 7 courses in pathway, incl 2 HSHM courses, 1 HSHM or Hist sem, 1 science course, and 3 electives, as specified; 3 addtl HSHM electives, incl 1 sem and 1 outside major pathway, as specified

Senior requirement Yearlong project (HSHM 490, 491), or one-term project (HSHM 492) and 1 addtl HSHM sem

HSHM 204a/AMST 163a/EVST 120a/HIST 120a, Introduction to Environmental History Paul Sabin

For description see under Environmental Studies.

HSHM 206a/AMST 176a/EVST 206a/HIST 144a/HUMS 323a, Science and Technology in the United States Daniel Kevles

The development of science and technology in American society from the colonial period through the late twentieth century. The rise of the United States to a world-class scientific and technological power; the American scientific community and the tensions it has faced in a democratic society; the role of science and technology in exploration, agriculture, industry, national defense, religion, culture, and social change. HU

HSHM 211b/G&G 211b/HIST 143b, Catastrophe and the Earth Sciences since 1850 William Rankin

A history of the geological, atmospheric, and environmental sciences, with a focus on predictions of global catastrophe. Topics range from headline catastrophes such as global warming, ozone depletion, and nuclear winter to historical debates about the age of the Earth, the nature of fossils, and the management of natural resources. Tensions between science and religion; the role of science in government; environmental economics; the politics of prediction, modeling, and incomplete evidence. HU

HSHM 215a^G/HIST 140a, Public Health in America, 1793–2000 Naomi Rogers

A survey of public health in America from the yellow fever epidemic of 1793 to AIDS and breast cancer activism at the end of the past century. Focusing on medicine and the state, topics include quarantines, failures and successes of medical and social welfare, the experiences of healers and patients, and organized medicine and its critics. HU

HSHM 235a/HIST 234a, Epidemics and Society in the West since 1600

Frank Snowden

For description see under History.

***HSHM 413a/HIST 145Ja, Medical Imaging since 1895** Bettyann Kevles

The development of X rays, CT, MRI, ultrasound, and nuclear medicine. Their impact on diagnostic medicine, the legal system, and culture (high and low). Topics include the nature of invention – how new technologies appear; the economics of medicine in relation to technology; the role of warfare in invention; and the impact of these technologies on the arts. WR, HU

***HSHM 422a/HIST 140Ja, Cartography, Territory, and Identity** William Rankin

Exploration of how maps shape assumptions about territory, land, sovereignty, and identity. The relationship between scientific cartography and conquest, the geography of statecraft, religious cartographies, encounters between Western and non-Western cultures, and reactions to cartographic objectivity. Students make their own maps. No previous experience in cartography or graphic design required. WR, HU

***HSHM 437b^G/HIST 435Jb, The Global Crisis of Malaria** Frank Snowden

The global crisis of malaria examined in comparative and historical context. The mosquito theory of transmission and other developments in scientific understanding of the disease; World Health Organization strategies to eradicate malaria since 1955; the development of tools such as insecticides, medication, and bed nets; the attempt to create an effective vaccine. WR, HU

***HSHM 448b/HIST 151Jb/WGSS 448b, American Medicine and the Cold War**

Naomi Rogers

The social, cultural, and political history of American medicine from 1945 to 1960. The defeat of national health insurance; racism in health care; patient activism; the role of gender in defining medical professionalism and family health; the rise of atomic medicine; McCarthyism in medicine; and the polio vaccine trials and the making of science journalism. WR, HU

***HSHM 455a/HIST 148Ja/HUMS 312a/WGSS 460a, History of the Body: Science, Medicine, and the Arts** Paola Bertucci, Courtney Thompson

The body as a site of knowledge in science, medicine, and the arts from antiquity to the present. The history of anatomy from Leonardo to the Body Worlds exhibits; the artificial body from the cyborg to cosmetic surgery; the gendering of natural knowledge. WR, HU

***HSHM 459b/HIST 159Jb/HUMS 317b, Spies, Secrets, and Science** Paola Bertucci

Relationships between secrecy, intellectual property, and science from the Middle Ages to the Cold War. Topics include alchemy and esoteric knowledge; the Manhattan Project and other secret scientific projects of the state; the history of patents and copyright laws; and scientists as spies. WR, HU

***HSHM 470a and 471b, Directed Reading** Paola Bertucci

Readings directed by members of the faculty on topics in the history of science, medicine, or public health not covered by regular course offerings. Subjects depend on the interests of students and faculty. Weekly conferences; required papers.

***HSHM 490a or b and 491a or b, Yearlong Senior Project** Paola Bertucci

Preparation of a yearlong senior project under the supervision of a member of the faculty. There will be a mandatory meeting at the beginning of the term for students who have chosen the yearlong senior project; students will be notified of the time and location by e-mail before classes begin. Majors planning to begin their projects who do not receive this notice should contact the senior project director.

Students expecting to graduate in May enroll in HSHM 490 during the fall term and complete their projects in HSHM 491 in the spring term. December graduates enroll in HSHM 490 in the spring term and complete their projects in HSHM 491 during the following fall term. Majors planning to begin their projects in the second term should notify the senior project director by December 7, 2012. Students must meet progress requirements by specific deadlines throughout the first term to receive a temporary grade of SAT for HSHM 490, which will be changed to the grade received by the project upon the project's completion. Failure to meet any requirement may result in the student's being asked to withdraw from HSHM 490. For details about project requirements and deadlines, consult the HSHM Senior Project Handbook.

Students enrolled in HSHM 491 must submit a completed project to 211 HGS no later than 5 p.m. on April 8, 2013, in the spring term, or no later than 5 p.m. on December 3, 2012, in the fall term. Projects submitted after 5 p.m. on the due date without an excuse from the student's residential college dean will be subject to grade penalties. Cr/year only

***HSHM 492a or b, One-Term Senior Project** Paola Bertucci

Preparation of a one-term senior project under the supervision of an HSHM faculty member, or of an affiliated faculty member with approval of the director of undergraduate studies. There will be a mandatory meeting at the beginning of the term for students who have chosen the one-term senior project; students will be notified of the time and location by e-mail before classes begin. Majors planning to begin their projects who do not receive this notice should contact the senior project director.

Students expecting to graduate in May enroll in HSHM 492 during the fall term. December graduates enroll in HSHM 492 in the preceding spring term. Students planning to begin their project in the spring should notify the senior essay director by December 7, 2012. Majors must submit a completed Statement of Intention form signed by the faculty member who has agreed to supervise the project to the HSHM administrator in 207 HGS no later than September 14, 2012 (HSHM 492a), or January 14, 2013 (HSHM 492b). Blank statement forms are available in 207 HGS and in the HSHM Senior Project Handbook.

Students enrolled in HSHM 492 must submit a completed senior project to 211 HGS no later than 5 p.m. on December 10, 2012, in the fall term, or no later than 5 p.m. on April 29, 2013, in the spring term. Projects submitted after 5 p.m. on the due date without an excuse from the student's residential college dean will be subject to grade penalties.

Humanities

Director of undergraduate studies: Norma Thompson, Whitney Humanities Center, 53 Wall St., 432-1313, norma.thompson@yale.edu; director: R. Howard Bloch, 53 Wall St., 432-0670, howard.bloch@yale.edu; www.yale.edu/humanities

FACULTY ASSOCIATED WITH THE PROGRAM OF HUMANITIES

Professors Jeffrey Alexander (*Sociology*), Tim Barringer (*History of Art*), R. Howard Bloch (*French*), Harold Bloom (*Humanities*), Rüdiger Campe (*German*), Francesco Casetti (*Humanities*), Stephen Davis (*Religious Studies*), Carlos Eire (*History, Religious Studies*), Benjamin Foster (*Near Eastern Languages & Civilizations*), Paul Freedman (*History*), Kirk Freudenburg (*Classics*), David Gelernter (*Computer Science*), Phyllis Granoff (*Religious Studies*), Emily Greenwood (*Classics*), Valerie Hansen (*History*), Carol Jacobs (*German*), Daniel Kevles (*History, American Studies, History of Medicine*), Ivan Marcus (*History, Religious Studies*), Barry McCrea (*Comparative Literature*), María Rosa Menocal (*Humanities*), Robert Nelson (*History of Art*), Richard Prum (*Ecology & Evolutionary Biology*), Joseph Roach (*Theater Studies*), William Sledge (*School of Medicine*), Steven Smith (*Political Science*), Henry Sussman (*German*), Gary Tomlinson (*Music, Humanities*), Jing Tsu (*East Asian Languages & Literatures*), Anders Winroth (*History*), Craig Wright (*Music*)

Associate Professors Murray Biggs (*Theater Studies*), Moira Fradinger (*Comparative Literature*), Milette Gaifman (*History of Art, Classics*), Marci Shore (*History*), Kirk Wetters (*German*)

Assistant Professors Joshua Billings (*Humanities*), Molly Brunson (*Slavic Languages & Literatures*), David Gabriel (*Comparative Literature*), Paul North (*German*), Kishwar Rizvi (*History of Art*), Yue Zhuo (*French*)

Senior Lecturers Peter Cole (*Humanities*) (*Visiting*), Charles Hill (*Humanities*), Jane Levin (*Humanities*), Koichi Shinohara (*Religious Studies, East Asian Studies*), Norma Thompson (*Humanities*)

Lecturers Edward Barnaby (*Comparative Literature*), Amerigo Fabbri (*Humanities*), Hilary Fink (*Slavic Languages & Literatures*), Karen Foster (*Near Eastern Languages & Civilizations*), Mia Genoni (*Humanities*), Virginia Jewiss (*Humanities*), Sadia Saeed (*Sociology*), Kathryn Slanski (*Humanities, Near Eastern Languages & Civilizations*), George Syrimis (*Hellenic Studies*)

Senior Lecturer II Risa Sodi (*Italian*)

Senior Lecturer Rita Lipson (*Slavic Languages & Literatures*)

The interdisciplinary program in Humanities is designed to contribute to an integrated understanding of the Western cultural tradition. Selected works of European literature, music, philosophy, and visual arts are studied in relation to each other and to the history of ideas and political institutions. The varied program of study offers many options for students in all years interested in interdisciplinary and broad-based work in the humanities, from special seminars for freshmen to the Franke and Shulman Seminars for senior majors. Most courses are open to nonmajors.

The major in Humanities offers three areas of concentration: the arts in the humanities, intellectual history, and the West and its encounters. The major is intended to emphasize breadth and interdisciplinary effort without sacrificing depth. It brings together traditional disciplines in the humanities such as history, literature, history of art, philosophy, and history of music in a manner that is both broadly based and intensively rigorous.

Prerequisite There is a prerequisite in ancient civilization, which can be satisfied by Directed Studies or by two courses in classical civilization or in ancient Near Eastern civilization.

Requirements of the major In addition to the prerequisite, thirteen term courses are required for the major, including two core seminars in one of the areas of concentration; any five Humanities electives (including Franke and Shulman Seminars), with at least one in each of the three areas of concentration; five additional electives selected to complement the student's area of concentration, with approval of the director of undergraduate studies; and the senior essay, normally written in the spring term of the senior year. Majors in Humanities are strongly encouraged to enroll in at least one term course in literature in a foreign language. Students are expected to declare their intent to major in Humanities in a meeting with the director of undergraduate studies before their junior year.

Core courses Two core seminars must be selected from one area of specialization: the arts in the humanities, intellectual history, or the West and its encounters. All seminars listed under these subheads are core seminars.

The Franke Seminars and the Shulman Seminar Sponsored by the Whitney Humanities Center and designed to speak across disciplinary lines to broad public and intellectual issues, the Franke Seminars and the Shulman Seminar each include a series of coordinated public lectures. The seminars are for enrolled students; the lecture series are open to the Yale and local communities. Humanities majors may enroll in a Franke or a Shulman Seminar with permission of the director of undergraduate studies and the instructor.

Summer program in Rome Humanities majors who take the spring-term course HUMS 444, *The City of Rome*, and develop individual research topics to be pursued in Rome may apply for enrollment in a two-credit summer course offered by Yale Summer Session. Museums, archaeological sites, churches, piazzas, libraries, and the city itself are part of the classroom for the summer course, which addresses key issues relevant to all three areas of concentration in the Humanities major. Further information is available on the Web at www.yale.edu/humanities/summer.html and summer.yale.edu.

REQUIREMENTS OF THE MAJOR

Prerequisite Directed Studies, or 2 courses in classical civ or ancient Near Eastern civ

Number of courses 13 term courses beyond prereq (incl senior essay)

Distribution of courses 2 core sems in 1 area of concentration; 5 Humanities electives, at least 1 in each of 3 areas of concentration; 5 addtl electives

Senior requirement Senior essay (HUMS 491)

SEMINAR FOR FRESHMEN

*HUMS 095a/CLCV 002a, **The Romans: A Cultural Introduction** Kirk Freudenburg
For description see under Classics.

THE ARTS IN THE HUMANITIES

*HUMS 208b/THST 399b, **Politics of Performance** Dominika Laster
For description see under Theater Studies.

*HUMS 211b/HSAR 420b, **Monuments of Naples: City and Self** Mia Genoni
Study of architectural and sculptural monuments erected in Naples and Campania during the Middle Ages and the Renaissance. The effects of changes in both rulers and cultural traditions over time. The structure of monuments; interactions with other monuments and the built environment; issues of patronage; the construction of personal and social identity. HU

*HUMS 215a/MUSI 243a, **Opera** Gary Tomlinson
For description see under Music.

HUMS 216a/FILM 312a^G/LITR 354a, **Theory of Media** Francesco Casetti
For description see under Film Studies.

*HUMS 217a/MUSI 107a, **Exploring the Nature of Genius** Craig Wright
For description see under Music.

*HUMS 218a, **Shakespearian Character: Falstaff, Hamlet, Iago, Cleopatra**
Harold Bloom
A close study of four of Shakespeare's most compelling characters: Iago (from *Othello*), Cleopatra (from *Antony and Cleopatra*), Falstaff (from *Henry IV*), and the title character Hamlet. HU

*HUMS 219b, **Shakespeare: Four Late Masterworks** Harold Bloom
A close study of *King Lear*, *Macbeth*, *The Winter's Tale*, and *The Tempest*. HU

HUMS 220b/HSAR 221b/RUSS 220b, **Russian and Soviet Art, 1757 to the Present**
Molly Brunson
For description see under Slavic Languages & Literatures.

*HUMS 221a, **Whitman, Melville, Dickinson** Harold Bloom
A close reading of works by two major American poets and of Melville's great American novel, *Moby-Dick*. Selections from Ralph Waldo Emerson's prose serve as a starting point. HU

*HUMS 224b, **Wallace Stevens and Hart Crane** Harold Bloom
A close reading of the poetry and prose of Wallace Stevens and Hart Crane. HU

*HUMS 226a, **Classical to Romantic Epic** Jane Levin
The epic as it has been used in different times and countries to express ideas about the hero, the divine, nature, and art. Poets and poems include Homer, Vergil, *Beowulf*, Milton, Pope, Wordsworth, and Whitman. HU

***HUMS 227a/GMAN 348a^G, Classicism and Beyond in German Literature**

Kirk Wetters

For description see under Germanic Languages & Literatures.

HUMS 228a/HIST 281a/RLST 268a^G, Christian Mysticism, 1200–1700 Carlos Eire

For description see under Religious Studies.

HUMS 232a/CLCV 115a, Classical Mythologies Timothy Robinson and staff

For description see under Classics.

HUMS 243a or b/ENGL 223a or b/LITR 223a or b/THST 223a or b, Foundations of Modern Drama Murray Biggs and staff

For description see under Theater Studies.

***HUMS 250b/FREN 342b/LITR 235b, French Literary Movements from Romanticism to Decadence** Yue Zhuo

For description see under French.

HUMS 252b/ARCG 239b/HSAR 239b^G/NELC 104b^G, Art of the Ancient Near East and Aegean Karen Foster

For description see under History of Art.

***HUMS 255a/GMAN 361a/GMST 361a, Visions of the End and Representations of Transcendence** Kirk Wetters

For description see under Germanic Languages & Literatures.

***HUMS 260b/CLCV 108b, Death in Greek Tragedy** Joshua Billings

For description see under Classics.

***HUMS 261a/GMST 365a^G/LITR 468a, The Question of Form** Carol Jacobs

For description see under Literature.

***HUMS 264a/ITAL 157a, Italian through Opera and Film** Risa Sodi

For description see under Italian.

***HUMS 265b/RUSS 219b, The Russian Festive Table in Literature, Film, and Art**

Rita Lipson

For description see under Slavic Languages & Literatures.

***HUMS 268a/GMST 183a/LITR 336a, Childhood and Memory in Modern Literature**

Henry Sussman

For description see under German Studies.

***HUMS 269b/CLCV 238b/LITR 155b, Classics in Africa and the Black Diaspora**

Emily Greenwood

For description see under Classics.

***HUMS 270b/HSAR 310b, Futurism: The Shock of the New** Amerigo Fabbri

Cultural and intellectual shifts in literature, philosophy, and the arts at the end of the nineteenth century, marking the rise of modernism. Futurism, surrealism, and other avant-garde movements that transformed into art the dramatic challenges of a new technological and psychological reality. HU

***HUMS 273a/CLCV 210a/LITR 150a/MGRK 217a, Receptions of Odysseus in Literature and Drama** George Syrimis

For description see under Hellenic Studies.

***HUMS 275b/ENGL 256b/LITR 458b, Class, Desire, and the Novel** Barry McCrea

For description see under Literature.

***HUMS 276b/RUSS 250b, Masterpieces of Russian Literature I** Hilary Fink

For description see under Slavic Languages & Literatures.

***HUMS 278b/CLCV 214b/LITR 225b/MGRK 202b/WGSS 337b, The Poetry of C. P. Cavafy** George Syrimis

For description see under Hellenic Studies.

***HUMS 281a, Epic Heroes and Heroic Violence** Jonathan Cayer

An exploration of epic poetry from the classical period to the Renaissance, focusing on representation of the epic hero. Works include Homer's *Iliad*, Statius' *Thebaid*, *The Song of Roland*, *The Song of the Cid*, *The Nibelungenlied*, and Tasso's *Jerusalem Delivered*. HU

***HUMS 284a/ITAL 311a/LITR 173a/THST 316a, Italian Theater from Antiquity to the Renaissance** Giuseppe Mazzotta

For description see under Italian.

HUMS 285a/HIST 237a/RSEE 390a/RUSS 241a, Russian Culture: The Modern Age John MacKay, Paul Bushkovitch

For description see under Russian & East European Studies.

***HUMS 292b/ITAL 366b, Representations of the Borgias** Angela Capodivacca

For description see under Italian.

***HUMS 295a/ENGL 353a/LITR 463a, Medieval Celtic Literature** David Gabriel

For description see under Literature.

INTELLECTUAL HISTORY

***HUMS 300b, Oratory in Statecraft** Charles Hill

A seminar and practicum in oratory, the first tool of leadership. A study of oratory as it provides direction, builds support, and drives action on a strategic agenda. Analysis of speeches in antiquity, the early modern era, and the unique American voice: Edwards to Lincoln to King. HU

HUMS 302a/PLSC 290a/SOCY 151a, Foundations of Modern Social Theory

Sadia Saeed, Emily Erikson

For description see under Sociology.

***HUMS 303b/GMAN 285b^G/GMST 285b, Science and Literature in Modernism** Rüdiger Campe

For description see under Germanic Languages & Literatures.

***HUMS 306a, Science and Human Sciences** Gary Tomlinson

The modern dichotomy of natural science and human science, i.e., the totality of disciplines devoted to human experience, as it has developed from the mid-seventeenth century to

the present. Focus on key works by Galileo Galilei, Giambattista Vico, Charles Darwin, and Terrence Deacon. The shifting relations of Western understandings of the natural and human realms. HU

***HUMS 312a/HIST 148Ja/HSHM 455a/WGSS 460a, History of the Body: Science, Medicine, and the Arts** Paola Bertucci, Courtney Thompson

For description see under History of Science, Medicine, and Public Health.

***HUMS 313a, Strategic American Fictions** Charles Hill

Six American classics read as chapters of a single epic, written with intent to shape the nation's destiny: *The Last of the Mohicans*, *The Scarlet Letter*, *Moby-Dick*, *Uncle Tom's Cabin*, *Walden*, and *Leaves of Grass*. Selected twentieth-century novels as commentaries on the styles, thoughts, claims, and demands of these classics. The value of literary-critical methods for understanding international affairs. HU

***HUMS 315a, The Making of Character** Norma Thompson

Human nature and its plasticity explored through literature and philosophy. The level of rational control humans can exert over their own character formation; the extent to which character depends on upbringing and education; possibilities for improvement or radical change; the relation of individual and national character formations. HU

***HUMS 316b/GMST 293b^G, Illegitimacy** Kirk Wetters

For description see under German Studies.

***HUMS 317b/HIST 159Jb/HSHM 459b, Spies, Secrets, and Science** Paola Bertucci

For description see under History of Science, Medicine, and Public Health.

HUMS 322b/HIST 215b^G/RLST 283b, Reformation Europe, 1450–1650 Carlos Eire

For description see under History.

HUMS 323a/AMST 176a/EVST 206a/HIST 144a/HSHM 206a, Science and Technology in the United States Daniel Kevles

For description see under History of Science, Medicine, and Public Health.

***HUMS 325a/EP&E 459a/PLSC 284a^G, Modern Liberty** Bryan Garsten

For description see under Political Science.

***HUMS 331b/HIST 235Jb, Existentialism and Dissent** Marci Shore

For description see under History.

HUMS 335a/SOCY 202a^G, Cultural Sociology Jeffrey Alexander

For description see under Sociology.

***HUMS 362a/FREN 397a/LITR 339a, French Theory from Sartre to Derrida**
Yue Zhuo

For description see under French.

HUMS 364a/PHIL 327a^G, Existentialism Scott Edgar

For description see under Philosophy.

***HUMS 365a/GMST 355a, The Concept of Time** Paul North

For description see under German Studies.

***HUMS 368a/GMST 315a^c/LITR 431a, Systems and Their Theory** Henry Sussman
For description see under German Studies.

HUMS 375b/FILM 333b/LITR 351b, Early Film Theory and Modernity
Francesco Casetti
For description see under Film Studies.

HUMS 380a/HIST 210a, The Early Middle Ages, 284–1000 Anders Winroth
For description see under History.

HUMS 381b/HIST 211b, The Birth of Europe, 1000–1500 Paul Freedman
For description see under History.

***HUMS 386b/EP&E 354b/PLSC 322b^c, Empire and Modern Political Thought**
Karuna Mantena
For description see under Political Science.

***HUMS 400b/GMST 182b/LITR 346b, Legacies of the Enlightenment** Kirk Wetters
For description see under German Studies.

HUMS 407a/CPSC 150a, Computer Science and the Modern Intellectual Agenda
David Gelernter
For description see under Computer Science.

HUMS 408b/CPSC 151b, The Graphical User Interface David Gelernter
For description see under Computer Science.

THE WEST AND ITS ENCOUNTERERS

HUMS 416a/HSAR 381a^c/MMES 101a, Introduction to Islamic Art Kishwar Rizvi
For description see under History of Art.

***HUMS 418a/EALL 202a/RLST 130a/SAST 367a, Traditional Literature of India, China, and Japan** Koichi Shinohara, Phyllis Granoff
Introduction to literary works that shaped the great civilizations of Asia. Focus on traditional literature from India, China, and Japan. Readings range from religious and philosophical texts to literature of the court, poetry, drama, and epics. HU

HUMS 421a/HIST 315a, History of Traditional China to 1600 Valerie Hansen
For description see under History.

HUMS 422a/HIST 226a^c/NELC 326a/RLST 158a^c, Jesus to Muhammad: Ancient Christianity to the Rise of Islam Stephen Davis
For description see under Religious Studies.

HUMS 423a/HSAR 264a/MMES 124a, Byzantium, Constantinople, Istanbul
Robert Nelson
Byzantium, Constantinople, Istanbul, one city by three names, straddles Europe and Asia. The life and monuments of one of the world's most interesting and beautiful cities from antiquity to the present, Homer to Pamuk, and church to mosque to secularism. HU

***HUMS 425b/LITR 465b, Travel and Quests in Early World Literature** David Gabriel
For description see under Literature.

***HUMS 427b/LITR 348b, The Practice of Literary Translation** Peter Cole

Intensive readings in the history and theory of translation paired with practice in translating. Case studies from ancient languages (the Bible, Greek and Latin classics), medieval languages (classical Arabic literature), and modern languages (poetic texts). HU

***HUMS 434b/CLCV 113b/NELC 230b, Mesopotamia's Literary Legacy**

Kathryn Slanski

Major works of ancient Near Eastern literature; relationships with literary traditions in the Hebrew Bible and ancient Greece. Readings include myths, epics, wisdom literature, love poetry, and humorous stories. HU

HUMS 438b/NELC 101b, Origins of Western Civilization: The Near East from

Alexander to Muhammad Benjamin Foster

Cultural and historical survey of Hellenistic, eastern Roman, Parthian, Byzantine, and Sassanian empires in the Near East. Emphasis on mutual influences of Near Eastern and classical worlds, the rise of Christianity and Islam in Near Eastern contexts, and the division of East and West between conflicting ideas of unity. HU

HUMS 440a/MMES 102a/NELC 102a, Introduction to the Middle East

Benjamin Foster

For description see under Near Eastern Languages & Civilizations.

HUMS 441a/NELC 121a, The Hero in the Ancient Near East Kathryn Slanski

For description see under Near Eastern Languages & Civilizations.

***HUMS 443a/HIST 232Ja/JDST 270a/MMES 342a/RLST 201a, Medieval Jews, Christians, and Muslims Imagining Each Other** Ivan Marcus

For description see under History.

HUMS 444b, The City of Rome Virginia Jewiss

An interdisciplinary study of Rome from its legendary origins through its evolving presence at the crossroads of Europe and the world. Exploration of the city's rich interweaving of history, theology, literature, philosophy, and the arts in significant moments of Roman and world history. (Formerly HUMS 396) HU

***HUMS 448a/CHNS 251a/ER&M 304a/HIST 308a/LITR 265a, China in the World**

Jing Tsu

For description see under East Asian Languages & Literatures.

THE FRANKE SEMINARS***HUMS 465a/CLCV 265a/LITR 153a, Contemporary Reception of Greek and Roman Classics** Emily Greenwood

The role of readers and audiences in the constant adaptation and reinvention of classical texts. The trauma of modern history as impetus for engagement with classical traditions; the tension between the epic and the fragmentary in contemporary receptions; the role of classical imitation in the construction of Western subjectivity. HU

***HUMS 466a/CLCV 266a/HSAR 443a, Classicism and Modernity** Milette Gaifman, Tim Barringer

Major works of art and architecture from classical antiquity, and responses they elicited from Western scholars and collectors from the eighteenth through twentieth centuries.

Focus on the Grand Tour, an extended tour of Europe traditionally undertaken by wealthy young men as an educational rite of passage. The Grand Tour as primary facilitator for modern engagement and fascination with Greek and Roman cultures. HU

THE SHULMAN SEMINAR

*HUMS 468b/LITR 401b, Freud and Science in the Twenty-First Century

William Sledge, Moira Fradinger

Freud's theories of human subjectivity and their connections to current developments in the social sciences, cognitive science, and neuroscience. Introduction to basic psychoanalytic concepts and their criticism from the point of view of scientific discourse; small-group dynamics and the psychology of interpersonal relationships; psychoanalytic perspectives on civil society. HU

INDIVIDUAL RESEARCH AND SENIOR ESSAY COURSES

*HUMS 470a and 471b, Special Studies in the Humanities Norma Thompson

For students who wish to pursue a topic in Humanities not otherwise covered. May be used for research or for directed reading under the guidance of one or more faculty advisers. In either case a term paper or its equivalent is required, as are regular meetings with the adviser or advisers. To apply, a student should present a prospectus and a bibliography signed by the adviser or advisers to the director of undergraduate studies. Enrollment limited to juniors and seniors majoring in Humanities.

*HUMS 491a or b, The Senior Essay Staff

Independent library-based research under faculty supervision. To register, students must consult the director of undergraduate studies no later than the end of registration period in the previous term. A written plan of study approved by a faculty adviser must be submitted to the director of undergraduate studies by November 16, 2012, if the essay is to be submitted during the spring term, by April 25, 2013, for yearlong or fall-term essays. A rough draft of the essay is due at noon on March 25, 2013, for spring-term essays or on October 29, 2012, for fall-term essays. The final essay is due at noon on April 12, 2013, for spring-term essays or on December 7, 2012, for fall-term essays; late essays will be penalized by a lower grade. RP

Indonesian

(See under Southeast Asia Studies.)

International Studies

(See under Global Affairs.)

isiZulu

(See under African Studies.)

Islamic Studies

(See under History, under History of Art, under Humanities, under Modern Middle East Studies, under Near Eastern Languages and Civilizations, under Political Science, and under Religious Studies.)

Italian

Director of undergraduate studies: Millicent Marcus, Rm. 426, 82–90 Wall St., 432-0599, millicent.marcus@yale.edu; *italian.yale.edu*

FACULTY OF THE DEPARTMENT OF ITALIAN

Professors Millicent Marcus, Giuseppe Mazzotta (*Chair*)

Associate Professor Susanna Barsella (*Visiting*)

Assistant Professor Angela Capodivacca

Senior Lecturer II Risa Sodi

Senior Lecturers Michael Farina, Monica Georgeo, Anna Iacovella

The major in Italian explores Italy's vital role in the formation of Western thought and culture. The core language courses bring students to a high level of aural, spoken, and written proficiency, provide a solid literary and historical background in the language, and prepare students for study in Italy. Other offerings build on the core courses to explore Italian literature, film, history, culture, and art. The Italian major is of particular relevance to the fields of art, economics, film studies, history, history of art, international relations, linguistics, literature, philosophy, and theology.

Requirements of the major Candidates for the major should have completed a course in Italian at the level of 130 (L3) or should have received credit for equivalent work by the end of their sophomore year. Exceptions may be made in the case of outstanding students who have not satisfied this requirement.

The major normally consists of eleven term courses. Eight term courses in the Italian department numbered 140 or above (including graduate courses) are required, at least five of which must be conducted in Italian. The eight courses must include either ITAL 150 or 151 and a course on Dante's *Divine Comedy* as well as four courses covering different periods in Italian literature: one in the Middle Ages (in addition to the one on Dante's *Divine Comedy*), one in the Renaissance, and two in Italian literature after 1600. The aim of these six foundation courses is to provide students with both a broad acquaintance with the major works of Italy's literary tradition and a more detailed knowledge of specific periods in Italian literature. Students are also strongly encouraged to use their elective courses to expand their knowledge of either the *Trecento* (fourteenth century) or the *Cinquecento* (sixteenth century). No more than three Italian department courses taught in English may count toward the major. Students intending to major in Italian should consult the director of undergraduate studies.

In completing their programs, students are required to elect two courses in other languages and literatures, history of art, history, or philosophy that are related to their field of study and approved by the director of undergraduate studies. Any graduate course in another national literature or in linguistics may be substituted for one of these two courses. Some knowledge of Latin is desirable.

Senior requirement In the fall or spring of the senior year, all students majoring in Italian must present a departmental essay written in Italian and completed under the direction of a faculty adviser in ITAL 491. The essay should demonstrate careful reading and research on a topic approved by the adviser in consultation with the director of undergraduate studies. A recommended length for the essay is thirty pages. Prospectus and draft deadlines are determined by the adviser; the final deadline is determined by the director of undergraduate studies. The senior requirement culminates in a meeting with department faculty to discuss the thesis and the student's overall experience of study in the major.

Related majors In addition to the major in Italian literature, the department supports the applications of qualified students who wish to pursue a course in Italian studies under the provisions of a Special Divisional Major. Majors can devise a broad program in social, political, economic, or intellectual history as related to and reflected in Italian literature, or pursue special interests in architecture, film, art, philosophy, music, history, linguistics, theater, political theory, or other fields especially well suited for examination from the perspective of Italian cultural history. Majors in Italian studies must design their programs in close consultation with the director of undergraduate studies and seek the guidance of an additional member of the department whose interests closely coincide with the proposed program of study. For further information, see Special Divisional Majors in this chapter.

The department's course offerings vary greatly from year to year. Students interested in planning course work in Italian that extends beyond the current academic year should consult the director of undergraduate studies.

For the Year or Term Abroad program, see chapter II.

Placement All students who have not taken Italian at Yale are expected to take the departmental placement test, with the exception of students who have no previous knowledge of Italian. The departmental placement examination will be given at the beginning of the fall term; see the *Calendar for the Opening Days of College* and the departmental Web site for details.

REQUIREMENTS OF THE MAJOR

Prerequisite ITAL 130 or equivalent

Number of courses 11 term courses beyond prereq

Distribution of courses 8 term courses in Italian dept numbered 140 or above, incl 1 in Middle Ages (in addition to 1 on Dante's *Divine Comedy*), 1 in Renaissance, and 2 in Italian lit after 1600, at least 5 of these conducted in Italian; 2 term courses in other langs or lits, hist of art, hist, or phil approved by DUS

Specific courses required ITAL 150 or 151; ITAL 310 or equivalent

Substitution permitted Any grad course in another national lit or in ling for 1 of the 2 courses in other depts, with DUS permission

Senior requirement Senior essay (ITAL 491) and oral interview

GROUP A COURSES

***ITAL 110a, Elementary Italian I** Simona Lorenzini and staff

A beginning course with extensive practice in speaking, reading, writing, and listening and a thorough introduction to Italian grammar. Activities include group and pairs work, role-playing, and conversation. Introduction to Italian culture through readings and films. Conducted in Italian. Credit only on completion of ITAL 120. L1 1½ Course cr

***ITAL 120a or b, Elementary Italian II** Risa Sodi and staff

Continuation of ITAL 110. L2 1½ Course cr

***ITAL 125a or b, Intensive Elementary Italian** Risa Sodi and staff

An accelerated beginning course in Italian that covers in one term the material taught in ITAL 110 and 120. Admits to ITAL 130 or 145. Enrollment limited to 15. L1–L2 2 Course cr

***ITAL 130a or b, Intermediate Italian I** Christopher Kaiser and staff

The first half of a two-term sequence designed to increase students' proficiency in the four language skills and advanced grammar concepts. Authentic readings paired with contemporary films. In-class group and pairs activities, role-playing, and conversation. Admits to ITAL 140. Conducted in Italian. Prerequisite: ITAL 120 or equivalent. L3 1½ Course cr

***ITAL 140b, Intermediate Italian II** Risa Sodi, Taylor Papallo, and staff

Continuation of ITAL 130. Emphasis on advanced discussion of Italian culture through authentic readings (short stories, poetry, and comic theater) and contemporary films. Admits to Group B courses. Conducted in Italian. L4

***ITAL 145b, Intensive Intermediate Italian** Risa Sodi, Anna Iacovella

An accelerated intermediate course in Italian that covers in one term the material taught in ITAL 130 and 140. Continued practice in the four basic skills begun at the elementary level. Emphasis on grammar review, vocabulary enrichment, and appreciation of literary texts. Admits to Group B courses. Enrollment limited to 15. Prerequisite: ITAL 120 or 125. L3–L4 2 Course cr

GROUP B COURSES

Group B courses are conducted in Italian and are open to students who have passed ITAL 140 or 145 and to others with the consent of the director of undergraduate studies and of the instructor.

ITAL 150a, Advanced Composition and Conversation Risa Sodi, Monica Georgeo, and staff

Discussion of social, political, and literary issues in order to improve active command of the language. Development of advanced reading skills through magazine and newspaper articles, essays, short stories, films, and a novel; enhancement of writing skills through experiments with reviews, essays, creative writing, and business and informal Italian. Classroom emphasis on advanced speaking skills and vocabulary building. L5

***ITAL 151b, Advanced Italian Workshop: Writing and Translation** Michael Farina

Development of advanced writing and speaking skills. Close readings and extensive practice writing in a variety of genres, which may include autobiography, biography, jokes,

letter, essay, poem, news article, comic strip, children's book, and short story. Popular narrative genres such as the *giallo* and *romanzo rosa*. Creation and performance of short dramatic texts. L5

***ITAL 155b, The Language of Journalism** Anna Iacovella

Introduction to communication patterns and language in Italian media. Readings from journalistic literature, the news media, online newspapers, and the blogosphere on current events and issues in politics, economy, religion, gender, and arts and culture. L5, HU

***ITAL 156b, Language in Film** Monica Georgeo

Analysis of films by the directors Mario Monicelli and Luigi Magni. Focus on the challenges of translating filmic language, with some attention to sociocultural issues at stake in the works. Students translate dialogues, create subtitles, and stage performances of scenes. L5, HU

***ITAL 157a/HUMS 264a, Italian through Opera and Film** Risa Sodi

Exploration of opera and contemporary Italian film to improve Italian grammar and conversational skills. Exercises include performances and presentations. Works include the operas *La Bohème*, *Otello*, and *I pagliacci* and the films *Storia di ragazzi e ragazze*, *Caro diario*, and *La stanza del figlio*. L5, HU

***ITAL 160a, Advanced Italian Grammar: Old Italian** Michael Farina

An in-depth study of historical Italian grammar and vocabulary, intended for students pursuing advanced literary, linguistic, or cultural studies. Emphasis on the chronogeographic development of the Italian vernacular, from the birth of the language through the *Cinquecento*. Readings from early anonymous works, Latini, Dante, Boccaccio, Bembo, and Machiavelli. Linguistic analysis of original texts; translation into modern Italian; and advanced grammar. L5

***ITAL 185b, Italian History from 1945** Risa Sodi

An examination of the major events in Italian history from 1945 to the present. Advanced grammar, writing, and speaking explored in the context of Italian history. Topics include World War II, the founding of the Italian Republic, postwar reconstruction, the major political parties, the protest movements of 1968, the collapse of the Left, and the rise of the Northern League and Berlusconi. Consideration also given to immigration, the environment, and cultural issues. L5, HU

***ITAL 259a, Translation Studies** Angela Capodivacca

Introduction to major thinkers and translators, vocabulary, and critical issues in translation studies. Theories of translation, from classical contributions to modern semiotics; the utility of translating; difficulties presented by differences in language structure and in the underlying cultures; development of a theoretical framework for use in the practice of translation. Discussion in Italian and English. Recommended preparation: ITAL 150. HU

***ITAL 277a, The Historical Novel** Angela Capodivacca

Close reading of modern Italian historical novels: Manzoni's *Promessi Sposi*, Giuseppe di Lampedusa's *Gattopardo*, Anna Banti's *Artemisia*, and Umberto Eco's *Name of the Rose*; viewing of films adapted from these texts. Criticism by Lukács, Manzoni, de Certeau, and Gramsci. Introduction to key moments and figures of Italian history and culture; theoretical reflection on the relationship between history and fiction. L5, HU

***ITAL 470a and 471b, Special Studies in Italian Literature** Millicent Marcus

A series of tutorials to direct students in special interests and requirements. Students meet regularly with a faculty member.

***ITAL 491a or b, The Senior Essay** Millicent Marcus

A research essay on a subject selected by the student in consultation with the faculty adviser.

GROUP C COURSES

Group C courses are conducted in English and are open to students without previous study of Italian. Majors in Italian are required to read the material and write their papers in Italian.

ITAL 310a/LITR 183a, Dante in Translation Giuseppe Mazzotta

A critical reading of Dante's *Divine Comedy* and selections from the minor works, with an attempt to place Dante's work in the intellectual and social context of the late Middle Ages by relating literature to philosophical, theological, and political concerns. One discussion section conducted in Italian. HU Tr

***ITAL 311a/HUMS 284a/LITR 173a/THST 316a, Italian Theater from Antiquity to the Renaissance** Giuseppe Mazzotta

The influence of Aristotle's *Poetics* on the theatrical premises of theater and on Florentine intellectual life in the late fifteenth century; Machiavelli's writings and the theatrical spectacles of Italian sixteenth-century politics; Ariosto's *Negromante* and traditions of *sacre rappresentazioni* and the commedia dell'arte; aesthetics of the theater as an original mode of knowing characters and the worlds they inhabit. HU Tr

***ITAL 366b/HUMS 292b, Representations of the Borgias** Angela Capodivacca

Representations of Renaissance Italy, with a focus on depictions of Alessandro, Cesare, and Lucrezia Borgia. Sources range from Machiavelli and Leonardo to Dumas and Hugo to modern television. The extent to which Renaissance texts try to overdetermine future representations; ideology in modern depictions of the Borgias; the boundaries between history and fiction. HU Tr

***ITAL 379b, Boccaccio, Chaucer, and the Art of Medieval Storytelling**

Millicent Marcus, Giulia Cardillo

An in-depth reading of Giovanni Boccaccio's *Decameron* that leads into a comparison with Geoffrey Chaucer's *Canterbury Tales*. Discussion of issues such as ethics, politics, violence, deceit, desire, friendship, representation of women, and the role of literature in life. WR, HU Tr

Japanese

(See under East Asian Languages and Literatures.)

Japanese Studies

(See under East Asian Studies.)

Judaic Studies

Director of undergraduate studies: Ivan Marcus, 225 HGS, 432-1379, ivan.marcus@yale.edu [F]; Steven Fraade, Rm. 303, 451 College St., 432-0838, steven.fraade@yale.edu [Sp]; www.yale.edu/judaicstudies

FACULTY ASSOCIATED WITH THE PROGRAM OF JUDAIC STUDIES

Professors Yom Tov Assis (*History*) (*Visiting*), Yochanan Breuer (*Religious Studies*) (*Visiting*), Leslie Brisman (*English*), Steven Fraade (*Chair*) (*Religious Studies*), Paul Franks (*Philosophy*), Christine Hayes (*Religious Studies*), Richard Kalmin (*Religious Studies*) (*Visiting*), Ivan Marcus (*History, Religious Studies*), María Rosa Menocal (*Spanish & Portuguese*), Michael Morgan (*Philosophy*) (*Visiting*), Marc Saperstein (*History*) (*Visiting*), Steven Smith (*Political Science*), Laura Wexler (*Women's, Gender, & Sexuality Studies, American Studies*), Robert Wilson (*Religious Studies*)

Associate Professors Hindy Najman (*Religious Studies*), Marci Shore (*History*)

Assistant Professors Joel Baden (*Divinity School*), Eliyahu Stern (*History*)

Senior Lecturer Peter Cole (*Humanities*) (*Visiting*)

Lecturers Eve Krakowski (*Religious Studies*), Margaret Olin (*Divinity School, History of Art, Religious Studies*)

Senior Lector II Ayala Dvoretzky

Senior Lector Shiri Goren

Lector Dina Roginsky

Judaic Studies enables students to develop a substantial knowledge of the history, religion, literature, languages, and culture of the Jews. Jewish society, texts, ideologies, and institutions are examined in comparative perspective in the context of the history and culture of nations in which Jews have lived and created throughout the ages.

The program in Judaic Studies offers courses that encompass all the major epochs of Jewish history: the biblical period, which includes biblical literature and archaeology; the classical period, which includes the literature and history of rabbinic Judaism and its antecedents; the medieval period, which includes Jewish history and literature in both Christian and Islamic lands; the early modern period, which includes Jewish history from the fifteenth through the eighteenth centuries; and the modern period, which includes the history and literature of Jews and Judaism from the late eighteenth to the twenty-first centuries and the impact of different facets of modernization.

The Judaic Studies major, especially as a second major with Economics, Political Science, English, or History, offers intensive background training for those considering admission to graduate or professional schools and to those planning careers in journalism, international relations, foreign service, publishing, the rabbinate, international law, politics, or social work. The interdisciplinary character of the program provides students with both a broad liberal arts background and an intensive preparation in the historical and religious experience of the Jewish culture.

Students considering the major in Judaic Studies should contact the director of undergraduate studies as early as possible.

Requirements of the major The major in Judaic Studies requires thirteen term courses, including the senior essay course. Prerequisite or corequisite to the major is a year of elementary modern Hebrew (HEBR 110, 120) or its equivalent. The major consists of a Hebrew language and literature requirement, a set of core requirements, and two areas of concentration.

Hebrew language and literature Each student majoring in Judaic Studies must attain the equivalent of the second year of modern Hebrew (HEBR 130, 140). In addition, each student must take two term courses in which Hebrew literature is studied in Hebrew, for which HEBR 130 and 140 (but not HEBR 110 or 120) may count. Students who fulfill the Hebrew language requirement by passing an examination rather than by enrolling in HEBR 110, 120, 130, and 140 must take two other term courses in which Hebrew literature is studied in Hebrew. Students concentrating in Hebrew Bible may, in consultation with the director of undergraduate studies, substitute two years of biblical Hebrew for the language and literature requirements.

Core requirements Each student must elect at least three from the following: (1) a term course in Hebrew Bible; (2) a term course in rabbinic literature; (3) JDST 200, *History of the Jews and Their Diasporas to Early Modern Times*; (4) JDST <201>, *History of Jewish Culture, 1500 to the Present*; (5) JDST <202>, *Judaism: Continuity and Change*; (6) a term survey course in Hebrew and Jewish literature.

Areas of concentration Students must select two areas of concentration. The standard areas are ancient Israel/Hebrew Bible; Judaism of Second Temple and Talmudic times; Jewish history and civilization of medieval and early modern times; modern Jewish history and civilization; and Jewish/Hebrew literature (requires study of literature in Hebrew). With the approval of the director of undergraduate studies, students may design their own areas of concentration.

In each of the two areas of concentration, students choose three term courses in consultation with the director of undergraduate studies. These are normally expected to include one introductory course; one seminar taken in junior year and requiring a final research paper; and one relevant course in an area outside Judaic Studies, such as a course relating to the larger historical context if the concentration is in a historical period, or a course in the theory or practice of literature if the concentration is in Jewish or Hebrew literature. Most seminars listed under “Electives within the Major” may be counted as junior seminars in a student’s areas of concentration with permission of the director of undergraduate studies.

Senior requirement Students are expected to write a one- or two-term senior essay (JDST 491 and 492). If a one-term senior essay is chosen, the student must complete an additional seminar. The one-term essay normally relates to one of the student’s areas of concentration, while the seminar relates to the other. A two-term essay should relate to both of the student’s areas of concentration. The senior essay, whether completed during one or two terms, should build on one or both of the student’s junior seminar papers.

Study in Israel Students majoring in Judaic Studies should be aware of the numerous opportunities for study and travel in Israel. Those interested in either a summer or an extended stay in Israel should consult the director of undergraduate studies.

REQUIREMENTS OF THE MAJOR

Prerequisites HEBR 110, 120 or equivalents

Number of courses 13 term courses (incl senior req)

Specific courses required HEBR 130, 140 or equivalents

Distribution of courses 3 term courses from (1) Hebrew Bible, (2) rabbinic lit, (3) JDST 200, (4) JDST <201>, (5) JDST <202>, (6) survey of Hebrew and Jewish lit; 2 areas of concentration, with 3 courses in each (normally 1 intro, 1 junior sem, 1 outside Judaic Studies related to concentration) for a total of 6

Substitution permitted 2 years of biblical Hebrew for HEBR 130, 140 or equivalents for students with an area of concentration in Hebrew Bible

Senior requirement Two-term senior essay (JDST 491, 492), or one-term senior essay and addtl sem

CORE COURSE

JDST 200a^G/ER&M 219a/HIST 219a^G/MMES 149a/RLST 148a^G, History of the Jews and Their Diasporas to Early Modern Times Ivan Marcus

For description see under History.

SPECIAL PROJECT AND SENIOR ESSAY COURSES

***JDST 471a or b, Individual Tutorial** Staff

For students who wish, under faculty supervision, to investigate an area in Judaic Studies not covered by regular course offerings. May be used for research or for directed reading, but in either case a long essay or several short ones are required. To apply for admission, a student should present a prospectus with bibliography and a letter of support from the faculty member who will direct the work to the director of undergraduate studies.

***JDST 491a and 492b, The Senior Essay** Staff

The essay, written under the supervision of a faculty member, should be a substantial paper between 6,500 and 8,000 words for one term and between 12,500 and 15,000 words for two terms.

ELECTIVES WITHIN THE MAJOR

Classical Period

***JDST 235b^G/RLST 147b^G, Introduction to Judaism in the Ancient World**

Steven Fraade

The emergence of classical Judaism in its historical setting. Jews and Hellenization; varieties of early Judaism; apocalyptic and postapocalyptic responses to suffering and catastrophe; worship and atonement without sacrificial cult; interpretations of scriptures; law and life; the rabbi; faith in reason; Sabbath and festivals; history and its redemption. No prior background in Jewish history assumed. HU

***JDST 247b^c/RLST 325b^c, Rabbis and Others in Late Antiquity** Richard Kalmin
 Relations between Jews and other religious and ethnic groups in Persian and Roman Mesopotamia during late antiquity, from the third through the seventh centuries A.D. Attention to Syriac-speaking Christians, Zoroastrians, and indigenous Babylonian pagans. Consideration of rivals to the rabbis for power over the Jewish community, such as dream interpreters, aristocrats claiming royal descent, magicians, holy men, and astrologers. Attitudes, personalities, and events described in the Babylonian Talmud. HU

***JDST 393b^c/RLST 409b^c, Midrash Seminar: The Theophany of Sinai**
 Steven Fraade

Close study of the earliest rabbinic commentary to the Book of Deuteronomy, focusing on its interpretations of laws dealing with the responsibilities of public figures: judges, kings, priests, and prophets. Particular attention to the interrelation of rabbinic legal rhetoric and the hermeneutics of scriptural commentary, with comparisons to other corpora of ancient Jewish and non-Jewish law. Prerequisite: reading fluency in ancient Hebrew. L5, HU

Medieval and Early Modern Periods

***JDST 263a^c/HIST 222a/NELC 159a/WGSS 225a, Marriage and Kinship in Medieval Near East** Eve Krakowski

The social world of ordinary Jews during the Middle Ages in relation to the norms expressed in elite religious texts and in comparison with their Christian and Muslim neighbors. Use of Jewish documents preserved from tenth- to thirteenth-century Egypt and Syria. Focus on kinship and family life; the family as a flexible unit of social organization in a context marked by relatively few formal institutions. HU

***JDST 270a/HIST 232Ja/HUMS 443a/MMES 342a/RLST 201a, Medieval Jews, Christians, and Muslims Imagining Each Other** Ivan Marcus

For description see under History.

***JDST 276b^c/NELC 158b/RLST 250b^c, Jews and Minorities in the Islamic State**
 Eve Krakowski

Jewish legal identity and the social practice of Jewish law in the medieval Islamic Near East. Islamic political contexts of Jewish communal institutions; leadership, authority, and coercion; practices and functions of legal courts; comparative readings of responsa, legal documents, and prescriptive legal codes. HU

***JDST 285b^c, Early Modern Jewish History** Marc Saperstein

Jewish historical experience from the expulsion from Spain in 1492 to the French Revolution. The dynamics of Jewish life in Europe; skeptical critique of Jewish tradition; the messianic movement of Shabbatai Zevi; Hasidism; the Jewish Enlightenment. Emphasis on new trends in historiography. HU

Modern Period

***JDST 281a/PHIL 405a, Jewish Philosophy in the Twentieth Century**
 Michael Morgan

Major figures in the tradition of Jewish philosophy during the twentieth century. Engagement with the Western philosophical tradition, especially in Europe and in postwar America. The impact of the Six-Day War and the Nazi Holocaust on American Jewish thinkers. HU

JDST 286b^G/HIST 269b^G/RLST 230b^G, Holocaust in Historical Perspective

Marc Saperstein

For description see under History.

***JDST 294a^G/PHIL 454a^G, Emmanuel Levinas: Ethics as First Philosophy**

Michael Morgan

The works of Emmanuel Levinas, a French philosopher and Jewish thinker of the second half of the twentieth century. Levinas's early study of Husserl and Heidegger, the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human "other," the role of language and the relationship between ethics and religion, and Judaism and its relationship to Western philosophy. HU

***JDST 306b/MMES 157b/NELC 157b^G, Israeli Narratives** Shiri Goren

For description see under Near Eastern Languages & Civilizations.

JDST 313b/LAST 313b/LITR 256b, Jewish Latin American Literature Adriana Jacobs

For description see under Literature.

***JDST 386a/FREN 353a, Jewish Identity and French Culture** Maurice Samuels

For description see under French.

LANGUAGE AND LITERATURE

***JDST 301b/HEBR 151b^G/MMES 153b, Introduction to Modern Israeli Literature**

Ayala Dvoretzky

For description see under Near Eastern Languages & Civilizations.

***JDST 311b^G/RLST 418b^G, Babylonian Aramaic** Yochanan Breuer

Introduction to the Aramaic dialect used in the Babylonian Talmud and Geonic literature. Basic structure and types of the dialect; methodology for investigating it; comparison with other Aramaic dialects; contact with Hebrew and other languages. Prerequisite: HEBR 140 or equivalent, or with permission of instructor.

JDST 314a/LITR 201a, Transnational Encounters in Contemporary Israeli Poetry

Adriana Jacobs

For description see under Literature.

***JDST 405a/HEBR 156a^G/MMES 216a, Dynamics of Israeli Culture** Shiri Goren

For description see under Near Eastern Languages & Civilizations.

JDST 407b/HEBR 161b/MMES 156b, Israeli Popular Music Dina Roginsky

For description see under Near Eastern Languages & Civilizations.

***JDST 409b/HEBR 159b^G/MMES 159b, Conversational Hebrew: Israeli Media**

Shiri Goren

For description see under Near Eastern Languages & Civilizations.

***JDST 410a/HEBR 163a, Mishnaic Hebrew Grammar** Yochanan Breuer

For description see under Near Eastern Languages & Civilizations.

GRADUATE AND PROFESSIONAL SCHOOL COURSES OF INTEREST TO UNDERGRADUATES

Qualified students may elect relevant courses in the Graduate School with permission of the director of graduate studies, the director of undergraduate studies, and the instructor of the course. They may also offer toward the degree as many as four courses taken in professional schools of the University with permission of the instructors, the director of undergraduate studies, and the dean or registrar of the schools involved. (See "Courses in the Yale Graduate and Professional Schools" in chapter II, section K.) A complete list and descriptions of relevant graduate and professional school courses are available from the director of undergraduate studies.

Kiswahili

(See under African Studies.)

Korean

(See under East Asian Languages and Literatures.)

Latin

(See under Classics.)

Latin American Studies

Director of undergraduate studies: Aníbal González, Rm. 226, 82–90 Wall St., 432-1149, anibal.gonzalez@yale.edu; www.yale.edu/macmillan/lais

FACULTY ASSOCIATED WITH THE PROGRAM OF LATIN AMERICAN STUDIES

Professors Rolena Adorno (*Spanish & Portuguese*), Mark Ashton (*Forestry & Environmental Studies*), Ned Blackhawk (*History, American Studies*), Garry Brewer (*School of Management*), Richard Burger (*Anthropology*), Alicia Schmidt Camacho (*American Studies*), Hazel Carby (*African American Studies, American Studies*), Amy Chua (*Law School*), Carlos Eire (*History, Religious Studies*), Eduardo Engel (*Economics*), Paul Freedman (*History*), Aníbal González (*Spanish & Portuguese*), Roberto González Echevarría (*Spanish & Portuguese*), K. David Jackson (*Spanish & Portuguese*), Gilbert Joseph (*History*), Stathis Kalyvas (*Political Science*), Enrique Mayer (*Anthropology*), Robert Mendelsohn (*Forestry & Environmental Studies*), María Rosa Menocal (*Spanish & Portuguese*), Mary Miller (*History of Art*), Florencia Montagnini (*Forestry & Environmental Studies*), Stephen Pitti (*History*), Susan Rose-Ackerman (*Law School, Political Science*), T. Paul Schultz (*Economics*), Stuart Schwartz (*History*), Susan Stokes (*Political Science*), Robert Thompson (*History of Art*), Noël Valis (*Spanish & Portuguese*), Michael Veal (*Music*), Elisabeth Wood (*Political Science*)

Associate Professors Thad Dunning (*Political Science*), Moira Fradinger (*Comparative Literature*), Leonard Munstermann (*Public Health*)

Assistant Professors Jafari Allen (*Anthropology, African American Studies*), Robert Bailis (*Forestry & Environmental Studies*), Sean Brotherton (*Anthropology*), Susan Byrne (*Spanish & Portuguese*), Ana De La O (*Political Science*), Mariola Espinosa (*School of Medicine*), Leslie Harkema (*Spanish & Portuguese*), Paulo Moreira (*Spanish & Portuguese*), Paulina Ochoa Espejo (*Political Science*), Kevin Poole (*Spanish & Portuguese*)

Senior Lectors II Margherita Tórtora, Sonia Valle

Senior Lectors Sybil Alexandrov, Marta Almeida, Pilar Asensio, Teresa Carballal, Mercedes Carreras, Ame Cividanes, Sebastián Díaz, Maripaz García, Oscar González Barreto, María Jordán, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé-Colom, Bárbara Safille, Terry Seymour

Lector Rosamaría León

The major in Latin American Studies is designed to further understanding of the societies and cultures of Latin America as viewed from regional and global perspectives. The Latin American Studies major builds on a foundation of language and literature, history, history of art, theater studies, humanities, and the social sciences; its faculty is drawn from many departments and professional schools of the University.

The major The major in Latin American Studies is interdisciplinary. With two goals in mind—intellectual coherence and individual growth—the student proposes a course of study that must satisfy the requirements listed below. The proposed course of study must be approved by the director of undergraduate studies. Though all students choose courses in both the humanities and the social sciences, they are expected to concentrate on one or the other.

Prerequisite to the major is knowledge of the two dominant languages of the region, Spanish and Portuguese. Depending on their interests, students select one language for two years of instruction and the other for one. Other languages necessary for research may in appropriate circumstances be substituted for the second language with the consent of the director of undergraduate studies. Students are encouraged to meet the language requirements as early as possible. Courses used to satisfy the language prerequisite may not be counted toward the major.

The major itself requires twelve term courses: one introductory course approved by the director of undergraduate studies; eight courses related to Latin America from departmental offerings or from the list of electives below; two further electives, preferably seminars; and the senior essay, LAST 491. The eight Latin American content courses must be selected from the following categories: two courses in the social sciences (anthropology, economics, political science, or sociology), two courses in history, two courses in Spanish American or Brazilian literatures beyond the language requirement, one course in history of art or theater studies, and a seminar. Recommended courses are SPAN 266 and 267.

Students must enroll in three seminars or upper-level courses during their junior and senior years. For a list of seminars students should consult the director of undergraduate studies. Elective seminars must be approved by the director of undergraduate studies.

The senior essay is a research paper written usually in one term (LAST 491). Students choose their own topics, which may derive from research done in an earlier course. The essay is planned in advance in consultation with a qualified adviser and a second reader.

In preparing the senior essay, students may undertake field research in Latin America. Support for research is available to recipients of an Albert Bildner Travel Prize, for which application should be made in the spring of the junior year. Students may also apply for summer travel grants through the Council on Latin American and Iberian Studies. Information about these and other grants is available on the Web at studentgrants.yale.edu.

Students are strongly encouraged to take advantage of study abroad opportunities during summers or through the Year or Term Abroad program.

REQUIREMENTS OF THE MAJOR

Prerequisites 2 years of 1 lang (Spanish or Portuguese), 1 year of the other

Number of courses 12 term courses beyond prereqs (incl senior essay)

Distribution of courses 1 intro course approved by DUS; 8 courses related to Latin America as specified, one a sem from approved list; 2 adtl electives; 3 approved sems or upper-level courses among electives in junior and senior years

Senior requirement Senior essay (LAST 491)

ELECTIVES WITHIN THE MAJOR

Students wishing to count toward the major courses that do not appear on this list should consult with the director of undergraduate studies.

***LAST 001b/PORT 001b/SPAN 050b, Latin American Short Fiction** Paulo Moreira
For description see under Portuguese.

***LAST 220b/SPAN 220b/THST 220b, Theater and Poetry Workshop** Sonia Valle
For description see under Spanish.

***LAST 222a/SPAN 222a, Legal Spanish** Mercedes Carreras
For description see under Spanish.

***LAST 223b/SPAN 223b, Spanish in Film: An Introduction to the New Latin American Cinema** Margherita Tórtora
For description see under Spanish.

***LAST 224a or b/SPAN 224a or b, Spanish in Politics, International Relations, and the Media** Teresa Carballal
For description see under Spanish.

LAST 225b/SPAN 225b, Spanish for the Medical Professions Mercedes Carreras
For description see under Spanish.

***LAST 227a/SPAN 227a, Creative Writing** María Jordán
For description see under Spanish.

LAST 232a/ANTH 232a/ARCG 232a, Ancient Civilizations of the Andes
Richard Burger
For description see under Anthropology.

- LAST 243a or b/SPAN 243a or b, Advanced Spanish Grammar** Terry Seymour,
Sybil Alexandrov
For description see under Spanish.
- ***LAST 253a/HIST 253Ja, Dissidence and Control in Hapsburg Spain and Its New World Empire** María Jordán
For description see under History.
- LAST 266a/SPAN 266a, Studies in Latin American Literature I** Rolena Adorno
For description see under Spanish.
- LAST 267b/SPAN 267b, Studies in Latin American Literature II**
Roberto González Echevarría
For description see under Spanish.
- LAST 313b/JDST 313b/LITR 256b, Jewish Latin American Literature** Adriana Jacobs
For description see under Literature.
- ***LAST 318a/ARCH 341a^G, Globalization Space** Keller Easterling
For description see under Architecture.
- ***LAST 328a/PLSC 328a, Latin American Political Thought** Paulina Ochoa Espejo
For description see under Political Science.
- LAST 348a/AFST 347a/PLSC 347a, Post-Conflict Politics** David Simon
For description see under Political Science.
- ***LAST 352b/PLSC 355b^G, Armed Groups and Patterns of Violence** Elisabeth Wood
For description see under Political Science.
- ***LAST 356b/ER&M 270b/HIST 358Jb, History of Mexico since Independence**
Gilbert Joseph
For description see under History.
- LAST 361a/HIST 361a, History of Brazil** Stuart Schwartz
For description see under History.
- ***LAST 372a/ER&M 342a/HIST 372Ja, Revolutionary Change and Cold War in Latin America** Gilbert Joseph
For description see under History.
- ***LAST 406a/AFST 420a/EP&E 246a/PLSC 430a, The Politics of Development Assistance** David Simon
For description see under Ethics, Politics, & Economics.
- ***LAST 410b/ECON 462b/EP&E 228b/GLBL 316b, The Economics of Human Capital in Latin America** Douglas McKee
For description see under Economics.
- ***LAST 423a/EP&E 243a/GLBL 336a/PLSC 423a, Political Economy of Poverty Alleviation** Ana De La O
For description see under Political Science.

*AFAM 339a/AMST 339a/ER&M 343a/LITR 272a, **Caribbean Fiction** Hazel Carby
For description see under African American Studies.

*ANTH 114a, **Introduction to Medical Anthropology** Sean Brotherton

*ANTH 357a^G, **Anthropology of the Body** Sean Brotherton

*ANTH 427b, **Topics in Medical Anthropology** Sean Brotherton

*ANTH 462b^G, **Ethnographic Perspectives on Global Health** Marcia Inhorn

ER&M 200a, **Introduction to Ethnicity, Race, and Migration**
Alicia Schmidt Camacho

HIST 184a/AFAM 160a/AMST 160a, **Slavery and Abolition in Atlantic History, 1500–1888** Edward Rugemer, Alejandra Dubcovsky
For description see under History.

*HIST 415Ja/AMST 318a, **Perspectives on World Poverty** Joanne Meyerowitz
For description see under History.

HSAR 378b/AFAM 178b/AFST 188b/ER&M 278b, **From West Africa to the Black Americas: The Black Atlantic Visual Tradition** Robert Thompson
For description see under History of Art.

HSAR 379a/AFAM 112a, **New York Mambo: Microcosm of Black Creativity**
Robert Thompson
For description see under History of Art.

*PORT 350a^G/LITR 252a, **Machado de Assis** K. David Jackson
For description see under Portuguese.

*PORT 385b^G/LITR 260b, **Brazilian Literature in the New Republic** K. David Jackson
For description see under Portuguese.

*SPAN 060a, **Freshman Colloquium: Literary Studies in Spanish** Leslie Harkema

SPAN 246b, **Introduction to the Cultures of Spain** Susan Byrne, Leslie Harkema

*SPAN 250a, **Composition and Analysis** Susan Byrne

*SPAN 306b, **Modernity in Hispanic Poetry** Leslie Harkema

*SPAN 351a, **Travelers in Latin American Fiction** Aníbal González

*SPAN 352a, **Ethics and Politics in the Spanish American Short Story**
Aníbal González

DIRECTED READING AND SENIOR ESSAY COURSES

*LAST 471a or b, **Directed Reading** Aníbal González

For students who wish to investigate an area of Latin American Studies not covered by regular offerings. The project must terminate with a term paper or its equivalent. No more than one term of credit may be earned. To apply for admission, a student should present

a prospectus and a bibliography to the director of undergraduate studies no later than one day before the course selection period concludes. Written approval from the faculty member who will direct the student's reading and writing must accompany the prospectus.

***LAST 491a or b, The Senior Essay** Aníbal González

Preparation of a research paper about forty pages long under the direction of a faculty adviser, in either the fall or the spring term. Students write on subjects of their own choice. During the term before the essay is written, students plan the project in consultation with a qualified adviser or the director of undergraduate studies. The student must submit a suitable project outline and bibliography to the adviser and the director of undergraduate studies by the third week of the term. The outline should indicate the focus and scope of the essay topic, as well as the proposed research methodology.

Permission may be given to write a two-term essay after consultation with an adviser and the director of undergraduate studies and after submission of a project statement. Only those who have begun to do advanced work in a given area are eligible. The requirements for the one-term senior essay apply to the two-term essay, except that the two-term essay should be substantially longer.

OTHER COURSES RELEVANT TO THE MAJOR

A list of courses intended as a guide to students in preparing their programs is available at the office of the director of undergraduate studies. Qualified students may also elect pertinent courses in the Graduate School and in some of the professional schools with permission of the director of graduate studies and the director of undergraduate studies.

Lesbian and Gay Studies

(See under Women's, Gender, and Sexuality Studies.)

Linguistics

Director of undergraduate studies: Raffaella Zanuttini, Rm. 209, 370 Temple St., 432-2452, raffaella.zanuttini@yale.edu; ling.yale.edu

FACULTY OF THE DEPARTMENT OF LINGUISTICS

Professors Stephen Anderson, Robert Frank (*Chair*), Roberta Frank, Laurence Horn, Frank Keil, Zoltán Szabó, Raffaella Zanuttini

Associate Professors Ann Biersteker (*Adjunct*), Claire Bowern, Maria Piñango

Assistant Professors Ashwini Deo, Gaja Jarosz, Jelena Krivokapić

Lecturer Einar Mencl

Linguistics is the scientific study of language. The major in Linguistics offers a program of studies leading toward an understanding of phonological, grammatical, and semantic structure and of various approaches to descriptive, experimental, and historical linguistics.

It also includes course work leading to proficiency in one or two foreign languages. Majors may concentrate on theoretical, experimental, or computational linguistics, on various aspects of comparative grammar, or on a particular family of languages. Interested students should consult the director of undergraduate studies.

The normal prerequisite for the major is LING 110 or 117 with a grade of B+ or better. This requirement may be waived by the director of undergraduate studies for students who have taken other linguistics courses. Fourteen additional term courses are required for the major, distributed as follows:

1. Breadth requirement (four courses). All majors must take Introduction to Phonological Analysis (LING 232) and Syntax I (LING 253). In addition, at least one course must be taken in any two of the following areas: phonetics, morphology, semantics/pragmatics, computational linguistics, language and mind/brain, and historical linguistics.
2. Depth requirement (two courses). In one of the eight core areas (phonetics, phonology, morphology, syntax, semantics/pragmatics, computational linguistics, language and mind/brain, and historical linguistics), students must take two additional courses beyond the introductory level.
3. Language requirement (three courses). Three term courses (or the equivalent) in one or two foreign languages beyond the elementary level are required; courses designated L₃ or higher are normally accepted. This requirement may be fulfilled in part in the freshman or sophomore years.
4. Electives (three courses). Three additional courses relating to linguistics are required. Electives may be selected from Linguistics courses or from approved courses with substantial linguistic content in other departments (including foreign language courses). With the approval of the director of undergraduate studies, one course bearing a less direct relation to linguistics from another program (e.g., Anthropology, Classics, Cognitive Science, Computer Science, English, Philosophy, or Psychology) may be applied to this requirement if it is relevant to the student's program.
5. Research requirement (two courses). Research Methods in Linguistics (LING 490) and the Senior Essay (LING 491) are required, and are usually taken in sequence during the senior year.

REQUIREMENTS OF THE MAJOR

Prerequisites LING 110, 117, or equivalent, with a grade of B+ or higher

Number of courses 14 term courses beyond prereq (incl senior req)

Specific courses required LING 232, 253, 490

Distribution of courses One course each in 2 of 6 core areas other than phonology and syntax; 2 courses beyond intro level in one of 8 core areas; 3 language courses at level L₃ or higher; 3 electives

Senior requirement Senior essay (LING 491)

INTRODUCTORY COURSES

Courses in this group do not require previous study of linguistics.

***LING 107a, Linguistic Diversity and Endangerment** Stephen Anderson

Introduction to the complexity of the question “How many languages are there in the world?” Geographical and historical survey of the world’s languages; consideration of the ways in which languages can differ from one another. Language endangerment and the threat to world linguistic diversity it poses. SO

LING 108b, Structure and History of English Words Laurence Horn

Sources and resources of the English lexicon. The development and internal structure of English words, especially those of classical origin. Application of linguistic principles to the study of etymology, word meaning, and semantic change. Focus on understanding the richness of the English vocabulary and its cultural roots while acquiring tools to analyze words and their elements. HU

LING 110a^G, Language: Introduction to Linguistics Raffaella Zanuttini and staff

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 relation of linguistics to psychology, logic, and other disciplines. SO

LING 112a^G, Historical Linguistics Claire Bowern and staff

Introduction to language change and language history. Types of change that a language undergoes over time: sound change, analogy, syntactic and semantic change, borrowing. Techniques for recovering earlier linguistic stages: philology, internal reconstruction, the comparative method. The role of language contact in language change. Evidence from language in prehistory. HU

***LING 115a^G/SKRT 110a, Introductory Sanskrit I** David Brick

For description see under South Asian Studies.

LING 116b/CGSC 216b, Cognitive Science of Language Robert Frank

The study of language from the perspective of cognitive science. An exploration of the mental structures that underlie our ability to learn and process language, drawing on studies of normal and atypical language development and processing, brain imaging, neuropsychology, and computational modeling. Innate linguistic structure vs. determination by experience and culture; the relation between linguistic and nonlinguistic cognition in the domains of decision making, social cognition, and musical cognition; the degree that our language shapes perceptions of color, number, space, and gender. SO

LING 117a^G/PSYC 137a, Language and Mind Maria Piñango

Knowledge of language as a component of the mind: mental grammars, the nature and subdivisions of linguistic knowledge in connection with 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. SO

LING 125b^G/SKRT 120b^G, Introductory Sanskrit II David Brick

For description see under South Asian Studies.

LING 138a/SKRT 130a^G, Intermediate Sanskrit I David Brick

For description see under South Asian Studies.

LING 148b/SKRT 140b^G, Intermediate Sanskrit II David Brick

For description see under South Asian Studies.

LING 149b/PSYC 149b, Animal Communication and Human Language

Stephen Anderson

Animal communication systems found in nature, including those of honeybees, frogs, birds, and primates. Comparison of these systems with human language. Evaluation of efforts to find or induce specifically linguistic abilities in a variety of animals, leading to conclusions about animals' cognitive capacities. SO

***LING 150a/ENGL 150a, Old English** Roberta Frank

For description see under English Language & Literature.

***LING 183b/ENGL 155b, Readings in Old Norse Poetry and Prose: Chronicles of the Vikings** Roberta Frank

For description see under English Language & Literature.

INTERMEDIATE COURSES

Some courses in this group have prerequisites; others do not, and may be taken as a student's first course in linguistics.

***LING 200b^G, Experimentation in Linguistics** Jelena Krivokapić

Principles and techniques of experimental design and research in linguistics. Linguistic theory as the basis for framing experimental questions. The development of theoretically informed hypotheses, notions of control and confounds, human subject research, statistical analysis, data reporting, and dissemination. Prerequisite: LING 110, 117, 220, CGSC 110, or PSYC 110, or permission of instructor. SO

***LING 211a, Grammatical Diversity in U.S. English** Raffaella Zanuttini

Study of differences among varieties of English spoken in North America, focusing in particular on morphosyntactic variation: double modals ("I might could go to the store"), a-prefixing ("She was a-building a house"), negative inversion ("Don't nobody want to ride the bus"), aspect marking ("Bruce be running," "I done pushed it"). Emphasis on the grammatical richness and complexity of each variety. Prerequisite: at least one 100-level course in Linguistics, or permission of instructor. SO

LING 212b^G, Linguistic Change Stephen Anderson

Principles governing linguistic change in phonology and morphology. Status and independence of proposed mechanisms of change. Relations between the principles of historical change and universals of language. Systematic change as the basis of linguistic comparison; assessment of other attempts at establishing linguistic relatedness. Prerequisites: LING 112, 232, and 253. SO

LING 220a^G/PSYC 318a, General Phonetics Jelena Krivokapić

Investigation of possible ways to describe the speech sounds of human languages. Acoustics and physiology of speech; computer synthesis of speech; practical exercises in producing and transcribing sounds. (Formerly LING 120) SO

LING 224b^G, Formal Foundations of Linguistic Theories I Gaja Jarosz

Mathematical methods in linguistics. Set theory, logic and formal systems, model theory, lambda calculus, formal language theory, elementary statistics, and probability. QR

LING 227a^G/PSYC 327a, Language and Computation Gaja Jarosz

Design and analysis of computational models of language. Topics include finite state tools, computational morphology and phonology, grammar and parsing, lexical semantics, and the use of linguistic models in applied problems. Prerequisite: Prior programming experience or permission of instructor. (Formerly LING 141) QR, SO

***LING 230b^G, Techniques in Neurolinguistics** Einar Mencl

Introduction to common techniques and research in cognitive neuroimaging, with applications to the study of language. Techniques include MRI acquisition, preprocessing, single- and multisubject data analysis, visualization, and network analysis. Review of ERP and MEG. Topics include speech production and perception, literacy, and dyslexia. Prerequisite: LING 110 or permission of instructor.

LING 231b^G/PSYC 331b, Neurolinguistics Maria Piñango

The study of language as a cognitive neuroscience. The interaction between linguistic theory and neurological evidence from brain damage, degenerative diseases (e.g., Alzheimer's disease), mental illness (e.g., schizophrenia), neuroimaging, and neurophysiology. The connection of language as a neurocognitive system to other systems such as memory and music. SO

LING 232a^G, Introduction to Phonological Analysis Gaja Jarosz

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. Prerequisite: LING 220, or a grade of B or above in LING 110. (Formerly LING 132) SO

***LING 235b^G, Phonological Theory** Gaja Jarosz and staff

Topics in the architecture of a theory of sound structure. Motivations for replacing a system of ordered rules with a system of ranked constraints. Optimality theory: universals, violability, constraint types and their interactions. Interaction of phonology and morphology, as well as relationship of phonological theory to language acquisition and learnability. Opacity, lexical phonology, and serial versions of optimality theory. Prerequisite: LING 232 or permission of instructor. (Formerly LING 135) SO RP

***LING 236b^G, Articulatory Phonology** Jelena Krivokapić

Introduction to phonology as a system for combining units of speech (constriction gestures of the vocal organs) into larger structures. Analysis of articulatory movement data; modeling using techniques of dynamical systems. Emphasis on universal versus language-particular aspects of gestural combination and coordination. Prerequisite: LING 220 or permission of instructor. SO

***LING 241b^G, Field Methods** Claire Bower and staff

Principles of phonetics, phonology, morphology, syntax, and semantics applied to the collection and interpretation of novel linguistic data. Data are collected and analyzed by the class as a group, working directly with a speaker of a relatively undocumented language. Open to majors in Linguistics, and to others with permission of instructor. SO

***LING 247b⁶, Indigenous Languages of Australia** Claire Bower

A general introduction to the indigenous languages of Australia. Issues in phonology, morphology, syntax, sociolinguistics, prehistory (e.g., theories of colonization and spread), and language endangerment and revitalization. Prerequisite: a course in linguistics. (Formerly LING 147) SO

LING 253a⁶, Syntax I Raffaella Zanuttini

An introduction to the syntax of natural language. Generative syntactic theory and key theoretical concepts. Syntactic description and argumentation. Topics include the structure of clauses and noun phrases, movement operations, and the notion of parameter. (Formerly LING 153) SO

LING 254b⁶, Syntax II Robert Frank

Recent developments in the principles and parameters approach to syntactic theory. In-depth exploration of theoretical and empirical issues in long-distance dependencies (island effects, dependency types, movement vs. binding), the character of syntactic structure (constituency, thematic mapping, functional categories), and the architecture of grammatical derivations (logical form, operations for structure building, anaphora). Prerequisite: LING 253. SO

LING 263b⁶, Semantics Ashwini Deo and staff

Introduction to truth-conditional compositional semantics. Set theory, first- and higher-order logic, and the lambda calculus as they relate to the study of natural language meaning. Some attention to analyzing the meanings of tense/aspect markers, adverbs, and modals. QR, SO

LING 271b/PHIL 271b, Philosophy of Language Bruno Whittle

For description see under Philosophy.

ADVANCED SEMINARS***LING 320b, Origins of Sound Structure** Gaja Jarosz

Universal Grammar, learning biases, and phonetics as potential explanations for phonological typology. Perspectives include diachronic approaches, computational models, and experimental and acquisition studies. Prerequisite: LING 232; LING 235 recommended. SO

***LING 321a⁶, Topics in Phonetics: Prosody** Jelena Krivokapić

Survey of structural and phonetic properties of prosody. Theories of prosodic hierarchies, manifestations of prosodic structure in acoustics and articulation, factors influencing prosodic boundary placement, prosody in speech perception, and prosodic transcription. Laboratory exercises examine acoustic properties of prosodic structure. Prerequisite: LING 220 or permission of instructor. SO

***LING 340a⁶, Topics in Phonology: Foot Structure** Ryan Bennett

Arguments for and against the existence of foot structure in natural language. Evidence drawn from stress systems, prosodic morphology, foot-conditioned segmental phonotactics, and experimental studies. Other possible topics include prosodic hierarchy theory and competing views of metrical structure; opacity effects in metrically conditioned

phenomena; and the typology of foot structure and possible sources for observed cross-linguistic regularities in footing. Prerequisites: LING 220, 232. SO

***LING 355b^c, Doubling in Syntax** Raffaella Zanuttini

Syntactic structures that exhibit doubling effects, and syntactic mechanisms that can give rise to them. Topics include double modal constructions (“I might could go with you tomorrow”); clitic doubling (“Lo vimos a Juan”); doubling in questions (“John takes everything seriously, doesn’t he?”) and declaratives (“He takes everything seriously, John does”). Prerequisite: LING 253 or equivalent. SO

***LING 360a, Topics in Syntax: Compositional Syntax** Robert Frank

Grammatical frameworks in which the properties of the operations for constructing syntactic structure play a central explanatory role. Comparison of minimalism, tree adjoining grammar, and combinatory categorial grammar, with attention to their implications for syntactic phenomena such as agreement, displacement, and word order variation, as well as their consequences for the nature of the syntax-semantics interface. Prerequisite: LING 254 or equivalent, or with permission of instructor. SO

***LING 372b^c, Meaning, Concepts, and Words** Maria Piñango

A cognitive approach to the structure of meaning from the perspective of the language system. The brain’s finite collection of stored concepts, which are combined and recombined via predetermined principles. The system of associating combinations of concepts with combinations of words and sentences to produce an unlimited number of novel thoughts. Prerequisite: at least one course in linguistics, psychology, or cognitive science. SO

***LING 376b^c/PHIL 433b, Implicature and Pragmatic Theory** Laurence Horn

Diverse approaches to the characterization of what is said and what is meant. Pragmatic intrusion into truth-conditional meaning in neo-Gricean pragmatics and relevance theory; the problem of “embedded implicatures” and the grammatical view of scalar implicature. Experimental studies of implicature and the grammar/pragmatics interface. Prerequisite: one course in semantics or pragmatics, or permission of instructor. (Formerly LING 276) SO RP

ADVANCED RESEARCH COURSES

***LING 471a and 472b, Special Projects** Raffaella Zanuttini

Special projects set up by students with the help of a faculty adviser and the director of undergraduate studies to cover material not otherwise offered by the department. The project must terminate with at least a term paper or its equivalent and must have the approval of the director of undergraduate studies. Only one term of credit for a project may count toward the major; no more than two terms may count toward the bachelor’s degree.

***LING 490a^c/PSYC 372a, Research Methods in Linguistics** Maria Piñango

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, and use of language corpora and databases. Introduction to research in language acquisition and language change. Prerequisites: one course in syntax and one course in phonology.

***LING 491b, The Senior Essay** Raffaella Zanuttini

A weekly colloquium in which senior Linguistics majors, in rotation, make presentations of research material that will culminate in the development of their senior essays. Under the guidance of departmental faculty (or in some cases supporting faculty in other departments), students select a topic, present material related to the research on that topic, give preliminary versions of their essay, and complete the essay. Prerequisite: LING 490.

RELATED COURSES

***ANTH 364a^c, Language, Nation, and Globalization** J. Joseph Errington

***ANTH 413b^c, Language, Culture, and Ideology** J. Joseph Errington

***CHLD 128b/EDST 128b/PSYC 128b, Language, Literacy, and Play** Nancy Close,
Carla Horwitz

For description see under Child Study Center.

***ENGL 402b, Alliterative Poetry in Middle English** Ian Cornelius

LATN 390b^c, Latin Syntax and Stylistics Joseph Solodow

For description see under Classics.

PHIL 115a, First-Order Logic Raul Saucedo

PHIL 267b^c, Mathematical Logic Sun-Joo Shin

***PHIL 426b^c, Logic and Metaphysics in Eastern Philosophy** Raul Saucedo

The Literature Major

Director of undergraduate studies: Moira Fradinger, Rm. 102, 451 College St., 432-4750,
maryjane.stevens@yale.edu

FACULTY OF THE LITERATURE MAJOR

Professors Dudley Andrew (*Chair*), Peter Brooks (*Emeritus*), Katerina Clark, Roberto González Echevarría, Benjamin Harshav (*Emeritus*), Geoffrey Hartman (*Emeritus*), Michael Holquist (*Emeritus*), Carol Jacobs, Pericles Lewis, Barry McCrea, Rainer Nägele, David Quint, Katie Trumpener

Associate Professor Moira Fradinger

Assistant Professors Benjamin Conisbee Baer, David Gabriel

Lecturers Jan Hagens, Adriana Jacobs

Senior Lector Howard Stern

Affiliated Faculty Rolena Adorno (*Spanish & Portuguese*), R. Howard Bloch (*French*), Rüdiger Campe (*German*), Francesco Casetti (*Film Studies*), Kang-i Sun Chang (*East Asian Languages & Literatures*), Peter Demetz (*Emeritus*) (*German*), Michael Denning (*American Studies*), Wai Chee Dimock (*English*), Shoshana Felman (*Emeritus*) (*French*), Paul Fry (*English*), Beatrice Gruendler (*Near Eastern Languages & Civilizations*), Karsten

Harries (*Philosophy*), Tina Lu (*East Asian Languages & Literatures*), John MacKay (*Slavic Languages & Literatures*), Giuseppe Mazzotta (*Italian*), Christopher L. Miller (*French*), Joseph Roach (*English*), Maurice Samuels (*French*), Henry Sussman (*German*) (*Visiting*), Christopher Wood (*History of Art*), Ruth Yeazell (*English*)

The Literature Major allows students to address fundamental questions about the nature, function, and value of literature in a broadly comparative context. Majors read and write about a wide variety of literary works across periods, genres, and national traditions. They investigate traditional and contemporary approaches to literary study, ancient and modern literary theory, and the relationship of literature to film and to other branches of the arts and sciences.

The Literature Major offers students the freedom to construct a program of study that reflects their intellectual goals. All students planning to major in Literature should register with the director of undergraduate studies, who will work with them to develop a coherent, well-focused sequence of courses suited to their individual interests.

The major offers a number of its own courses, which constitute the core of the program. Other courses are normally chosen from different language and literature programs, many of which offer courses on literature and film in translation. Among these programs are African American Studies, Classics, East Asian Languages and Literatures, English, Film Studies, French, German, Italian, Near Eastern Languages and Civilizations, Portuguese, Slavic Languages and Literatures, and Spanish. Courses in film studies count toward the major in the same way as courses in literature. Students with a particular interest in film may wish to elect the film track within the Literature major, described below.

The experience of reading a foreign literature in the original language enables us to understand the nature of both language and literature more fully. Prospective Literature majors are strongly encouraged to begin the study of a foreign language as early as possible in their academic careers and to continue such study throughout their time at Yale. Students interested in graduate study in comparative literature should be aware that many programs require reading knowledge of two or three foreign languages.

Prerequisites Completion of the Yale College foreign language distributional requirement is a prerequisite for entry into the major. Two specific courses are also prerequisites, LITR 120, Introduction to Narrative, and 122, World Poetry and Performance. These courses may be taken in either order.

The standard major Beyond the prerequisites, the Literature Major requires twelve term courses, including one required course, two core seminars, and the senior requirement. Students must take LITR 300, Introduction to Theory of Literature, in the sophomore or junior year. Students take an additional three courses in a foreign literature, in which they read the texts in the original language. Students may also elect to include in their major two courses in a related discipline that has direct bearing on their study of literature, such as English, history of art, philosophy, anthropology, music, or theater studies. One of these elective courses may be in creative writing. A third elective from a related discipline may be applied to the major with permission of the director of undergraduate studies.

Core seminars In core seminars, LITR 400–480, students focus intensively on particular texts, films, literary and cultural issues, and theoretical problems. Students are required to take at least two core seminars, preferably one in the junior and one in the senior year. The seminars provide training in literary interpretation and theory, preparing students for the senior essay.

Pre-1800 course requirement The Literature Major requires at least one course in literature before 1800. Because both genres and individual works of literature refer to, emulate, challenge, and rewrite older works and conventions, students benefit from acquiring a degree of historical perspective. All courses listed under “The Ancient World” and “Medieval and Early Modern Literature to 1800” fulfill the pre-1800 requirement. Courses from other departments may also fulfill the requirement.

Poetry or drama requirement In addition to LITR 122 and the pre-1800 course, all students must take one course in poetry or drama. The course may be one offered in a program other than Literature.

Foreign literature requirement All majors are required to take at least three additional term courses, beyond the foreign language distributional requirement, in an ancient or modern foreign literature, in which the literature is read in the original language. One or more courses can be taken at a basic literature level (normally equivalent to the third year of language study); however, at least one course must be taken at an advanced level (normally equivalent to the fourth year of language study or higher). Students are encouraged to continue developing their foreign language skills by taking advanced language courses and may, with permission of the director of undergraduate studies, substitute one language course at the L5 level for one of the three required foreign literature courses.

A literature course in translation is sometimes suitable as a foreign literature course. In such cases, Literature majors are expected to request additional assignments from their instructors that demonstrate they have engaged with the texts in the original language. They should fill out a form, signed by the instructor, attesting to their intent to do so. This form is available in the department office in Room 102, 451 College St.; students should submit it to the director of undergraduate studies along with their course schedule.

Nonnative speakers of English who are granted permission by Yale College to complete the foreign language distributional requirement by taking ENGL 114, 120, or 450 may take three additional English literature courses to fulfill the foreign literature requirement of the Literature Major, or they may fulfill the major requirements in a third language.

The senior essay In the senior essay, required of all majors, students develop a research topic of their choice and work closely with a faculty adviser. Normally, the essay makes use of texts in the language of their original composition. Any exceptions must be approved by the director of undergraduate studies. Deadlines for the prospectus, the rough draft, and the completed essay are listed in the course descriptions of the senior essay course (LITR 491 and 492, 493).

The senior essay may be written over one term (LITR 491) or over two terms (LITR 492, 493). Alternatively, students may fulfill the senior essay requirement within the

context of a core seminar (the senior seminar essay). Because no more than five students per seminar may elect this option, students should petition the instructor promptly at the beginning of the term. It is understood that students choosing the senior seminar essay will work closely with the instructor throughout the term and produce a substantial paper, approximately thirty pages. Students earn one course credit for the seminar in which the essay is written; no additional course credit is awarded for the essay itself.

Students with an especially well-developed project may petition to write a yearlong senior essay. Interested juniors must apply to the director of undergraduate studies by the last day of classes in the spring term. Students may count the second term of the essay as one elective course toward the total number of courses required for the major. Students expecting to graduate in May enroll in LITR 492 during the fall term and complete their essays in 493 in the spring term. December graduates enroll in 492 in the spring term and complete their essays in 493 during the following fall term. Students planning to begin their essay in the spring term should notify the director of undergraduate studies by the last day of classes in the fall term.

Film track Students may elect to pursue a film-intensive concentration within the Literature Major. Students in the film track must fulfill the same requirements as those in the standard Literature track, with the following exceptions. Film-track students take LITR 143, World Cinema, instead of LITR 122 as one of the prerequisites to the major. They take two foreign literature courses rather than three; neither may be substituted with an advanced language course. In addition, students in the film track must take one course in film theory and three electives in the field of film studies.

Intensive major Students in the intensive major complete three courses each in two non-anglophone literatures, in all of which the literature is read in the original language. Three of these courses take the place of the three electives in the non-intensive major. Intensive majors must also demonstrate proficiency at the L₅ level in one of their languages and at the L₄ or above in the other. Students taking the intensive major in three national literatures must take two courses each in two national literatures and three in a third. They must demonstrate proficiency at the L₅ level in the language of their principal literature, and at the L₄ level or above in the other two.

Year or term abroad The Literature Major encourages students to consider spending a summer, a term, or a year abroad. Courses taken on international programs may, with permission of the director of undergraduate studies, be applied to the Literature Major's foreign literature requirement.

Foreign literature courses The following table lists languages in which advanced literature instruction is available at Yale, specifying courses that fulfill the basic and advanced literature requirements for the major. Courses with numbers higher than those listed also normally fulfill the requirement, providing that they focus on literature (rather than language) and that the literature is read in the original language.

<i>Language</i>	<i>Basic Literature Course</i>	<i>Advanced Literature Course</i>
Arabic	ARBC 150, 151	ARBC 165 or <166>
Chinese	CHNS 150, 151	CHNS 170, 171
French	FREN 170	Courses in French numbered 200 or higher
German	Courses in German numbered 170 or higher	Courses in German numbered 200 or higher
Ancient Greek	GREK 131 or 141	Ancient Greek courses numbered 400 or higher
Biblical Hebrew	HEBR <137>, <147>	By arrangement with instructor
Modern Hebrew	HEBR 151	HEBR 151
Italian	Courses in Italian numbered 200 or higher	Courses in Italian numbered 200 or higher
Japanese	JAPN 150, 151	JAPN 170 or 171
Korean	KREN 150, 151	KREN 470 or 471
Latin	LATN 131 or 141	Latin courses numbered 400 or higher
Persian	PERS 150	PERS 150
Portuguese	By arrangement with instructor	By arrangement with instructor
Russian	RUSS 150, 151	Courses in Russian numbered 170 or higher
Spanish	SPAN 261, 262, 266, or 267	Courses in Spanish numbered 300 or higher

Other ancient and modern languages, including those from Africa, South Asia, and the Middle East, may be suitable for the Literature Major if a qualified faculty adviser is available to supervise the major.

REQUIREMENTS OF THE MAJOR

Prerequisites *Both tracks*—LITR 120; completion of Yale College foreign lang distributional req; *Standard track*—LITR 122; *Film track*—LITR 143

Number of courses 12 term courses beyond prereqs (incl senior essay)

Specific course required LITR 300

Distribution of courses *Both tracks*—1 course in lit before 1800; 1 course in poetry or drama; 2 core sems; *Standard track*—3 courses in 1 foreign lit, as specified; *Film track*—2 courses in 1 foreign lit, as specified; 1 course in film theory; 3 electives in film studies

Substitution permitted *Standard track*—for 2 electives, 2 courses in another discipline, incl 1 in creative writing; a third course in another discipline for a lit elective, with DUS permission; 1 advanced lang course for 1 of 3 req foreign lit courses, with DUS permission

Senior requirement One-term senior essay (LITR 491); or two-term senior essay (LITR 492 and 493); or 1 core sem (LITR 400–480) with senior sem essay

Intensive major 3 addtl courses in a second foreign lang in place of 3 electives; demonstrated command of the second foreign lang to L4 level.

FRESHMAN SEMINAR

*LITR 099a/FILM 099a, **Film and the Arts** Dudley Andrew

For description see under Film Studies.

PREREQUISITES AND REQUIRED COURSES

***LITR 120a, Introduction to Narrative** Barry McCrea, Moira Fradinger,
David Gabriel

A team-taught course that examines how narratives work and what they do. Emphasis on fictional form, the mechanics of plot, and questions of time and duration. Texts are drawn from a variety of periods and cultures, and include folktales, short stories, novels, case studies, graphic novels, and films. WR, HU

LITR 122b, World Poetry and Performance Katie Trumpener, David Gabriel

A team-taught course that examines lyric and epic poetry, drama, film, song, and performance. Texts are drawn from a broad range of cultures and time periods, from the ancient Near East to our own time. Emphasis on how poetic and dramatic forms shape the stories they tell, on the social and cultural uses to which these forms are put, on the relationship between text and performance, and on historical and cross-cultural connections among texts. WR, HU

LITR 143b/FILM 240b, World Cinema John MacKay

An examination of the varieties of films that have been produced around the globe. Different functions served by the medium, particularly since World War II; analysis and contextualization of selected films from four continents. WR, HU

LITR 300b⁶/ENGL 300b, Introduction to Theory of Literature Paul Fry

An examination of concepts and assumptions in contemporary views of literature. Theories of meaning, interpretation, and representation. Critical analysis of formalist, psychoanalytic, structuralist, poststructuralist, Marxist, and feminist approaches to theory and to literature. HU

THE ANCIENT WORLD

***LITR 150a/CLCV 210a/HUMS 273a/MGRK 217a, Reception of Odysseus in Literature and Drama** George Syrimis

For description see under Hellenic Studies.

***LITR 153a/CLCV 265a/HUMS 465a, Contemporary Reception of Greek and Roman Classics** Emily Greenwood

For description see under Humanities.

***LITR 154a/ENGL 395a, The Bible as Literature** Leslie Brisman

For description see under English Language & Literature.

***LITR 155b/CLCV 238b/HUMS 269b, Classics in Africa and the Black Diaspora**
Emily Greenwood

For description see under Classics.

***LITR 156b/SAST 461b, Indian Texts and Contexts** Benjamin Conisbee Baer

For description see under South Asian Studies.

LITR 158a/CLCV 254a, Introduction to Greek Literature Victor Bers

For description see under Classics.

LITR 159b/CLCV 255b, Introduction to Latin Literature Christina Kraus

For description see under Classics.

MEDIEVAL AND EARLY MODERN LITERATURE TO 1800

***LITR 172a^c/CHNS 200a^c, Man and Nature in Chinese Literature** Kang-i Sun Chang

For description see under East Asian Languages & Literatures.

***LITR 173a/HUMS 284a/ITAL 311a/THST 316a, Italian Theater from Antiquity to the Renaissance** Giuseppe Mazzotta

For description see under Italian.

LITR 183a/ITAL 310a, Dante in Translation Giuseppe Mazzotta

For description see under Italian.

EUROPEAN LITERATURE SINCE 1800

LITR 201a/JDST 314a, Transnational Encounters in Contemporary Israeli Poetry

Adriana Jacobs

Introduction to authors and trends that have shaped Hebrew poetry of the twentieth and twenty-first centuries in Israel and abroad. Topics include multilingualism, translation, cosmopolitanism, gender politics, travel, diaspora, and migration. No knowledge of Hebrew required. HU Tr

LITR 206b/RSEE 255b/RUSS 255b, Studies in the Novel: Tolstoy

Vladimir Alexandrov

For description see under Slavic Languages & Literatures.

LITR 208a/RSEE 256a/RUSS 256a, Studies in the Novel: Dostoevsky Molly Brunson

For description see under Slavic Languages & Literatures.

***LITR 210a/GMST 319a/RUSS 325a, Modernist Berlin, Petersburg, and Moscow**

Katerina Clark, Roman Utkin

For description see under Slavic Languages & Literatures.

***LITR 220b/CZEC 301b/RSEE 300b, Milan Kundera: The Czech Novelist and French Thinker** Karen von Kunes

For description see under Slavic Languages & Literatures.

LITR 223a or b/ENGL 223a or b/HUMS 243a or b/THST 223a or b, Foundations of Modern Drama Murray Biggs and staff

For description see under Theater Studies.

***LITR 225b/CLCV 214b/HUMS 278b/MGRK 202b/WGSS 337b, The Poetry of C. P. Cavafy** George Syrimis

For description see under Hellenic Studies.

***LITR 235b/FREN 342b/HUMS 250b, French Literary Movements from Romanticism to Decadence** Yue Zhuo

For description see under French.

***LITR 247b/GMAN 350b/GMST 350b, Kafka's K's** Rainer Nägele

For description see under Germanic Languages & Literatures.

NON-EUROPEAN LITERATURE SINCE 1800

*LITR 251b/JAPN 251b^C, **Japanese Literature after 1970** John Treat

For description see under East Asian Languages & Literatures.

*LITR 252a/PORT 350a^C, **Machado de Assis** K. David Jackson

For description see under Portuguese.

LITR 256b/JDST 313b/LAST 313b, **Jewish Latin American Literature** Adriana Jacobs

An introduction to the major Jewish poets and fiction writers of Latin America. No knowledge of Spanish, Portuguese, or Hebrew required. HU Tr

*LITR 257b/ER&M 337b, **Literature, Ethics, and Globalization** Karin Gosselink

Exploration of globally circulating novels, short stories, and films that engage with the ethics of contemporary globalization. Multiculturalism, hybridity, and cosmopolitanism; the impact of political and economic ideologies of globalization. Particular attention to the literary representation of ethical dilemmas and responsibilities confronted by individuals and communities. HU

*LITR 260b/PORT 385b^C, **Brazilian Literature in the New Republic** K. David Jackson

For description see under Portuguese.

*LITR 263a/AFAM 461a/FILM 436a/FREN 411a, **Novel and Film in the Francophone Colonial and Postcolonial World** Christopher L. Miller

For description see under French.

*LITR 265a/CHNS 251a/ER&M 304a/HIST 308a/HUMS 448a, **China in the World** Jing Tsu

For description see under East Asian Languages & Literatures.

*LITR 271b/AFAM 369b/AMST 378b/ENGL 364b/THST 369b, **African American Theater** Paige McGinley

For description see under Theater Studies.

*LITR 272a/AFAM 339a/AMST 339a/ER&M 343a, **Caribbean Fiction** Hazel Carby

For description see under African American Studies.

*LITR 274a/SAST 374a, **Modern Literature in South Asia** Benjamin Conisbee Baer

For description see under South Asian Studies.

*LITR 280b/AFAM 338b/ENGL 335b, **Caribbean Poetry** Anthony Reed

For description see under English Language & Literature.

*LITR 291a/PORT 410a, **The Brazilian Short Story in Translation** K. David Jackson

For description see under Portuguese.

LITERARY THEORY AND SPECIAL TOPICS

*LITR 306a, **Poetry and Translation** Adriana Jacobs

The relationship between poetry and translation examined through various historical and critical lenses. The influence of translation on poetic traditions, the (un)translatibility of poetry, the relation between poets and their translators, self-translation, pseudotranslation, and the figure of the poet-translator. HU

*LITR 311b^G/FILM 409b^G/RUSS 311b^G, **Montage, Collage, and Politics** John MacKay
For description see under Film Studies.

*LITR 321a/AFST 322a/FREN 422a/MMES 362a/WGSS 344a, **Francophone Postcolonial Theory and Literature** Edwige Tamalet-Talbayev
For description see under French.

*LITR 323b/ENGL 336b/THST 303b, **The Opera Libretto** J. D. McClatchy
For description see under English Language & Literature.

*LITR 325a, **The Art of Poetry** Benjamin Harshav
A systematic theory of poetry, based on critical close readings of poems and concrete methods of description and analysis. Poems from various periods, trends, languages (translated or in the original), and poetics. Assignments can be based on works in other languages, coordinated with the instructor. Poems by Shakespeare, Milton, Wordsworth, Coleridge, Pushkin, Elizabeth Bishop, T. S. Eliot, W. H. Auden, E. E. Cummings, Brecht, O'Hara, Ashbery, and Yehuda Amichai. Theoretical essays include works by Roman Jakobson, I. A. Richards, Cleanth Brooks, Monroe Beardsley, and Benjamin Harshav. HU

*LITR 334b/GMAN 191b, **Problems of Lyric** Howard Stern
Masterpieces of European and American lyric studied in relation to the various determinants of poetry: grammar and logic, meter and rhyme, self-consciousness and performativity, myth and theme. Poets include Brecht, Rilke, Goethe, Frost, and Elizabeth Bishop. Reading knowledge of German or French useful but not required. HU

*LITR 336a/GMST 183a/HUMS 268a, **Childhood and Memory in Modern Literature** Henry Sussman
For description see under German Studies.

*LITR 339a/FREN 397a/HUMS 362a, **French Theory from Sartre to Derrida** Yue Zhuo
For description see under French.

*LITR 346b/GMST 182b/HUMS 400b, **Legacies of the Enlightenment** Kirk Wetters
For description see under German Studies.

*LITR 348b/HUMS 427b, **The Practice of Literary Translation** Peter Cole
For description see under Humanities.

FILM

*LITR 350b/FILM 410b/GMAN 406b, **Theatricality in Film** Brigitte Peucker
For description see under Film Studies.

LITR 351b/FILM 333b/HUMS 375b, **Early Film Theory and Modernity** Francesco Casetti
For description see under Film Studies.

LITR 354a/FILM 312a^G/HUMS 216a, **Theory of Media** Francesco Casetti
For description see under Film Studies.

*LITR 361a/FILM 305a, **History and Theory of Animation** Aaron Gerow
For description see under Film Studies.

*LITR 380b/FILM 411b, **The Films of Alfred Hitchcock** Brigitte Peucker

For description see under Film Studies.

CORE SEMINARS

Two seminars are required for Literature majors; nonmajors may be admitted with permission of the instructor.

*LITR 401b/HUMS 468b, **Freud and Science in the Twenty-First Century**

William Sledge, Moira Fradinger

For description see under Humanities.

*LITR 402b/ENGL 329b/HSAR 441b, **Picture Book to Graphic Novel**

Katie Trumpener, Ksenia Sidorenko

History of picture narratives from the early modern period to the present, placing the Anglo-American tradition within a broader context. The picture book's relationship to the comic strip, comic book, and especially the contemporary graphic novel. The complex relations between image and narrative, format and address. HU

*LITR 404a/ENGL 423a, **Paradise Lost and Epic** David Quint

For description see under English Language & Literature.

*LITR 408b, **Imperialist Modernism** Katerina Clark

The role of imperialism in modernist culture explored through literature, film, and painting. Works by Camus, Conrad, Leonard and Virginia Woolf, Gauguin, Victor Segalen, Kafka, T. S. Eliot, E. M. Forster, James Joyce, Pierre Loti, and Paul Bowles, as well as ethnographic films. HU

*LITR 409a, **Transnational Modernism** Benjamin Conisbee Baer

Introduction to the transnational in literature. Ways in which modernist writers around the world have imagined and represented other worlds in relation to their own. Writings from sites of cosmopolitan literary activity contrasted with works from or about rural and agrarian colonial locales. The figurative, political, and economic connections between such places in relation to their literary depictions. Modernity as a specifically colonial development. HU

*LITR 412b, **Comparative Primitivism** Benjamin Conisbee Baer

Representations of the primitive in modernist literature and visual art from the first half of the twentieth century. Primitivism as a way of accessing what is common to human beings; psychic archaism; psycholinguistic primitivity; representations of indigenous and aboriginal peoples; relations between anthropology, visual arts, and literature. Examples from India, Africa, and the Americas. HU

*LITR 420a/SPAN 393a, **The Jungle Books** Roberto González Echevarría

For description see under Spanish.

*LITR 431a/GMST 315a^G/HUMS 368a, **Systems and Their Theory** Henry Sussman

For description see under German Studies.

*LITR 439b^G/GMAN 308b^G, **Rilke and Yeats** Carol Jacobs

For description see under Germanic Languages & Literatures.

*LITR 440a/ENGL 422a, **James Joyce's *Ulysses*** Pericles Lewis

For description see under English Language & Literature.

*LITR 458b/ENGL 256b/HUMS 275b, **Class, Desire, and the Novel** Barry McCrea

Literary plots involving social and erotic progress examined in works from the seventeenth century to the present. Topics include social ambition or decline, the marriage plot and its alternatives, the narrative role of family or social outsiders, and sexuality and narrative form. HU

*LITR 463a/ENGL 353a/HUMS 295a, **Medieval Celtic Literature** David Gabriel

Major texts of Celtic literature, focusing on works from the birth of vernacular literature in the Middle Ages to the early modern period. Cultural, historical, and literary issues surrounding works in the Irish and Welsh languages; literary culture in Breton, Cornish, Scottish Gaelic, and Manx. Genres include lyric and bardic poetry, heroic and religious narrative, and early Arthurian works. Readings in English translation; no knowledge of Celtic languages assumed. HU Tr

*LITR 464a/ENGL 404a/FILM 464a, **Film and Fiction** Dudley Andrew,
David Bromwich

Investigation of the close relationship between fiction and film. The reliance of these media on metonymy, or partial representation in the economy of narrative, and on the enchantment of character. Case studies include short stories, long stories, and novels that passed from fiction to film. Ideas of aesthetic modernity and of the possibility and difficulty of translation across the arts. HU RP

*LITR 465b/HUMS 425b, **Travel and Quests in Early World Literature** David Gabriel

Journeys of all types—Viking voyage of discovery, saintly pilgrimage, Zen journey to enlightenment, knightly quest—that speak to the core of the human experience. Literature of travel, journeys, and quests in the ancient and medieval world; focus on the motivation behind travel and on the repercussions of translating such journeys into literary form. HU

*LITR 468a/GMST 365a^G/HUMS 261a, **The Question of Form** Carol Jacobs

The concept of art in relation to form and deformation. The Platonic tradition in *The Republic* and echoed in twentieth-century philosophy (Cassirer and Heidegger), modern literature (Keats, Hardy, Kleist, Poe, Kafka), and film (Godard, Egoyan, Dreyer, Sun Zhou, Wong Kar Wai). HU

*LITR 469a, **The World as Theater** Jan Hagens

Dramatic texts in the Western tradition that display the world as a theater. Their aesthetics, dramatic structure, historical significance, and assertions about human psychology, individual and societal action, and the meaning of life. HU

*LITR 470a/GMAN 226a/GMST 226a, **Faust** Jan Hagens

The development of the Faust motif through time, from the legend's origins in the Renaissance-Reformation period to twentieth-century variations. Readings from the English adaptation of the original German chapbook, Marlowe's *Doctor Faustus*, Goethe's *Faust* (Part I), and Thomas Mann's *Doctor Faustus*; screenings of films with a Faustian theme. HU

***LITR 480a/WGSS 452a, Topics in Literary Theory: Psychoanalysis in Literature and Film** Moira Fradinger

In-depth examination of a field of literary theory; topics change annually. The topic for 2012 is concepts in psychoanalytic theory that bridge the clinical world, literary and critical theory, and film and gender studies. Foundational works by Freud and Lacan are considered together with literary and theoretical texts in order to explore the link between the arts and psychoanalytic theory. Concepts from the clinical field that have been imported into theories of culture, society, and the arts. May be repeated for credit. HU

***LITR 488a or b, Directed Reading and/or Individual Research** Moira Fradinger

Special projects in an area of the student's particular interest set up with the help of a faculty adviser and the director of undergraduate studies. Projects must cover material not otherwise offered by the department, must terminate in at least a term paper or its equivalent, and must have the approval of the director of undergraduate studies. Enrollment limited to Literature majors.

SENIOR COURSES

***LITR 491a or b, The Senior Essay** Moira Fradinger

An independent writing and research project. The senior essay is due in the office of the director of undergraduate studies according to the following schedule: (1) by September 7 (for LITR 491a) or January 18 (for LITR 491b), a three-page prospectus signed by the student's adviser; (2) by October 19 (for LITR 491a) or March 7 (for LITR 491b), a full rough draft (not notes); (3) by December 3 (for LITR 491a) or April 12 (for LITR 491b), the completed essay. The minimum length for an essay is twenty-five pages. Students are urged to arrange a topic and adviser early in the term before the term in which the essay is to be written.

***LITR 492a or b and 493a or b, The Yearlong Senior Essay** Moira Fradinger

A two-term extended research project. Students must petition the curriculum committee for permission to enroll by the last day of classes in the term preceding enrollment in LITR 492. For students expecting to graduate in May, the senior essay is due in the office of the director of undergraduate studies according to the following schedule: (1) by September 7, a three-page prospectus signed by the student's adviser; (2) by January 18, a full rough draft (not notes); (3) by April 12, the completed essay. December graduates should consult the director of undergraduate studies for required deadlines. The minimum length for a yearlong senior essay is forty pages.

Management Sciences

(See under Operations Research.)

Marine Corps

(See under Naval Science.)

Mathematics

(SEE ALSO APPLIED MATHEMATICS.)

Director of undergraduate studies: Andrew Casson, 216 LOM, 432-7056,
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FACULTY OF THE DEPARTMENT OF MATHEMATICS

Professors Donald Brown, Andrew Casson, Ronald Coifman, Igor Frenkel, Howard Garland, Alexander Goncharov, Roger Howe, Peter Jones, Mikhail Kapranov, Gregory Margulis, Yair Minsky, Vincent Moncrief, David Pollard, Vladimir Rokhlin, Peter Schultheiss (*Emeritus*), Van Vu, Gregg Zuckerman

Assistant Professors Amanda Folsom, Alexander Kontorovich, Sam Payne

J. W. Gibbs Assistant Professors Yael Algom-Kfir, Kim Dang, Swarnendu Datta, Yen Quang Do, Tobias Dyckerhoff, Daniel Fresen, Asaf Hadari, Jiuzu Hong, Garving Luli, Andrei Osipov, Ronen Talmon, Zhenqi Wang, Zhiren Wang, Peng Zhao

Adjunct Professors Michael Frame, Gil Kalai, Alex Lubotzky

Lecturers Marketa Havlickova, Anna Lachowska, James Rolf

Operations Research Faculty Eric Denardo

Statistics Faculty Andrew Barron, Joseph Chang, Lisha Chen, John Hartigan (*Emeritus*), Mokshay Madiman, Balaji Raman, Jing Zhang

Mathematics has many aspects: it is the language and tool of the sciences, a cultural phenomenon with a rich historical tradition, and a model of abstract reasoning. The course offerings and the major in Mathematics reflect these multiple facets. The Mathematics major provides a broad education in various areas of mathematics in a program flexible enough to accommodate many ranges of interest.

B.A. and B.S. degree programs The prerequisite for each program is calculus through the level of MATH 120, or the equivalent. Each program normally consists of ten term courses in Mathematics numbered 222 or higher, including MATH 480. These ten may include no more than five term courses from other institutions. Each student is expected to take vector calculus and linear algebra, either MATH 230 and 231, or one of MATH 222 or 225 and MATH 250. To acquire both depth and breadth in the field, students are required to take at least two term courses in each of three of the following five categories: analysis, algebra and number theory, statistics and applied mathematics, geometry and topology, and logic and foundations. Specific courses in each category are listed below. Each major program must also include at least one course in at least two of the three core areas: real analysis (MATH 300 or 301 or higher), algebra (MATH 350 or higher), and complex analysis (MATH 310 or higher). Taking courses from all three core areas is strongly recommended. To be eligible for Distinction in the Major, a student must have completed at least one course from each of the three core areas.

Each Mathematics major is urged to acquire additional familiarity with the uses of mathematics by taking courses in Applied Mathematics, Computer Science, Engineering and Applied Science, Economics, Operations Research, Philosophy, Physics, Statistics, or other departments. In some instances a limited number of such courses may be counted among the ten courses required for the major in Mathematics, with the approval of the director of undergraduate studies.

A candidate for the B.S. degree must take at least two advanced term courses in the physical sciences, such as CHEM 328, 332, 333, or PHYS 401, 402, in addition to the ten term courses required for the B.A. degree. Such courses require the approval of the director of undergraduate studies; written approval is advised.

Any student interested in pursuing further study in pure mathematics should include MATH 301, 305, 310, 350, 370, and 430 in his or her program, and should consider taking one or more graduate-level courses. Students interested in applications of mathematics should include MATH 300 or 301, 310, 350, and a selection of courses from MATH 241, 242, 244, 246, 251, 260, and CPSC 440.

Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

The intensive major Candidates for a degree with an intensive major in Mathematics must take courses in all three of the core areas: real analysis (MATH 300 or 301 or higher), algebra (MATH 350 or higher), and complex analysis (MATH 310 or higher). Intensive majors are also expected to include at least two graduate term courses in the Mathematics department, or equivalent independent study, in their programs. Familiarity with the material of the following courses is prerequisite to graduate courses in each category: *algebra*: two courses between MATH 350 and 399; *analysis*: MATH 301, 305, 310; *algebraic topology*: MATH 301, 350; *logic and foundations*: MATH 270.

Senior requirement During the senior year students majoring in Mathematics normally take the senior seminar (MATH 480). Alternatively, with the consent of the director of undergraduate studies, highly qualified students may write a senior essay in MATH 470 under the guidance of a faculty member, and give an oral report to the department. Students wishing to write a senior essay should consult the director of undergraduate studies early in the fall term.

Combined B.S./M.S. degree program Students who, by the end of their senior year, complete the requirements of the department for the M.S. in Mathematics will be eligible to receive this degree at their Senior Commencement. Required are: (1) eight term courses numbered 500 or higher, most of which must be completed with grades of B or better; (2) a reading knowledge of mathematical literature in a foreign language of importance for mathematical research (normally French, German, or Russian); (3) satisfactory performance on a general oral examination.

The master's program is in no sense a substitute for the B.A. or B.S. program; rather, it is designed to accommodate a very few exceptional students who, by means of accelerated or independent study, can satisfy the department as to their command of the content of the normal undergraduate program. During spring term of the sophomore year candidates must submit a proposal that foresees this level of achievement by the end of junior year to the director of undergraduate studies. If approved by the department this proposal will be

forwarded to the Dean's Office; see "Simultaneous Award of the Bachelor's and Master's Degrees" in chapter II, section K. Students' status and progress will be reviewed before they are permitted to continue in the program in the senior year.

Students take at least two graduate term courses in the junior year (normally courses in algebra or analysis are the first graduate courses taken). The general oral examination covers a list of topics available from the director of graduate studies and will be accepted in lieu of the usual senior oral presentation. Details concerning the requirements for the master's degree may be obtained from the director of graduate studies.

Placement in courses The department offers a three-term sequence in calculus, MATH 112, 115, and 120. Students who have not taken calculus at Yale and who wish to enroll in calculus must take the online placement examination found on the department Web page (math.yale.edu). At the beginning of each term a calculus preregistration session is held in 432 DL. To enroll in a calculus course a student must bring the results of the placement exam, as well as other pertinent information such as Advanced Placement test scores, to the preregistration session. Advisers will be on hand to assist each student in enrolling in the appropriate course.

MATH 112 is an introductory course that presupposes basic skills in high school algebra, geometry, and trigonometry. Enrolling students are expected to know the basic definitions of the trigonometric functions, synthetic division, factorization, and elementary area and volume formulas of plane and solid geometry. MATH 115 presupposes familiarity with the topics covered in MATH 112. MATH 120 presupposes familiarity with the topics covered in MATH 115.

MATH 230, 231 is an advanced course in linear algebra and introductory analysis for students with exceptionally strong backgrounds in mathematics. Students who wish to enroll in MATH 230 should consult with the instructor of the course. After MATH 115, students with a strong interest in abstract mathematics should consider taking MATH 230, 231.

REQUIREMENTS OF THE MAJOR

Prerequisite MATH 120 or equivalent

Number of courses *B.A.* — 10 term courses numbered 222 or higher, incl MATH 480;
B.S. — same, with 2 addtl courses in physical sciences

Distribution of courses *B.A.* — 2 courses in each of 3 categories chosen from (a) analysis, (b) algebra and number theory, (c) stat and applied math, (d) geometry and topology, (e) logic and foundations; courses from 2 of the 3 core areas (real analysis, algebra, complex analysis), as specified; *B.S.* — same, with 2 addtl advanced courses in physical sciences approved by DUS

Specific courses required MATH 230 and 231; or MATH 222 or 225, and MATH 250

Substitution permitted With DUS permission, certain courses in Applied Math, Comp Sci, Engineering & Applied Science, Econ, Operations Research, Phil, Physics, Stat
Senior requirement Senior sem (MATH 480) or, with DUS permission, senior essay (MATH 470) and oral report

Intensive major Courses in all 3 core areas; 2 grad courses or equivalent independent study counted among the required courses

Introductory courses MATH 101, 107, 108, 109, 112, 115, 116, 118, 120, 121, 190

Analysis MATH 231, 246, 250, 300, 301, 305, 310, 315, 320, 325

Statistics and applied mathematics MATH 241, 242, 244, 246, 247, 251, 260, 310, 330, 400; CPSC 201, 365, 440

Algebra and number theory MATH 222, 225, 230, 235, 244, 350, 353, 354, 360, 370, 380, 381, 440

Geometry and topology MATH 228, 290, 360, 430, 435

Logic and foundations MATH 270; PHIL 267, 427

INTRODUCTORY COURSES

Introductory courses do not count toward the requirements of a major in Mathematics. Students planning to enroll in MATH 112, 115, or 120 who have not taken one of these courses at Yale are required to take an online placement examination and meet with an adviser to receive an official placement. A link to the online placement exam and additional information can be found at math.yale.edu/calculus-placement-advising-session. Students should bring a printout of the examination to the departmental advising session on Tuesday, August 28, from 9 a.m. to 4:30 p.m. in 432 DL. Online preregistration for MATH 112, 115, and 120 will take place on Tuesday, August 28, from 4:30 to 7:30 p.m.

*MATH 101b, Geometry of Nature Michael Frame

Geometric patterns in nature, including classical models of spirals in seashells and sunflowers, symmetry of honeycombs and snowflakes, and the curvature of soap films; the shape of the universe; ways to visualize the fourth dimension; and a brief introduction to fractal geometry. Enrollment limited to freshmen and sophomores who have not previously taken a high school or college calculus course. QR

*MATH 107a, Mathematics in the Real World Anna Lachowska

The use of mathematics to address real-world problems. Applications of exponential functions to compound interest and population growth; geometric series in mortgage payments, amortization of loans, present value of money, and drug doses and blood levels; basic probability, Bayes's rule, and false positives in drug testing; elements of logic. No knowledge of calculus required. Enrollment limited to students who have not previously taken a high school or college calculus course. QR

MATH 108b, Estimation and Error Roger Howe

A problem-based investigation of basic mathematical principles and techniques that help make sense of the world. Estimation, order of magnitude, approximation and error, counting, units, scaling, measurement, variation, simple modeling. Applications to demographics, geology, ecology, finance, and other fields. Emphasis on both the practical and the philosophical implications of the mathematics. Does not count toward the requirements of a major in Mathematics. QR

MATH 109b, History of Mathematics Alexander Kontorovich

The historical development of mathematical ideas from various geographical areas and fields of mathematics. Chronological study of important mathematical problems (conjectures/theorems), their solutions (proofs), and their discoverers, as well as the developments that led to each breakthrough. No knowledge of calculus required. QR

***MATH 112a or b, Calculus of Functions of One Variable I** Gregg Zuckerman and staff

Limits and their properties. Definitions and some techniques of differentiation and the evaluation of definite integrals, with applications. Use of the software package Mathematica to illustrate concepts. No prior acquaintance with calculus or computing assumed. QR

***MATH 115a or b, Calculus of Functions of One Variable II** James Rolf and staff

A continuation of MATH 112. Applications of integration, with some formal techniques and numerical methods. Improper integrals, approximation of functions by polynomials, infinite series. Exercises involve the software package Mathematica. After MATH 112 or equivalent; open to freshmen with some preparation in calculus. May not be taken after MATH 116. QR

***MATH 116a, Mathematical Models in the Biosciences I: Calculus Techniques**

Michael Frame

Introduction to topics in mathematical modeling that are applicable to biological systems. Discrete and continuous models of population, neural, and cardiac dynamics. Stability of fixed points and limit cycles of differential equations. Applications include Norton's chemotherapy scheduling and stochastic models of tumor suppressor gene networks. After MATH 112 or equivalent. May not be taken after MATH 115. QR

***MATH 118a or b, Introduction to Functions of Several Variables**

Marketa Havlickova [F], Andrew Casson [Sp]

A combination of linear algebra and differential calculus of several variables. Matrix representation of linear equations, Gauss elimination, vector spaces, independence, basis and dimension, projections, least squares approximation, and orthogonality. Three-dimensional geometry, functions of two and three variables, level curves and surfaces, partial derivatives, maxima and minima, and optimization. Intended for students in the social sciences, especially Economics. May not be taken after MATH 120 or 222. Prerequisite: MATH 112. QR

***MATH 120a or b, Calculus of Functions of Several Variables** Marketa Havlickova and staff

Analytic geometry in three dimensions, using vectors. Real-valued functions of two and three variables, partial derivatives, gradient and directional derivatives, level curves and surfaces, maxima and minima. Parametrized curves in space, motion in space, line integrals; applications. Multiple integrals, with applications. Divergence and curl. The theorems of Green, Stokes, and Gauss. After MATH 115, or with permission of instructor. May not be taken after MATH 121. QR

***MATH 121b, Mathematical Models in the Biosciences II: Advanced Techniques**

Michael Frame

A continuation of MATH 116, focusing on epidemiological models, mathematical foundations of virus and antiviral dynamics, ion channel models and cardiac arrhythmias, and evolutionary models of disease. After MATH 116, or with permission of instructor. QR

MATH 190a, Fractal Geometry Michael Frame

A visual introduction to the geometry of fractals and the dynamics of chaos, accessible to students not majoring in science. Study of mathematical patterns repeating on many levels and expressions of these patterns in nature, art, music, and literature. QR

INTERMEDIATE AND ADVANCED COURSES

The courses in this group count toward the requirements of a major in Mathematics.

MATH 222a or b/AMTH 222a or b, Linear Algebra with Applications

Yael Algom-Kfir, Peter Schultheiss

Matrix representation of linear equations. Gauss elimination. Vector spaces. Linear independence, basis, and dimension. Orthogonality, projection, least squares approximation; orthogonalization and orthogonal bases. Extension to function spaces. Determinants. Eigenvalues and eigenvectors. Diagonalization. Difference equations and matrix differential equations. Symmetric and Hermitian matrices. Orthogonal and unitary transformations; similarity transformations. After MATH 115 or equivalent. May not be taken after MATH 225. QR

MATH 225a or b, Linear Algebra and Matrix Theory Howard Garland and staff

An introduction to the theory of vector spaces, matrix theory and linear transformations, determinants, eigenvalues, and quadratic forms. Some relations to calculus and geometry are included. After or concurrently with MATH 120. May not be taken after MATH 222. QR

MATH 228a, From Euclid to Einstein Roger Howe

An introduction to the fundamental role of symmetry in geometry. The role of transformations in Euclidean geometry; use of transformations to describe non-Euclidean geometries; a geometric interpretation of Einstein's special theory of relativity. A geometric introduction to linear algebra. QR

***MATH 230a, Vector Calculus and Linear Algebra I** Asaf Hadari

A careful study of the calculus of functions of several variables, combined with linear algebra. QR

***MATH 231b, Vector Calculus and Linear Algebra II** Asaf Hadari

Continuation of MATH 230. Application of linear algebra to differential calculus. Inverse and implicit function theorems; the idea of a manifold; integration of differential forms; general Stokes' theorem. QR

***MATH 235b, Reflection Groups** Anna Lachowska

Concepts of linear algebra are used to explore the algebraic and geometric properties of groups generated by reflections. Examples from reflection groups introduce elements of group theory, Lie algebras, and representation theory. Reflections in a real Euclidean space, groups generated by reflections, crystallographic groups, and Coxeter groups. Preference to sophomores majoring in mathematics or the sciences. Prerequisite: MATH 222 or 225. QR

MATH 241a/STAT 241a^c, Probability Theory Harrison Zhou

For description see under Statistics.

MATH 242b/STAT 242b^c, Theory of Statistics Andrew Barron

For description see under Statistics.

MATH 244a/AMTH 244a, Discrete Mathematics Van Vu

Basic concepts and results in discrete mathematics: graphs, trees, connectivity, Ramsey theorem, enumeration, binomial coefficients, Stirling numbers. Properties of finite set systems. Recommended preparation: MATH 115 or equivalent. QR

MATH 246a or b, Ordinary Differential Equations Garving Luli and staff

First-order equations, second-order equations, linear systems with constant coefficients. Numerical solution methods. Geometric and algebraic properties of differential equations. After MATH 120 or equivalent; after or concurrently with MATH 222 or 225 or equivalent. QR

MATH 247b/AMTH 247b/G&G 247b, Partial Differential Equations Igor Frenkel

Introduction to partial differential equations, wave equation, Laplace's equation, heat equation, method of characteristics, calculus of variations, series and transform methods, and numerical methods. Prerequisites: MATH 222 or 225, MATH 246, and ENAS 194, or equivalents. QR

MATH 250a, Vector Analysis Roger Howe, Sam Payne

Calculus of functions of several variables, using vector and matrix methods. The derivative as a linear mapping. Inverse and implicit function theorems. Transformation of multiple integrals. Line and surface integrals of vector fields. Curl and divergence. Differential forms. Theorems of Green and Gauss; general Stokes' theorem. After MATH 120, and 222 or 225 or equivalent. QR

MATH 251b/STAT 251b^c, Stochastic Processes David Pollard

For description see under Statistics.

MATH 260a/AMTH 260a, Basic Analysis in Function Spaces Ronald Coifman

Diagonalization of linear operators, with applications in physics and engineering; calculus of variations; data analysis. MATH 260 is a natural continuation of PHYS 301. Prerequisites: MATH 120, and 222 or 225. QR

MATH 270a, Set Theory Gregg Zuckerman

Algebra of sets; finite, countable, and uncountable sets. Cardinal numbers and cardinal arithmetic. Order types and ordinal numbers. The axiom of choice and the well-ordering theorem. After MATH 120 or equivalent. QR

[MATH 290b, Fractal Geometry: Concepts and Applications]**MATH 300b, Topics in Analysis** Swarnendu Datta and staff

An introduction to analysis, with topics chosen from infinite series, the theory of metric spaces, and fixed-point theorems with applications. Students who have taken MATH 230, 231 should take MATH 301 instead of this course. After MATH 250 or with permission of instructor. QR

***MATH 301a, Introduction to Analysis** Peter Jones

Foundations of real analysis, including metric spaces and point set topology, infinite series, and function spaces. After MATH 230, 231 or equivalent. QR

MATH 305b, Real Analysis Yair Minsky, Swarnendu Datta

The Lebesgue integral, Fourier series, applications to differential equations. After MATH 301 or with permission of instructor. QR

MATH 310a, Introduction to Complex Analysis Alexander Kontorovich,
Gregory Margulis

An introduction to the theory and applications of functions of a complex variable. Differentiability of complex functions. Complex integration and Cauchy's theorem. Series

expansions. Calculus of residues. Conformal mapping. After MATH 231 or 250 or equivalent. QR

***MATH 315b^c, Intermediate Complex Analysis** Yen Quang Do, Gregory Margulis
Continuation of MATH 310. Topics may include argument principle, Rouché's theorem, Hurwitz theorem, Runge's theorem, analytic continuation, Schwarz reflection principle, Jensen's formula, infinite products, Weierstrass theorem. Functions of finite order, Hadamard's theorem, meromorphic functions. Mittag-Leffler's theorem, subharmonic functions. After MATH 310. QR RP

***MATH 320a^c, Measure Theory and Integration** Gregory Margulis, Howard Garland
Construction and limit theorems for measures and integrals on general spaces; product measures; L_p spaces; integral representation of linear functionals. After MATH 305 or equivalent. QR RP

***MATH 325b^c, Introduction to Functional Analysis** Garving Luli, Yen Quang Do
Hilbert, normed, and Banach spaces; geometry of Hilbert space, Riesz-Fischer theorem; dual space; Hahn-Banach theorem; Riesz representation theorems; linear operators; Baire category theorem; uniform boundedness, open mapping, and closed graph theorems. After MATH 320. QR RP

MATH 330b/STAT 330b^c, Advanced Probability David Pollard
For description see under Statistics.

MATH 350a, Introduction to Abstract Algebra Andrew Casson, Mikhail Kapranov
Group theory, structure of Abelian groups, and applications to number theory. Symmetric groups and linear groups including orthogonal and unitary groups; properties of Euclidean and Hermitian spaces. Some examples of group representations. Modules over Euclidean rings, Jordan and rational canonical forms of a linear transformation. After MATH 222 or equivalent. QR

MATH 353a, Introduction to Representation Theory Anna Lachowska, Igor Frenkel
An introduction to basic ideas and methods of representation theory of finite groups and Lie groups. Examples include permutation groups and general linear groups. Connections with symmetric functions, geometry, and physics. After MATH 222 or equivalent. QR

***MATH 354b, Number Theory** Alexander Kontorovich
Prime numbers; quadratic reciprocity law, Gauss sums; finite fields, equations over finite fields; zeta functions. After MATH 350. QR

[MATH 360a, Introduction to Lie Groups]

MATH 370b, Fields and Galois Theory Marketa Havlickova
Rings, with emphasis on integral domains and polynomial rings. The theory of fields and Galois theory, including finite fields, solvability of equations by radicals, and the fundamental theorem of algebra. Quadratic forms. After MATH 350. QR

MATH 380a^c, Modern Algebra I Mikhail Kapranov, Sam Payne
A survey of algebraic constructions and theories at a sophisticated level. Topics include categorical language, free groups and other free objects in categories, general theory of rings and modules, artinian rings, and introduction to homological algebra. After MATH 350 and 370. QR RP

MATH 381b^G, Modern Algebra II Gregg Zuckerman, Tobias Dyckerhoff
 Topics in commutative algebra: general extension of fields; Noetherian, local, and Dedekind rings. Introduction to valuation theory. Rudiments of algebraic geometry. After MATH 380. QR RP

[MATH 400a, Introduction to Mathematical Mechanics]

[MATH 430b, Introduction to Algebraic Topology]

MATH 435b, Differential Geometry Andrew Casson, Vincent Moncrief
 Applications of calculus to the study of the geometry of curves and surfaces in Euclidean space, intrinsic differential geometric properties of manifolds, and connections with non-Euclidean geometries and topology. After MATH 231 or 250 or equivalent. QR

MATH 440b, Introduction to Algebraic Geometry Swarnendu Datta
 An introduction to algebraic geometry through the study of algebraic curves. Topics include curves in the projective plane and their intersection theory; Bezout's theorem; divisors and line bundles; the Riemann-Hurwitz formula; hyperelliptic curves; and the Riemann-Roch theorem. Prerequisites: MATH 310, 350, and some background in differential forms. QR

MATH 470a or b, Individual Studies Andrew Casson
 Individual investigation of an area of mathematics outside of those covered in regular courses, involving directed reading, discussion, and either papers or an examination. A written plan of study approved by the student's adviser and the director of undergraduate studies is required. The course may normally be elected for only one term.

***MATH 480a or b, Senior Seminar: Mathematical Topics** Igor Frenkel and staff
 A number of mathematical topics are chosen each term – e.g., differential topology, Lie algebras, mathematical methods in physics – and explored in one section of the seminar. Students present several talks on the chosen topic. One section each year is devoted to topics of interest to Economics and Mathematics majors, and is co-taught by a member of the Economics department.

RELATED COURSES IN OTHER DEPARTMENTS

A limited number of these courses may, with permission of the director of undergraduate studies, be counted with Mathematics courses toward the requirements of the major.

CPSC 201a or b, Introduction to Computer Science Dana Angluin [F],
 Holly Rushmeier [Sp]

CPSC 365b, Design and Analysis of Algorithms Daniel Spielman

CPSC 440b^G, Numerical Computation Vladimir Rokhlin

OPRS 235a/AMTH 235a, Optimization Eric Denardo
 For description see under Operations Research.

PHIL 267b^G, Mathematical Logic Sun-Joo Shin

***PHIL 427b^G, Computability and Logic** Sun-Joo Shin

GRADUATE COURSES OF INTEREST

Each year the Mathematics and Statistics departments offer a large number of graduate courses, some of which are accessible to undergraduates with advanced preparation in mathematics. Further information may be obtained from the directors of undergraduate studies whose permission, with that of the relevant director of graduate studies, is required for admission.

Mathematics and Computer Science

(See under Computer Science and Mathematics.)

Mathematics and Economics

(See under Economics and Mathematics.)

Mathematics and Philosophy

The Mathematics and Philosophy major allows students to explore those areas where philosophy and mathematics meet, in particular, mathematical and philosophical logic and the philosophy of mathematics.

The prerequisite for the major is MATH 120. The major requires twelve term courses including the prerequisite, at least four of which must be in Mathematics at the 200 level or higher and five of which must be in Philosophy. All Philosophy courses are eligible for credit toward the major, with the exception of First-Order Logic (PHIL 115). Required courses include Set Theory (MATH 270), Mathematical Logic (PHIL 267), Computability and Logic (PHIL 427), an additional advanced Philosophy course with a substantive logical component, and one seminar in either Mathematics or Philosophy (other than PHIL 427) that fulfills the senior requirement (see below). Set Theory (MATH 270) and Mathematical Logic (PHIL 267) must be taken before the end of the junior year; it is strongly recommended that they be taken earlier.

Senior requirement Each year certain seminars offered by the Mathematics and Philosophy departments are designated as fulfilling the senior requirement of this major. If such a seminar is taken in order to fulfill the senior requirement, majors must consult with the instructor and agree upon additional work required. Typically, additional work includes a substantial class presentation and/or preparation of a series of drafts prior to submission of the final paper.

The Mathematics seminar MATH 480, Senior Seminar: Mathematical Topics, fulfills the senior requirement. For Philosophy seminars that fulfill the senior requirement, consult the director of undergraduate studies in Philosophy.

A typical program satisfying the major might consist of MATH 120, 222 or 225, 270, 300, 350, and a designated seminar; PHIL 126, 267, 427, a designated seminar (other than PHIL 427), and two additional electives.

Majors should consult Andrew Casson, 216 LOM, 432-7056, andrew.casson@yale.edu (Mathematics), and Kenneth Winkler, 406A C, 432-1679, kenneth.winkler@yale.edu (Philosophy).

REQUIREMENTS OF THE MAJOR

Prerequisite MATH 120**Number of courses** 12 term courses (incl prereq and senior sem)**Distribution of courses** At least 4 courses in Math at 200 level or higher; at least 5 courses in Phil, as specified**Specific courses required** MATH 270, PHIL 267, 427**Senior requirement** Senior sem

Mathematics and Physics

The major in Mathematics and Physics allows students to explore the productive interaction between the two subjects more extensively than either individual major. Prerequisites to the major include MATH 120 or its equivalent, an introductory physics lecture sequence numbered 180, 181 or above, and the associated laboratory sequence PHYS 205L, 206L. Beyond the prerequisites, the major requires a minimum of fourteen term courses above the introductory level, including the senior project. At least six of these must be Mathematics courses numbered 222 or above, and at least six must be advanced Physics courses chosen in consultation with the adviser for the major. A senior project in PHYS 471 or 472 on a topic appropriate for the combined major and acceptable to both the Physics and the Mathematics departments is also required. The student must present an oral report on this project to the Mathematics department.

Interested students should consult the adviser for the major, Vincent Moncrief, 64 SPL, 432-6930, vincent.moncrief@yale.edu.

REQUIREMENTS OF THE MAJOR

Prerequisites MATH 120 or equivalent; PHYS 180, 181, or 200, 201, or 260, 261; PHYS 205L, 206L**Number of courses** 14 term courses beyond prereqs, incl senior req**Distribution of courses** 6 Math courses numbered 222 or above; 6 advanced Physics courses selected in consultation with major adviser**Senior requirement** Senior project in PHYS 471 or 472 on topic acceptable to both depts; oral report on project to Math dept

Mechanical Engineering

Director of undergraduate studies: Corey O'Hern, M203 ML, 432-4258, corey.ohern@yale.edu

FACULTY OF THE DEPARTMENT OF MECHANICAL ENGINEERING AND MATERIALS SCIENCE

Professors Charles Ahn, †David Bercovici, Ira Bernstein (*Emeritus*), Juan Fernández de la Mora, Alessandro Gomez, †Shun-Ichiro Karato, Amable Liñán-Martínez (*Adjunct*), Marshall Long, †Daniel Rosner, Udo Schwarz, Mitchell Smooke (*Chair*), Forman Williams (*Adjunct*)

Associate Professors Eric Dufresne, Corey O'Hern, Jan Schroers

Assistant Professors Aaron Dollar, John Morrell, Nicholas Ouellette

Lecturers Beth Anne Bennett, Kailasnath Purushothaman, Joseph Zinter

†A joint appointment with primary affiliation in another department or school.

Mechanical engineering is among the most diversified of the traditional engineering disciplines. The mechanical engineer builds machines to extend our physical and mental capabilities and to convert traditional and novel energy sources into useful forms.

The role of the mechanical engineer has changed dramatically over the past few decades with the extensive use of high-performance computers (in such areas as computational fluid dynamics design, data acquisition, control, and manufacturing), the interfacing of MEMS and actuators via microprocessors to measure and control (e.g., in flow control, robot control, and optimization of automobile performance), and the advent of new materials (composite, shape-memory alloy, ceramic, superconducting) for new applications (e.g., prosthetic devices, biomaterials, stealth aircraft). These new areas offer mechanical engineering students special opportunities for creativity, demanding that they learn not only in depth but also in breadth. Demands for increased energy efficiency and reduced environmental impact—as might be realized, for example, in novel gas turbine or electric hybrid vehicles—require that students understand the fundamentals of mechanics, thermodynamics, fluid mechanics, combustion, and materials science. In all these tasks, the utmost consideration of the modern mechanical engineer is improving the quality of human life. The engineer must be constantly aware both of the finiteness of Earth's resources and its environment and of the burden that engineering works place on them.

The educational mission of the Department of Mechanical Engineering and Materials Science is to provide an excellent education that will prepare students to become members of the next generation of mechanical engineers. To implement this mission, the department adheres to the following set of educational objectives: to provide a balanced technical and nontechnical education to enable graduates to enter highly selective graduate schools and/or to pursue technical careers in industry or government laboratories; to enable graduates to improve and adapt their skills to accommodate rapid technological changes; to prepare graduates to communicate effectively and to understand the ethical responsibilities and impact on society of their profession. To achieve these objectives, the following fundamental educational goals have been established for the Department of Mechanical Engineering and Materials Science: to provide a comprehensive introduction to basic science and mathematics, which form the foundation of mechanical engineering; to provide thorough training in methods of analytical, experimental, and data analysis, including problem formulation; to provide instruction in the fundamentals of the design process, including project innovation, synthesis, and management, both individually and in a team setting; to provide both a technical and a nontechnical program of study in which oral and written communication skills are developed; to instill in students an understanding of their professional and ethical responsibilities, which affect society and their profession.

At Yale, three mechanical engineering programs are offered: a B.S. degree program with a major in Mechanical Engineering, a B.S. degree program with a major in Engineering

Sciences (Mechanical), and a B.A. degree program with a major in Engineering Sciences (Mechanical). Prospective majors in both B.S. programs are advised to complete introductory physics and mathematics through calculus (MATH 115) by the end of their freshman year.

A student's undergraduate engineering program usually culminates in one or more special project courses (MENG 471, 472), in which the student pursues a particular interest through design-oriented projects and experimental investigations. Projects may be initiated by the student, may be performed in a team, or may be derived from the ideas of faculty members who place undergraduates in their ongoing research projects. All interested students should contact the director of undergraduate studies, preferably no later than the beginning of the sophomore year.

B.S. degree program in Mechanical Engineering This is the most technically intensive mechanical engineering degree program and is accredited by the Engineering Accreditation Commission of ABET, Inc. This program is appropriate for students who plan careers as practicing engineers in industry, consulting firms, or government as well as for students who are considering a career in research and plan to pursue an advanced degree in engineering.

The prerequisites in mathematics are MATH 112, 115, and ENAS 151, or the equivalent. The basic science prerequisites are PHYS 200, 201, or 180, 181; one laboratory from PHYS 165L or 205L, and one from PHYS 166L or 206L, or equivalents.

Nineteen term courses beyond the prerequisites are required as follows:

1. Advanced mathematics: ENAS 194 and MATH 222 or 225
2. Mechanical engineering and related: MENG 211, 280, 285, 286L, 361, 363L, 383, 389, 390, 471 or 472 (the senior requirement), 489, ENAS 130, EENG 200, and at least one term course in chemistry (e.g., CHEM 112, 113, 114, 115, or 118)
3. Technical electives: Three approved technical electives chosen in consultation with the director of undergraduate studies.

The curriculum in this program is arranged in prescribed patterns, but some departures from it are possible with approval of the director of undergraduate studies.

B.S. degree program in Engineering Sciences (Mechanical) This non-ABET degree program is suitable for students who wish to gain significant expertise within mechanical engineering while combining their engineering studies with related disciplines. For example, a number of students have taken courses in architecture while pursuing a program in mechanical engineering that emphasizes structural mechanics; similarly, a student with an interest in computer graphics might combine engineering courses in computer-aided design with programming courses from the Department of Computer Science. The major requires twelve approved term courses in engineering, which can cover a broad array of topics within the subject provided that they contribute to a coherent program. Students should consult with the director of undergraduate studies at the beginning of their sophomore year.

The prerequisites in mathematics are MATH 112, 115, and ENAS 151, or the equivalent. The basic science prerequisites are PHYS 180, 181, or 200, 201; one laboratory from PHYS 165L or 205L, and one from PHYS 166L, 206L, or MENG 286L.

The program requires twelve approved term courses beyond the prerequisites, including the senior project.

B.A. degree program in Engineering Sciences (Mechanical) In a society with increasing levels of technical sophistication, a well-rounded individual must have some background in science and technology. The non-ABET B.A. program is designed for students who may be planning careers in business, law, medicine, journalism, or politics but need to understand the impact that science and technology can have on society at large. An understanding of engineering methods and practices, combined with a traditional liberal arts education, provides a strong background for a variety of careers. The program is well suited for students who wish to fulfill the requirements of two majors.

The prerequisites in mathematics are MATH 112 and 115. The basic science prerequisite is physics at least to the level of PHYS <150>, <151> or 170, 171.

The program requires eight approved term courses beyond the prerequisites, including the senior project.

Senior requirement In all B.S. and B.A. degree programs, students must successfully complete a project (MENG 471 or 472) during their senior year.

Courses for majors in the humanities and social sciences Mechanics and mechanical engineering content can be found in several courses intended for those not majoring in science. See under Engineering and Applied Science.

REQUIREMENTS OF THE MAJOR

MECHANICAL ENGINEERING, B.S.

Prerequisites MATH 112, 115, and ENAS 151, or equivalent; PHYS 200, 201, or 180, 181, and 2 labs (1 from PHYS 165L or 205L, and 1 from PHYS 166L or 206L, or equivalents)

Number of courses 19 term courses beyond prereqs (incl senior project)

Specific courses required ENAS 130 and 194; EENG 200; MATH 222 or 225; MENG 211, 280, 285, 286L, 361, 363L, 383, 389, 390, 489

Distribution of courses 3 technical electives chosen in consultation with DUS; 1 term course in chem

Substitution permitted With DUS approval

Senior requirement Senior project (MENG 471 or 472)

ENGINEERING SCIENCES (MECHANICAL), B.S. AND B.A.

Prerequisites *B.S.* – MATH 112, 115, and ENAS 151, or equivalent; PHYS 180, 181, or 200, 201, and 2 labs (1 from PHYS 165L or 205L; 1 from PHYS 166L, 206L, or MENG 286L); *B.A.* – MATH 112, 115; Physics at least at level of <150>, <151> or 170, 171

Number of courses *B.S.* – 12 term courses beyond prereqs (incl senior project); *B.A.* – 8 term courses beyond prereqs (incl senior project)

Substitution permitted With DUS approval

Senior requirement *Both degrees* – senior project (MENG 471 or 472)

MENG 101a/ENAS 101a/ENVE 101a/EVST 105a, Energy, Engines, and Environment

Alessandro Gomez

Energy sustainability and global warming; thermodynamic fundamentals; engines (combustion technologies, fossil-fuel pollution, carbon capture and sequestration). Wind, solar, biomass, and other renewable energy sources. Designed for non-science majors and for freshmen and sophomores in science and engineering. Prerequisite: a strong background in mathematics and/or science, typically demonstrated by a score of 4 or 5 on Advanced Placement examinations. SC

***MENG 185b, Mechanical Design** Aaron Dollar

A course designed for potential majors in mechanical engineering, with units on design, materials science, structural mechanics, utilization of a machine shop, mechanical dissection, and computers in mechanical engineering. Includes a design project competition. Prerequisite: physics at the level of PHYS 180, or permission of instructor. SC RP

MENG 211a, Thermodynamics for Mechanical Engineers Udo Schwarz

Study of energy and its transformation and utilization. First and Second Laws for closed and open systems, equations of state, multicomponent nonreacting systems, auxiliary functions (H, A, G), and the chemical potential and conditions of equilibrium. Engineering devices such as power and refrigeration systems and their efficiencies. Prerequisites: PHYS 180 or 200, and MATH 115. QR, SC RP

MENG 280a, Mechanical Engineering I: Strength and Deformation of Mechanical Elements Eric Dufresne

Elements of statics; mechanical behavior of materials; equilibrium equations, strains and displacements, and stress-strain relations. Elementary applications to trusses, bending of beams, pressure vessels, and torsion of bars. Prerequisites: PHYS 180 or 200, and MATH 115. QR, SC RP

MENG 285a, Introduction to Materials Science Jan Schroers

Study of the atomic and microscopic origin of the properties of engineering materials: metals, glasses, polymers, ceramics, and composites. Phase diagrams; diffusion; rates of reaction; mechanisms of deformation, fracture, and strengthening; thermal and electrical conduction. Prerequisites: elementary calculus and background in basic mechanics (deformation, Hooke's law) and structure of atoms (orbitals, periodic table). QR, SC RP

MENG 286Lb, Solid Mechanics and Materials Science Laboratory Jan Schroers

Experiments that involve either structural mechanics or materials science. Comparisons between structural theories and experimental results. Relationships among processing, microstructure, and properties in materials science. Introduction to techniques for the examination of the structure of materials. SC RP ½ Course cr

MENG 361a, Mechanical Engineering II: Fluid Mechanics Nicholas Ouellette

Mechanical properties of fluids, kinematics, Navier-Stokes equations, boundary conditions, hydrostatics, Euler's equations, Bernoulli's equation and applications, momentum theorems and control volume analysis, dimensional analysis and similitude, pipe flow, turbulence, concepts from boundary layer theory, elements of potential flow. Prerequisites: ENAS 194 or equivalent, and physics at least at the level of PHYS <150> or 170. QR, SC RP

***MENG 363Lb, Fluid Mechanics and Thermodynamics Laboratory**

Nicholas Ouellette

Hands-on experience in applying the principles of fluid mechanics and thermodynamics. Integration of experiment, theory, and simulation to reflect real-world phenomena. Students design and test prototype devices. Prerequisites: MENG 211 and 361. SC RP

MENG 383a, Mechanical Engineering III: Dynamics Corey O'Hern

Kinematics and dynamics of particles and systems of particles. Relative motion; systems with constraints. Rigid body mechanics; gyroscopes. Prerequisites: PHYS 180 or 200, and MATH 120 or ENAS 151. QR, SC RP

MENG 389b, Mechanical Engineering IV: Fluid and Thermal Energy Science

Kailasnath Purushothaman

Fundamentals of mechanical engineering applicable to the calculation of energy and power requirements, as well as transport of heat by conduction, convection, and radiation. Prerequisites: MENG 211, 361, and ENAS 194; or permission of instructor. QR, SC RP

MENG 390b, Mechatronics Laboratory John Morrell

Hands-on synthesis of control systems, electrical engineering, and mechanical engineering. Review of Laplace transforms, transfer functions, software tools for solving ODEs. Review of electronic components and introduction to electronic instrumentation. Introduction to sensors; mechanical power transmission elements; programming microcontrollers; PID control. Prerequisites: ENAS 194 or equivalent, ENAS 130, and EENG 200; or permission of instructor. QR RP

MENG 400a^c, Computer-Aided Engineering Marshall Long

Aspects of computer-aided design and manufacture (CAD/CAM). The computer's role in the mechanical design and manufacturing process; commercial tools for two- and three-dimensional drafting and assembly modeling; finite-element analysis software for modeling mechanical, thermal, and fluid systems. Prerequisite: ENAS 130 or permission of instructor. QR

MENG 440a/ENAS 440a^c, Applied Numerical Methods I Beth Anne Bennett

For description see under Engineering & Applied Science.

MENG 441b/ENAS 441b^c, Applied Numerical Methods II Beth Anne Bennett

For description see under Engineering & Applied Science.

MENG 457b/BENG 457b^c, Musculoskeletal Biomechanics Jing Zhou

For description see under Biomedical Engineering.

MENG 463a^c, Theoretical Fluid Dynamics Juan Fernández de la Mora

Derivation of the equations of fluid motion from basic principles. Potential theory, viscous flow, flow with vorticity. Topics in hydrodynamics, gas dynamics, stability, and turbulence. Prerequisite: MENG 361 or equivalent. QR, SC RP

***MENG 469b, Aerodynamics** Alessandro Gomez

Review of fluid dynamics. Inviscid flows over airfoils; finite wing theory; viscous effects and boundary layer theory. Compressible aerodynamics: normal and oblique shock waves and expansion waves. Linearized compressible flows. Prerequisite: MENG 361 or permission of instructor. QR, SC

***MENG 471a and 472b, Special Projects** Corey O'Hern

Faculty-supervised individual or small-group projects with emphasis on research (laboratory or theory), engineering design (required for the ABET-accredited program), or tutorial study. Students are expected to consult the director of undergraduate studies and appropriate faculty members to discuss ideas and suggestions for topics. These courses may be taken at any time during the student's career when appropriate and may be taken more than once. Permission of adviser and director of undergraduate studies required.

MENG 489a^c, Mechanical Design: Process and Implementation John Morrell

Study of the design process, including concept generation, project management, teamwork, detail design, and communication skills. Student teams implement a real-world design project with hardware objectives that can be achieved in a term, and a problem definition that allows room for creative solutions. Prerequisite: MENG 280, 361, or permission of instructor. SC RP

***MENG 491b, Appropriate Technology and the Developing World** Joseph Zinter

Introduction to user-centered design through exploration of appropriate technology, a class of solutions that solve a particular need and are viable and sustainable within the environmental, economic, cultural, and technological infrastructure for which they are intended. Focus on technologies for use in the developing world. Student design teams conceptualize, ideate, prototype, and generate a commercialization plan for a real-world appropriate technological device. RP

Media Theory and History

Coordinator: Francesco Casetti, 53 Wall St., 432-0671, francesco.casetti@yale.edu

FACULTY ASSOCIATED WITH MEDIA THEORY AND HISTORY

Professors Dudley Andrew (*Film Studies, Comparative Literature*), Jack Balkin (*Law School*), Rüdiger Campe (*German*), Francesco Casetti (*Humanities, Film Studies*), Aaron Gerow (*Film Studies, East Asian Languages & Literatures*), Inderpal Grewal (*Women's, Gender, & Sexuality Studies*), Beatrice Gruendler (*Near Eastern Languages & Civilizations*), Matthew Jacobson (*History, American Studies, African American Studies*), David Joselit (*History of Art*), David Scott Kastan (*English*), Marianne LaFrance (*Psychology, Women's, Gender, & Sexuality Studies*), John MacKay (*Slavic Languages & Literatures, Film Studies*), Charles Musser (*Film Studies*), Robert Post (*Law School*), Henry Sussman (*German*), Katie Trumpener (*Comparative Literature, English*), Michael Warner (*English, American Studies*), Laura Wexler (*American Studies, Women's, Gender, & Sexuality Studies*)

Associate Professors Jessica Brantley (*English*), Gundula Kreuzer (*Music*), Karen Nakamura (*Anthropology, East Asian Studies*)

Assistant Professors J. D. Connor (*History of Art*), Jessica Pressman (*English*), R. John Williams (*English*)

Media Theory and History examines the category of "media" as both an object and a method of study. This field of study considers media as historically constituted entities, as objects of theoretical and juridical debate, and as crucial elements of the messages they

convey and the audiences they help to constitute. Media Theory and History bridges diverse disciplinary approaches, including literature, film, legal studies, history of art, sociology, anthropology, architecture, history of science, and computer science. It considers the social contexts and cultural effects of different media, including oral communication, written and printed texts, recorded and broadcast sound and image, and digital media, among others.

Yale College does not have a department or a major in media studies. Media Theory and History serves as a network connecting faculty members whose interests in research and teaching intersect around the subject of media. The faculty members listed above have made themselves available to advise students interested in approaching media from various disciplinary perspectives. Advisers help students identify appropriate sequences and combinations of courses, and meet with students about senior essays on interdisciplinary topics in media studies.

*ENGL 185a, **Medieval Literature in Movies** Alastair Minnis

*ENGL 411b/FILM 355b, **Shakespeare on Film** Brian Walsh
For description see under English Language & Literature.

*ENGL 461a, **Writing for Film: Voice and Vision** John Crowley

*FILM 099a/LITR 099a, **Film and the Arts** Dudley Andrew
For description see under Film Studies.

FILM 312a^G/HUMS 216a/LITR 354a, **Theory of Media** Francesco Casetti
For description see under Film Studies.

*FILM 370a^G/AFAM 242a, **African American Cinema** Terri Francis
For description see under Film Studies.

*FILM 375b/AMST 375b/WGSS 375b, **LGBTQ Cinema** Ron Gregg
For description see under Film Studies.

*FILM 409b^G/LITR 311b^G/RUSS 311b^G, **Montage, Collage, and Politics** John MacKay
For description see under Film Studies.

*FILM 410b/GMAN 406b/LITR 350b, **Theatricality in Film** Brigitte Peucker
For description see under Film Studies.

*HSHM 455a/HIST 148Ja/HUMS 312a/WGSS 460a, **History of the Body: Science, Medicine, and the Arts** Paola Bertucci, Courtney Thompson
For description see under History of Science, Medicine, and Public Health.

*JAPN 272b, **Japanese Popular Culture** Aaron Gerow
For description see under East Asian Languages & Literatures.

*LITR 402b/ENGL 329b/HSAR 441b, **Picture Book to Graphic Novel**
Katie Trumpener, Ksenia Sidorenko
For description see under Literature.

***LITR 464a/ENGL 404a/FILM 464a, Film and Fiction** Dudley Andrew,
David Bromwich
For description see under Literature.

PLSC 219b, Press, Politics, and Policy Sean Smith

***PLSC 255b, Politics and the Media in the United States** Daniel Butler

***PLSC 412a/EP&E 447a, Global Journalism, National Identities** James Sleeper
For description see under Political Science.

***WGSS 380a/AMST 402a/ANTH 302a/FILM 324a, Gender and Sexuality in Media
and Popular Culture** Laura Wexler, Inderpal Grewal
For description see under Women's, Gender, & Sexuality Studies.

Middle East Studies

(See under Modern Middle East Studies and under Near Eastern Languages
and Civilizations.)

Modern Middle East Studies

Directors of undergraduate studies: Marcia Inhorn, 340 RKZ, 432-4510, marcia.inhorn@yale.edu; Colleen Manassa, 321 HGS, 436-8181, colleen.manassa@yale.edu;
www.yale.edu/macmillan/cmcs

FACULTY ASSOCIATED WITH THE PROGRAM OF MODERN MIDDLE EAST STUDIES

Professors Abbas Amanat (*History*), Gerhard Böwering (*Religious Studies*), John Darnell (*Near Eastern Languages & Civilizations*), Stephen Davis (*Religious Studies*), Rabab El Mahdi (*Visiting*), Benjamin Foster (*Near Eastern Languages & Civilizations*), Steven Fraade (*Religious Studies*), Eckart Frahm (*Near Eastern Languages & Civilizations*), Frank Griffel (*Religious Studies*), Beatrice Gruendler (*Near Eastern Languages & Civilizations*), Dimitri Gutas (*Near Eastern Languages & Civilizations*), Christine Hayes (*Religious Studies*), Marcia Inhorn (*Anthropology*), Anthony Kronman (*Law School*), Bentley Layton (*Religious Studies*), Joseph Manning (*Classics, History*), Ivan Marcus (*History*), Robert Nelson (*History of Art*), W. Michael Reisman (*Law School*), Lamin Sanneh (*Divinity School*), Harvey Weiss (*Near Eastern Languages & Civilizations*)

Associate Professors Kaveh Khoshnood (*Public Health*), Ellen Lust (*Political Science*), Colleen Manassa (*Near Eastern Languages & Civilizations*), Andrew March (*Political Science*)

Assistant Professors Narges Erami (*Anthropology*), Zareena Grewal (*American Studies*), Adria Lawrence (*Political Science*), Mark Lazenby (*School of Nursing*), Nikolay Marinov (*Political Science*), Alan Mikhail (*History*), Ahmed Mobarak (*School of Management*), Kishwar Rizvi (*History of Art*), Eliyahu Stern (*Religious Studies*), Edwige Tamalet-Talbayev (*French*), Jonathan Wyrzten (*Sociology*)

Senior Lecturers Geetanjali Singh Chanda (*Women's, Gender, & Sexuality Studies*), Tolga Koker (*Economics*)

Lecturers Adel Allouche (*History, Religious Studies*), Karla Britton (*Architecture*), Karen Foster (*History of Art*), Konstantina Maragkou (*History*), Sadia Saeed (*Sociology*), Kathryn Slanski (*Near Eastern Languages & Civilizations*)

Senior Lecturer II Ayala Dvoretzky

Senior Lectors Shiri Goren, Shady Nasser, Farkhondeh Shayesteh

Lectors Sarab al-Ani, Muhammad Aziz, Aaron Butts, Etem Erol, Dina Roginsky, Hasmik Tovmasyan

The Modern Middle East Studies major focuses on the culture, history, religion, politics, and society of the modern Middle East in its full geographical breadth, using any of its four major languages, Arabic, Hebrew, Persian, and Turkish. Courses are selected from the Department of Near Eastern Languages and Civilizations and from other departments in the humanities and social sciences, including Anthropology, History, History of Art, Judaic Studies, Political Science, and Religious Studies. The Modern Middle East Studies major gives students the language skills necessary to understand complex issues of the Middle East and serves as excellent preparation for graduate study or for business and professional careers in which an understanding of that region is essential.

Prerequisites There are no prerequisites, but prospective majors should keep the language requirement in mind while planning their course schedules (see below).

Language requirement All students are required to complete two courses at the L5 level in a Middle Eastern language. The two courses may be applied toward the twelve-course major requirement. Typical courses include ARBC 150, 151, and PERS 150.

Requirements of the major Twelve term courses are required for the major, including three foundational courses, one each in modern thought, classical thought, and the modern Middle East. Six electives on the modern Middle East examine culture and thought, history, religion, politics, and society. Elective courses must be spread geographically and substantively; they must focus on at least two different subregions and originate in at least two different departments. The proposed course of study requires the approval of the director of undergraduate studies.

Senior requirement Students in the major undertake a one- or two-term senior essay that involves use of materials in one or more modern Middle Eastern languages. The student selects a faculty adviser with competence in an appropriate language. A prospectus and outline signed by the adviser must be submitted to the director of undergraduate studies by the end of the fourth week of classes in either term of the senior year. Senior essays are graded by the adviser and a second reader. See the course descriptions of the senior essay courses (MMES 491, 492, 493) for additional information. Alternatively, majors may take an additional seminar and write an essay in that course to fulfill the senior requirement.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses

Distribution of courses 3 foundational courses, 1 each in modern thought, classical thought, and the modern Middle East; 6 electives spread geographically and substantively, focusing on at least 2 subregions and from at least 2 depths

Language requirement 2 courses at L₅ level in a Middle Eastern lang

Senior requirement Senior essay (MMES 491 or MMES 492, 493) or essay written in an addtl sem

FOUNDATIONAL COURSES

Modern Thought

*MMES 165a/FREN 215a, **Introduction to Maghreb Literature and Culture**

Edwige Tamalet-Talbayev

For description see under French.

*MMES 216a/HEBR 156a^G/JDST 405a, **Dynamics of Israeli Culture** Shiri Goren

For description see under Near Eastern Languages & Civilizations.

MMES 290a/PLSC 435a/RLST 290a, **Islam Today: Jihad and Fundamentalism**

Frank Griffel

For description see under Religious Studies.

*MMES 292b/RLST 292b^G, **Salafiyya Movement in Islam** Frank Griffel

For description see under Religious Studies.

Classical Thought

MMES 171a/HIST 360a/NELC 402a, **The Islamic Near East from Muhammad to the Mongol Invasion** Adel Allouche

For description see under Near Eastern Languages & Civilizations.

MMES 192a/RLST 170a, **The Religion of Islam** Gerhard Böwering

For description see under Religious Studies.

*MMES 342a/HIST 232Ja/HUMS 443a/JDST 270a/RLST 201a, **Medieval Jews, Christians, and Muslims Imagining Each Other** Ivan Marcus

For description see under History.

*MMES 490a/NELC 490a^G, **Introduction to Arabic and Islamic Studies**

Dimitri Gutas

For description see under Near Eastern Languages & Civilizations.

The Modern Middle East

MMES 102a/HUMS 440a/NELC 102a, **Introduction to the Middle East**

Benjamin Foster

For description see under Near Eastern Languages & Civilizations.

MMES 411a/ANTH 221a^G, **Middle East Society and Culture** Narges Erami

For description see under Anthropology.

MMES 441b/HIST 348b⁶, Empire, Nationalism, and Revolution in the Modern Middle East Abbas Amanat

For description see under History.

ELECTIVE COURSES

MMES 101a/HSAR 381a⁶/HUMS 416a, Introduction to Islamic Art Kishwar Rizvi

For description see under History of Art.

***MMES 111b/ANTH 360b, Representing Iran** Narges Erami

For description see under Anthropology.

MMES 124a/HSAR 264a/HUMS 423a, Byzantium, Constantinople, Istanbul

Robert Nelson

For description see under Humanities.

***MMES 143b/HIST 239Jb/MGRK 228b, Twentieth-Century Greek-Turkish Relations**

Konstantina Maragkou

For description see under Hellenic Studies.

MMES 149a/ER&M 219a/HIST 219a⁶/JDST 200a⁶/RLST 148a⁶, History of the Jews and Their Diasporas to Early Modern Times Ivan Marcus

For description see under History.

***MMES 153b/HEBR 151b⁶/JDST 301b, Introduction to Modern Israeli Literature**

Ayala Dvoretzky

For description see under Near Eastern Languages & Civilizations.

MMES 156b/HEBR 161b/JDST 407b, Israeli Popular Music Dina Roginsky

For description see under Near Eastern Languages & Civilizations.

***MMES 157b/JDST 306b/NELC 157b⁶, Israeli Narratives** Shiri Goren

For description see under Near Eastern Languages & Civilizations.

***MMES 159b/HEBR 159b⁶/JDST 409b, Conversational Hebrew: Israeli Media**

Shiri Goren

For description see under Near Eastern Languages & Civilizations.

***MMES 172b/HIST 384Jb/NELC 403b, The Middle East between Crusaders and Mongols** Adel Allouche

For description see under History.

***MMES 173b/HIST 398Jb/NELC 404b, Mamluk Egypt** Adel Allouche

For description see under History.

***MMES 181b/AFST 389b/PLSC 389b, Middle East Exceptionalism** Adria Lawrence

For description see under Political Science.

***MMES 189a/PLSC 455a, Religion, Empowerment, and the Role of Women in Nationalist Movements** Sallama Shaker

For description see under Political Science.

***MMES 282b/GLBL 362b/SOCY 339b⁶, Imperialism, Insurgency, and State Building in the Middle East** Jonathan Wyrzten

For description see under Sociology.

***MMES 311a/ER&M 327a/WGSS 327a, Constructing the Self: From Autobiography to Facebook** Geetanjali Singh Chanda

For description see under Women's, Gender, & Sexuality Studies.

***MMES 343b/EP&E 273b/RLST 291b^c/SOCY 343b^c, Sociology of Islam**

Jonathan Wyrzten, Jeffrey Guhin

For description see under Sociology.

***MMES 362a/AFST 322a/FREN 422a/LITR 321a/WGSS 344a, Francophone Postcolonial Theory and Literature** Edwige Tamalet-Talbayev

For description see under French.

***MMES 380b/SOCY 387b, Law in Muslim Societies** Sadia Saeed

For description see under Sociology.

***MMES 442a/HIST 347Ja^c, From the Great Game to the Great Satan** Abbas Amanat

For description see under History.

***MMES 465a or b/ARBC 165a^c or b^c, Arabic Seminar** Dimitri Gutas [F],

Beatrice Gruendler [Sp]

For description see under Near Eastern Languages & Civilizations.

***MMES 482a/PLSC 413a/SOCY 351a, The Arab Spring of 2011** Rabab El Mahdi

Analysis of theories that explain the persistence of authoritarianism in the Middle East; the failure of such theories to anticipate the popular uprisings of 2011. The development of state-society relations in the Arab world; so-called resistance to democratization and change; forms of mobilization and challenges to authoritarianism in the region. Case studies from Tunisia, Egypt, Syria, Yemen, Morocco, and Jordan.

INDEPENDENT DIRECTED STUDY

***MMES 471a and 472b, Independent Directed Study** Andrew March

Independent research or directed reading under the direction of a faculty member in the program on a special topic in Modern Middle East Studies not substantially covered by an existing undergraduate or graduate course. A proposal describing the nature of the program and the readings to be covered must be signed by the adviser and submitted to the director of undergraduate studies by the end of the second week of classes. The student should meet with the adviser regularly, typically for an hour a week, and write one term essay or several short essays.

SENIOR ESSAY COURSES

***MMES 491a or b, Senior Essay** Andrew March

The one-term senior essay is a research paper of at least thirty pages prepared under the supervision of a faculty member in accordance with the following schedule: (1) by the end of the second week of classes of the term, students meet with advisers to discuss the essay's topic, approach, sources, and bibliography; (2) by the end of the fourth week of classes a prospectus with outline, including an annotated bibliography of materials in one or more modern Middle Eastern languages and of secondary sources, is signed by the adviser and submitted to the director of undergraduate studies. The prospectus should indicate the formal title, scope, and focus of the essay, as well as the proposed research

method, including detailed indications of the nature and extent of materials in a modern Middle Eastern language that will be used; (3) at the end of the tenth week of classes, a rough draft of the complete essay is submitted to the adviser; (4) by 4 p.m. on the last day of reading period, two hard copies of the finished paper must be submitted to the MMES registrar, 115 Prospect St., room 344, and an electronic copy must be submitted to lora.lemosy@yale.edu. A late essay will receive a lower grade. Senior essays are graded by faculty associated with the Modern Middle East Studies program unless, for exceptional reasons, different arrangements for another reader have been made in advance with the director of undergraduate studies and the faculty adviser.

***MMES 492a and 493b, The Yearlong Senior Essay** Andrew March

The yearlong senior essay is a research paper of at least sixty pages prepared under the supervision of a faculty member in accordance with the following schedule: (1) by the end of the second week of classes of the first term, students meet with advisers to discuss the essay's topic, approach, sources, and bibliography; (2) by the end of the fourth week of classes in the first term, a prospectus with outline, including an annotated bibliography of materials in one or more modern Middle Eastern languages and of secondary sources, is signed by the adviser and submitted to the director of undergraduate studies. The prospectus should indicate the formal title, scope, and focus of the essay, as well as the proposed research method, including detailed indications of the nature and extent of materials in a modern Middle Eastern language that will be used; (3) at the end of February, a rough draft of the complete essay is submitted to the adviser; (4) by 4 p.m. on the last day of reading period in the second term, two hard copies of the finished paper must be submitted to the MMES registrar, 115 Prospect St., room 344, and an electronic copy must be submitted to lora.lemosy@yale.edu. A late essay will receive a lower grade. Senior essays are graded by faculty associated with the Modern Middle East Studies program unless, for exceptional reasons, different arrangements for another reader have been made in advance with the director of undergraduate studies and the faculty adviser. Cr/year only

Molecular Biophysics and Biochemistry

Director of undergraduate studies: Joan Steitz, 136E BCMM, 737-4418 [F]; Michael Koelle, CE 28A SHM, 737-5808 [Sp]; madeline.cavanaugh@yale.edu; www.mbb.yale.edu

FACULTY OF THE DEPARTMENT OF MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

Professors Susan Baserga, †Ronald Breaker, †Gary Brudvig, †Daniel DiMaio, Donald Engelman, Alan Garen, Mark Gerstein, Nigel Grindley, Mark Hochstrasser, Anthony Koleske, William Konigsberg, †I. George Miller, †Peter Moore, †Thomas Pollard, Lynne Regan, †David Schatz, Dieter Söll, Mark Solomon, Joan Steitz, Thomas Steitz, Scott Strobel, †William Summers, Patrick Sung, Kenneth Williams (*Adjunct*), †Sandra Wolin

Associate Professors Thomas Biederer, Enrique De La Cruz, Michael Koelle, Andrew Miranker, Yorgo Modis, A. Elizabeth Rhoades, Yong Xiong

Assistant Professors Christian Schlieker, Chuck Sindelar

Lecturers Carol Bascom-Slack, Kaury Kucera, Aruna Pawashe

†A joint appointment with primary affiliation in another department.

The programs offered by the Department of Molecular Biophysics and Biochemistry are planned for students interested in the molecular and chemical basis of biological processes and are well suited to students hoping to attend medical school or pursue graduate studies in biochemistry, molecular biology, genetics, or biophysics. The B.S. major, designed for those with a strong commitment to research, provides an intensive introduction to laboratory techniques in biochemistry and biophysics. Students in this program usually carry out research projects in faculty laboratories during their junior and senior years. The B.A. major provides the intellectual discipline of biochemistry and biophysics for students who also wish to have sufficient time to pursue in-depth studies outside the major or who are interested in molecular biology as a liberal education; they, too, may engage in research during their junior and senior years.

Basic science prerequisites for the Class of 2016 and subsequent classes The basic science courses required of all majors include four half-term units of introductory biology (BIOL 101, 102, 103, 104); a general chemistry course with laboratory (CHEM 112, 113, or 114, 115, and 116L, 117L; or 118 and 119L); a year course in organic chemistry with laboratory (CHEM 124, 125, or 220, 230, and 222L, 223L); one term of physical chemistry (CHEM 328); two terms of calculus (MATH 112 and 115); and one year of physics (PHYS 170, 171, or 180, 181, or 200, 201). The B.A. major also requires one term of biology laboratory (MCDB 121L or E&EB 123L). Some of the prerequisites in chemistry, mathematics, and physics may be satisfied by receiving scores on Advanced Placement tests or placement examinations sufficient to earn acceleration credits in the particular subjects, even if the student does not choose to accelerate.

B.S. degree for the Class of 2016 and subsequent classes Nine courses are required beyond the prerequisites: MB&B 300, 301, 302, 360L, and 490; two additional upper-level MB&B electives, one of which must be a lecture course; one quantitative reasoning elective (MATH 120 or above, STAT 105, 106, or 230 or above, CPSC 201 or above, or ENAS 130 or above); and one elective in the natural sciences at a level higher than required in the prerequisites. Students choose the elective courses in consultation with a faculty adviser (see below). Only two course credits of MB&B 470, 471, and 478, 479 may count toward these electives. Students may substitute CHEM 333 for MB&B 302. The quantitative reasoning requirement may not be fulfilled by Advanced Placement test scores.

B.A. degree for the Class of 2016 and subsequent classes Seven courses are required beyond the prerequisites: MB&B 251L, 300, 301, 302, and 490; one additional upper-level MB&B elective; and one quantitative reasoning elective (MATH 120 or above, STAT 105, 106, or 230 or above, CPSC 201 or above, or ENAS 130 or above). Students choose the elective courses in consultation with a faculty adviser (see below). Students may substitute CHEM 333 for MB&B 302. The quantitative reasoning requirement may not be fulfilled by Advanced Placement test scores.

Senior requirement The senior requirement for both the B.S. and the B.A. is fulfilled by successful completion of MB&B 490, The Senior Project. Students enrolled in this course prepare a written report and make an oral presentation of a literature project. Students meet with faculty members in charge of the colloquium during the first two weeks of the

spring term to agree on a topic and an approach. It is appropriate for students who took research for credit earlier in their training to write on their research topic. It is inappropriate for students to submit a revised version of a past research report or to resubmit a literature paper prepared for another course. The literature project for the senior requirement should be original work approved by the faculty member overseeing the senior colloquium.

The written report is expected to be 15–25 pages in length (double-spaced, twelve-point font exclusive of figures). A first draft of the paper is due two weeks prior to the date of the oral presentation. Faculty in charge of the program will review the draft and return it to the student with suggestions. A final draft of the paper is due the first day of the reading period in the student's final term.

Students make a fifteen-minute oral presentation during the last three weeks of their final term in a general scientific forum open to the public. Other students in the series are expected to attend all presentations.

Credit/D/Fail option Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

The major for the Class of 2015 and previous classes Students who have already taken or placed out of either MCDB <120> or E&EB <122> are not required to take BIOL 101, 102, 103, or 104. Beyond the prerequisites, the requirements for the major are the same as those for the Class of 2016, except that the B.S. degree requires one additional biology elective at the 200 level or higher.

Students who have not yet taken or placed out of MCDB <120> or E&EB <122> must either take or place out of at least two of the four introductory biology modules, BIOL 101, 102, 103, 104. Beyond the prerequisites, the requirements for the major are the same as those for the Class of 2016, except that the B.S. degree requires one additional biology elective at the 200 level or higher.

Recommended courses for all classes All B.S. majors are encouraged to include MB&B 470 or 471 among their MB&B electives. The prerequisites in either general or organic chemistry should be taken in the freshman year.

Students with a strong interest in biophysics, including those planning to attend graduate school, are strongly encouraged to take courses beyond the basic requirements of the major. Such students are advised to take mathematics through differential equations (ENAS 194, MATH 246, or PHYS 301) and a full year of physical chemistry (CHEM 328 or 332, and 333). In place of one term of biophysics (MB&B 302) they may elect a full year of upper-level biophysics (MB&B 420 and 421). Such revisions to the basic curriculum must be made in consultation with the faculty adviser.

Typical programs Programs with the minimal number of science courses required of B.A. and B.S. majors are shown below. Students whose scores on the Advanced Placement tests make them eligible for advanced courses are urged to replace the elementary science courses by more advanced ones in their freshman year, and to complete the required biochemistry and physics courses by the end of their sophomore and junior years, respectively. Students are permitted to take the biochemistry sequence (MB&B 300, 301) after one term of organic chemistry (CHEM 220).

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
BIOL 101, 102, 103, 104	CHEM 220, 230, 222L, 223L	MB&B 300, 301	CHEM 328
CHEM 112, 113, 116L, 117L	MATH 112, 115	One quantitative reasoning elective	MB&B 302
<i>And, for B.A. major:</i> MCDB 121L or E&EB 123L		PHYS 180, 181	One MB&B elective
		<i>And, for B.A. major:</i> MB&B 251L	MB&B 490
		<i>And, for B.S. major:</i> MB&B 360L	<i>And, for B.S. major:</i> One science elective A second MB&B elective

MB&B Faculty Committee on the Undergraduate Major Committee members are available for consultation throughout the year and are the only faculty advisers eligible to approve and sign MB&B majors' course schedules at the beginning of each term. Members acting as faculty advisers are:

<i>Class of 2013:</i>	E. De La Cruz, 423C JWG (432-5424) W. Konigsberg, CE 14A SHM (785-4599)
<i>Class of 2014:</i>	J. Steitz, 136E BCMM (737-4418) [F] Y. Xiong, 423A JWG (436-2608) [Sp] D. Söll, 238A BASS (432-6200)
<i>Class of 2015:</i>	P. Sung, C130A SHM (785-4553) C. Sindelar, CE 25 SHM (737-4752)
<i>Class of 2016:</i>	T. Biederer, CE 127 SHM (785-5465) M. Hochstrasser, 224 BASS (432-5101)

REQUIREMENTS OF THE MAJOR

Prerequisites *All classes*—CHEM 112, 113, or 114, 115, and 116L, 117L (or 118, 119L); CHEM 124, 125, or 220, 230, and 222L, 223L; CHEM 328; MATH 112, 115; PHYS 170, 171, or 180, 181, or 200, 201; *Class of 2016 and subsequent classes*—*B.S.*—BIOL 101, 102, 103, 104; *B.A.*—BIOL 101, 102, 103, 104; MCDB 121L or E&EB 123L; *Class of 2015 and previous classes*—*B.S.*—MCDB <120> or E&EB <122>; *B.A.*—MCDB <120> or E&EB <122>; MCDB 121L or E&EB 123L

Number of courses *Class of 2016 and subsequent classes*—*B.S.*—9 term courses beyond prereqs, incl senior req; *B.A.*—7 term courses beyond prereqs, incl senior req; *Class of 2015 and previous classes*—*B.S.*—10 term courses beyond prereqs, incl senior req; *B.A.*—7 term courses beyond prereqs, incl senior req

Specific courses required *All classes*—*B.S.*—MB&B 300, 301, 302, 360L; *B.A.*—MB&B 251L, 300, 301, 302

Distribution of courses *All classes*—*B.S.*—2 addtl MB&B electives, 1 quantitative reasoning elective, and 1 science elective, all as specified; *B.A.*—1 addtl MB&B elective and 1 quantitative reasoning elective, as specified; *Class of 2015 and previous classes*—*B.S.*—1 addtl biology elective at 200 level or higher

Substitution permitted CHEM 333 for MB&B 302

Senior requirement Senior project (MB&B 490)

MB&B 105a or b/MCDB 105a or b, An Issues Approach to Biology Timothy Nelson, Dieter Söll, and staff

For description see under Molecular, Cellular, & Developmental Biology.

***MB&B 110a, Current Issues in Biological Science** William Summers

Students identify a scientific problem and then plan and execute a program of individualized learning aimed at the particular scientific knowledge required to understand and analyze the chosen problem. Intended to help students develop self-education skills as applied to scientific understanding, apply those skills to acquire some specific scientific knowledge, and understand the process by which scientific knowledge and understanding are achieved. For non-science majors. SC

***MB&B 111a, The Science of Human Hormones** Kaury Kucera

A scientific study of human hormones and how they shape the human experience. Molecular mechanisms of hormone action in normal function; hormone abuse and molecular malfunction. Specific hormones and hormone pathways, including their biology, biochemistry, and relevance to disease and medicine. Topics include diabetes, steroid hormone abuse, and longevity. SC

MB&B 200b/MCDB 300b, Biochemistry Ronald Breaker and staff

For description see under Molecular, Cellular, & Developmental Biology.

***MB&B 230b/MCDB 230b, Rain Forest Expedition and Laboratory** Scott Strobel and staff

Preparation for a two-week expedition to one of the world's rain forests during spring break and for a ten-week summer laboratory experience using samples collected during the expedition. Integrated topics draw on the fields of ecology, microbiology, chemistry, pharmacology, molecular biology, and bioinformatics. Students participate in an original scientific project from field biology to natural product characterization. After one year of introductory biology or equivalent; after or concurrently with one term of organic chemistry. Limited enrollment. Funding for major travel expenses and summer research provided. SC

***MB&B 251La/MCDB 301La, Laboratory for Biochemistry** William Konigsberg and staff

An introduction to current experimental methods in molecular biology. After or concurrently with MB&B 200 or 300. Limited enrollment. Requires preregistration by e-mail to Aruna Pawashe and William Konigsberg prior to the first week of classes. SC
½ Course cr

MB&B 300a, Principles of Biochemistry I Thomas Biederer, Michael Koelle

Discussion of the physical, structural, and functional properties of proteins, lipids, and carbohydrates, three major classes of molecules in living organisms. Energy metabolism, hormone signaling, and muscle contraction as examples of complex biological processes whose underlying mechanisms can be understood by identifying and analyzing the molecules responsible for these phenomena. After BIOL 101; after or concurrently with CHEM 125 or 220 SC

MB&B 301b^c, Principles of Biochemistry II Joan Steitz and staff

A continuation of MB&B 300 that considers the chemistry and metabolism of nucleic acids, the mechanism and regulation of protein and nucleic acid synthesis, and selected topics in macromolecular biochemistry. Prerequisite: MB&B 300 or permission of instructor. SC

MB&B 302b, Principles of Biophysics Enrique De La Cruz, Yorgo Modis

An introduction to the theoretical basis of biophysical concepts and approaches with selected examples and applications. Prerequisites: MB&B 300 and CHEM 328. SC

***MB&B 360Lb^c, Laboratory for Biochemistry and Biophysics** Alan Garen and staff

An intensive introduction to the principles and applications of experimental techniques currently used in biochemistry, biophysics, and molecular biology. Recommended to be taken with or directly after MB&B 301. Limited enrollment. Requires preregistration by e-mail to Aruna Pawashe and William Konigsberg prior to the first week of classes. SC

MB&B 420a^c, Macromolecular Structure and Biophysical Analysis Andrew Miranker, Thomas Steitz, and staff

Analysis of macromolecular architecture 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: MB&B 301 and 302. SC

[MB&B 421b^c, Macromolecular Interactions and Dynamic Properties]**[MB&B 435a^c, Mathematical Methods in Biophysics]****MB&B 443b^c, Advanced Eukaryotic Molecular Biology** Mark Hochstrasser and staff

Selected topics in regulation of chromatin structure and remodeling, mRNA processing, mRNA stability, translation, protein degradation, DNA replication, DNA repair, site-specific DNA recombination, and somatic hypermutation. Prerequisites: MB&B 300 and 301, or permission of instructor. SC RP

***MB&B 445b, Methods and Logic in Molecular Biology** Anthony Koleske,

Mark Hochstrasser, Dieter Söll

An examination of fundamental concepts in molecular biology through analysis of landmark papers. Development of skills in reading the primary scientific literature and in critical thinking. Prerequisites: MB&B 300 and 301. SC RP

MB&B 449a, Medical Impact of Basic Science Joan Steitz and staff

Examples of recent discoveries in basic science that have elucidated the molecular origins of disease or that have suggested new therapies for disease. Readings from the primary scientific and medical literature, with emphasis on developing the ability to read this literature critically. Prerequisites: MB&B 300 and 301 or equivalents, or permission of instructor. SC

MB&B 452b^c/MCDB 452b^c, Bioinformatics: Practical Application of Simulation and Data Mining Mark Gerstein

Techniques in data mining and simulation applied to bioinformatics, the computational analysis of gene sequences, macromolecular structures, and functional genomics data on a large scale. Sequence alignment, comparative genomics and phylogenetics, biological databases, geometric analysis of protein structure, molecular-dynamics simulation, biological networks, microarray normalization, and machine-learning approaches to data integration. Prerequisites: MB&B 301 and MATH 115, or permission of instructor. SC

***MB&B 470a and 471b, Research in Biochemistry and Biophysics** Alan Garen

Individual laboratory projects under the supervision of a faculty member. Students must submit an enrollment form that specifies the research supervisor by the date that course

schedules are due. A required organizational meeting will be held at the beginning of each term. Students are expected to commit at least ten hours per week to working in a laboratory. Written assignments include a research proposal, due near the beginning of the term, and a research report that summarizes experimental results, due before the beginning of the final examination period. No more than two course credits count as electives toward the B.S. degree. Enrollment limited to junior and senior MB&B majors. Prerequisite: MB&B 251L or 360L.

***MB&B 478a and 479b, Intensive Research in Biochemistry and Biophysics**

Alan Garen

Individual laboratory projects under the supervision of a faculty member. Students must submit an enrollment form that specifies the research supervisor by the day that course schedules are due. A required organizational meeting will be held at the beginning of each term. Students are expected to commit at least twenty hours per week to working in a laboratory. Written assignments include a research proposal, due near the beginning of the term, and a research report that summarizes experimental results, due before the beginning of the final examination period. No more than two course credits count as electives toward the B.S. degree. Enrollment limited to senior MB&B majors. Prerequisite: MB&B 251L or 360L. 2 Course cr per term

***MB&B 490b, The Senior Project** William Konigsberg, Yorgo Modis

Colloquium for fulfillment of the senior requirement. The course involves a written and an oral presentation of a senior paper in an area of biochemistry or biophysics. The topic is selected in consultation with the faculty members in charge of the course.

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Graduate courses in molecular biophysics and biochemistry, biology, and the biomedical sciences that may be of interest to undergraduates are listed in the bulletin of the Graduate School, and many are posted at bbs.yale.edu. Additional information is available from the directors of undergraduate and graduate studies. Undergraduates with an appropriate background may enroll with the permission of the director of graduate studies and the instructor.

Molecular, Cellular, and Developmental Biology

Director of undergraduate studies: Douglas Kankel, 1220B KBT, 432-3839, crystal.adamchek@yale.edu; www.biology.yale.edu

FACULTY OF THE DEPARTMENT OF MOLECULAR, CELLULAR, AND DEVELOPMENTAL BIOLOGY

Professors Sidney Altman, Ronald Breaker, John Carlson, †Lynn Cooley, Craig Crews, Stephen Dellaporta, Xing-Wang Deng, Paul Forscher, Jo Handelsman, Vivian Irish, Christine Jacobs-Wagner, Douglas Kankel, †Paula Kavathas, Haig Keshishian, Mark Mooseker, Timothy Nelson, Thomas Pollard, Anna Pyle, Shirleen Roeder, Joel Rosenbaum, Frank Slack, Robert Wyman

Associate Professors Martín García-Castro, Scott Holley, †Akiko Iwasaki, Elke Stein, Weimin Zhong

Assistant Professors Murat Acar, †Sreeganga Chandra, Nicole Clay, Thierry Emonet, Valerie Horsley, Farren Isaacs, Kathryn Miller-Jensen, †Matthew Rodeheffer

Lecturers Carol Bascom-Slack, Alexia Belperron, Brett Berke, Emile Boulpaep, Iain Dawson, Mary Klein, Mitchell Kundel, Maria Moreno, Kenneth Nelson, Barry Piekos, Mark Saltzman, William Segraves, David Wells, Joseph Wolenski

†A joint appointment with primary affiliation in another department or school.

The science of biology is extremely broad, ranging across the domains of molecules, cells, tissues and organs, organisms, and ecosystems. Moreover, biology explores questions of evolutionary history and the processes of evolutionary change as well as the mechanisms by which cells, organisms, and ecosystems function. Students majoring in Molecular, Cellular, and Developmental Biology receive a thorough yet varied liberal education and preparation for professional careers in a diverse array of fields. Practical applications of biology include the development of biologicals and pharmaceuticals, the practice of medicine, and pursuit of the scientific bases for understanding the development and function of biological systems.

Molecular, Cellular, and Developmental Biology (MCDB) offers programs for students wishing to concentrate on molecular biology, cell biology, genetics, and their applications to problems in cell and developmental biology, neurobiology, and various aspects of computational biology. Interdisciplinary opportunities are available within the major in the biotechnology and neurobiology tracks.

The MCDB major offers many opportunities for independent laboratory research. With approval, research can be conducted under the supervision of faculty members in any Yale department. Some programs for study abroad are available to MCDB majors; approved programs can fulfill some of the requirements for the major. Interested students should consult the director of undergraduate studies and the Center for International and Professional Experience (cipe.yalecollege.yale.edu).

Prerequisites The basic science courses required of all MCDB majors are BIOL 101, 102, 103, 104; CHEM 112, 113, or 114, 115, or 118, taken with their associated laboratories, as well as one term of organic chemistry with laboratory (CHEM 124, 125 with 222L, 223L satisfies both chemistry requirements); two terms of PHYS 170, 171 or higher; and one term of MATH 115 or above (excluding MATH 190). The second term of organic chemistry, CHEM 230, may be used as an elective in the major. Note that these prerequisites fulfill most of the usual premedical science requirements.

Acceleration credit awarded in chemistry, mathematics, and physics, or completion of advanced courses in those departments, is accepted instead of the corresponding prerequisites for the MCDB major. Students who have mathematics preparation equivalent to MATH 115 or higher are encouraged to take additional mathematics courses, such as MATH 120, 121, 222, or 225.

Placement For students in the Class of 2016 and subsequent classes, placement in MCDB is determined by an examination administered at Yale. Based on the results of

the examination, a student may place out of one or more courses in the BIOL 101–104 sequence. However, one or more of these introductory Biology courses may be explicitly required as prerequisites for upper-level MCDB courses.

Students in the Class of 2015 and previous classes who have scored 710 or higher on the SAT subject matter Biology M test, or who have scored 5 on the Advanced Placement test in Biology, may be exempt from taking BIOL 101, 102, 103, and 104. Students with equivalent scores on one of the corresponding chemistry tests, or who have scored 7 on an International Baccalaureate higher-level examination in an appropriate subject, may also be exempt from taking BIOL 101, 102, 103, and 104.

Placement in chemistry courses is arranged by the Chemistry department. Because the required chemistry courses are prerequisite to several MCDB courses, students are strongly urged to take general and organic chemistry in the freshman and sophomore years. Students who place out of general chemistry should take organic chemistry during their freshman year. Finishing the prerequisites early allows for a more flexible program in later years.

Requirements of the major Beyond the prerequisites, the B.A. degree requires at least eight course credits, including seven lecture courses or seminars and two laboratories, as follows:

1. Three core courses: either MCDB 200 or 202; either MCDB 205 or 210; either MCDB 300 or MB&B 300
2. Three electives, for three course credits, from MCDB courses numbered 200 or above
3. One elective, for one course credit, from MCDB courses numbered 350 or above
4. Two MCDB laboratories (MCDB 121L may be applied toward this requirement)
5. The senior requirement, described below

Residential college seminars do not count toward the requirements of the major. The MCDB major should not be taken as one of two majors with Molecular Biophysics and Biochemistry or with Ecology and Evolutionary Biology.

Credit/D/Fail No course taken Credit/D/Fail may be counted toward the MCDB major, including prerequisites.

Neurobiology track In addition to the core courses for the major, the neurobiology track requires MCDB 320, one MCDB course numbered 350 or above, and two courses chosen from BENG 410, CPSC 475, MCDB 240, 310, 315, 415, 430, 440, 460, PSYC 270, and either STAT 101 or PSYC 200. Other courses may be substituted with the approval of the student's track adviser. (Students should note that PSYC 110 is a prerequisite for many psychology courses but does not substitute as an elective in the neurobiology track.) Two laboratories chosen from MCDB courses are also required as electives. Students interested in the neurobiology track should consult an adviser for the track. Advisers whose names are listed followed by "[F]" may be consulted during the fall term.

Neurobiology track advisers:

- P. Forscher [F], 222 KBT (432-6344)
- H. Keshishian [F], 640A KBT (432-3478)
- E. Stein, 232 KBT (432-8402)
- D. Wells, 338A KBT (432-3481)
- R. Wyman [F], 610A KBT (432-3475)
- W. Zhong, 616 KBT (432-9233)

Biotechnology track In addition to the core requirements for the major, the biotechnology track requires MCDB 370 and three courses chosen from any MCDB course numbered 150 or above, MB&B 420, 421, 443, BENG 351, 352, 410, 435, 457, 464, CENG 210, 411, 412, CPSC 437, 445, 470, or 475. Two laboratories are required: either two from MCDB (including at least one from MCDB 341L to MCDB 345L), or BENG 355L, 356L or CENG 412. Students interested in the biotechnology track should consult an adviser for the track. Advisers whose names are listed followed by “[F]” may be consulted during the fall term.

Biotechnology track advisers: R. Breaker [F], 506 KBT (432-9389)
 X. W. Deng, 352B OML (432-8908)
 K. Nelson, 710A KBT (432-5013)
 J. Wolenski, 330 KBT (432-6912)

Electives in all tracks If both MCDB 205 and 210 are taken, one counts as a core course and the other as an elective. Two laboratory courses from MCDB 342L, 343L, 344L, and 345L can be used together as one elective credit. If used as an elective, these laboratories cannot also fulfill the laboratory requirement. A relevant intermediate or advanced course from another department in science, engineering, mathematics, or statistics may be accepted as an elective with permission of the director of undergraduate studies. Residential college seminars cannot be substituted for electives.

Many of the courses in other departments listed above have prerequisites; such prerequisites can be substituted for an upper-level elective with permission of the director of undergraduate studies.

Senior requirement In addition to the course requirements described above, all students must satisfy a senior requirement undertaken during the senior year. A booklet listing the requirements of each track and degree is available in the office of the director of undergraduate studies (1220B KBT). All students must fill out a checklist of requirements and go over it with the undergraduate registrar, Crystal Adamchek, by the spring term of the junior year. For the B.A. degree the senior requirement can be met in any one of three ways: by submitting a senior essay of fifteen to twenty pages evaluating current research in a field of biology; by successful completion of one term of tutorial work (MCDB 470); or by successful completion of one term of individual research (MCDB 475).

A senior choosing to fulfill the requirement with a senior essay must consult with a faculty adviser on the scope and literature of the topic and submit the adviser’s written approval to the director of undergraduate studies no later than the course selection period of the term in which the paper is due. The senior essay may be related to the subject matter of a course, but the essay is a separate departmental requirement in addition to any work done in a course and does not count toward the grade in any course. The senior essay must be completed and submitted to the office of the director of undergraduate studies by the last day of classes. Students electing this option should obtain an approval form from the office of the director of undergraduate studies.

B.S. degree The requirements for the B.S. degree are the same as for the B.A. degree except for the senior requirement, which differs in its greater emphasis on individual research.

The senior requirement for the B.S. is usually fulfilled by completing a yearlong research course, MCDB 485, 486. Alternatively, two consecutive terms of MCDB 475 can be taken during the senior year. In the case of a two-term project in MCDB 475, it is possible for a student to begin the project during the spring term of the junior year, continue it over the summer, and complete it during the fall term of the senior year. In all other cases, the senior requirement must be completed during the senior year. Yale College does not grant academic credit for summer research unless the student is enrolled in an independent research course in Yale Summer Session. Seniors working toward the B.S. degree are expected to spend ten hours per week conducting individual research.

B.S. degree, intensive major Requirements for the B.S. degree with an intensive major are the same as those for the B.A. degree except that students take an additional seminar numbered MCDB 350 or higher and fulfill the senior requirement by taking MCDB 495, 496, Intensive Research, for four course credits. The additional seminar does not need to be taken during the senior year. Seniors in the intensive major are expected to spend twenty hours per week conducting individual research.

Research courses before senior year The research courses MCDB 475, 485, 486, and 495, 496 exist primarily to fulfill the senior requirement. Some students may wish to take MCDB 475 earlier in their course of study. This contributes to the thirty-six course credits required for graduation, but does not substitute for any of the other requirements for the major, including the senior requirement. Students may take up to three credits in MCDB 475 (MCDB 485, 486 counts as two terms of MCDB 475 in this calculation) during their undergraduate career.

Laboratory preparation for research Students with an interest in particular problems in cellular and molecular biology and who are planning to undertake independent research are advised to take one or more of the following laboratories first: MCDB 303L, 341L, 342L, 343L, 344L, or 345L.

Combined B.S./M.S. degree program Exceptionally able and well-prepared students may accelerate their professional education by completing a course of study leading to the simultaneous award of the B.S. and M.S. degrees after eight terms of enrollment. Completion in fewer than eight terms is not allowed. The requirements are as follows:

1. Candidates must satisfy the Yale College requirements for the B.S. degree. In addition to the three or four core requirements (depending on track) specified for the standard major, the three or four electives must be graduate-level courses designated "G." One of these is a graduate seminar selected with the approval of the director of undergraduate studies. Students must earn a grade of A or A- in two graduate-level courses and a grade of B- or higher in the rest.
2. Six credits outside the major must be taken in the last two years, and at least two undergraduate courses in the last two terms.
3. In addition to the courses specified above, students must complete two graduate research courses for six course credits: (a) MCDB 585, a two-credit course typically taken in the second term of the junior year. At the start of the course, each student forms a committee comprised of the adviser and two faculty members that meets to discuss

the research project. Two of the members of this committee must be members of the MCDB faculty. At the end of the course, the student completes a detailed prospectus describing the thesis project and the work completed to date. The committee evaluates an oral and written presentation of the prospectus and determines whether the student may continue in the combined program; (b) MCDB 595, a four-credit, yearlong course that is similar to MCDB 495, 496 and is taken during the senior year. During the course, the student gives an oral presentation describing the work. At the end of the course, the student is expected to present his or her work to the department in the form of a poster presentation. In addition, the student is expected to give an oral thesis defense, followed by a comprehensive examination of the thesis conducted by the thesis committee. Upon successful completion of this examination, as well as all other requirements, the student is awarded the combined B.S./M.S. degree.

Students must also satisfy the requirements of Yale College for the simultaneous award of the bachelor's and master's degrees, including the following:

1. Students must apply in writing to the director of undergraduate studies and obtain departmental approval no later than the beginning of the second term of their junior year. Applications must be submitted by November 1 in the preceding term. Students must have the approval of both the director of undergraduate studies and the director of graduate studies to receive graduate credit for the graduate courses they select.
2. Students must have two-thirds A or A– grades in all of their courses and two-thirds A or A– grades in MCDB courses, including prerequisites, in order to be admitted to the program.

Advising Freshmen considering a major in Molecular, Cellular, and Developmental Biology are invited to consult with the director of undergraduate studies and/or a faculty member in MCDB who is a fellow of their residential college. For assistance in identifying a suitable adviser, students should contact the departmental undergraduate registrar, Crystal Adamchek. Students in the neurobiology or biotechnology track should consult an adviser for their track (listed above). The course schedules of all MCDB majors (including sophomores intending to major in MCDB) must be signed by a faculty member in the department; the signature of the director of undergraduate studies is not required. Students whose regular adviser is on leave can consult the office of the director of undergraduate studies to arrange for an alternate.

Any member of the MCDB department can serve as a faculty adviser to majors. College faculty advisers available to freshmen:

BK, J. Wolenski	MC, X.W. Deng, H. Keshishian, K. Nelson, T. Pollard, F. Slack
BR, I. Dawson	PC, J. Carlson, C. Crews
CC, M. Mooseker, R. Wyman	SY, C. Jacobs-Wagner, S. Roeder
DC, P. Forscher, V. Irish, W. Zhong [Sp]	SM, S. Dellaporta [Sp], D. Kankel, J. Rosenbaum
TD, S. Holley	ES, E. Stein, D. Wells
JE, R. Breaker, T. Nelson [F]	TC, S. Altman

REQUIREMENTS OF THE MAJOR

Prerequisites BIOL 101, 102, 103, 104; CHEM 112, 113, or 114, 115, or 118, with labs, and 1 term of organic chem with lab (CHEM 124, 125 with 222L, 223L satisfies both reqs); PHYS 170, 171 or higher; MATH 115 or above (except MATH 190); all courses taken for letter grades

Number of courses *B.A.* – at least 7 courses and 2 labs beyond prereqs taken for letter grades, totaling at least 8 course credits (incl senior req); *B.S.* – 9 courses and 2 labs beyond prereqs taken for letter grades, totaling at least 10 course credits (incl senior req); *B.S., intensive major* – 10 courses and 2 labs beyond prereqs taken for letter grades, totaling at least 13 course credits (incl senior req)

Specific courses required *All tracks* – MCDB 200 or 202; MCDB 205 or 210; MCDB 300 or MB&B 300; *Neurobiology track* – MCDB 320; *Biotechnology track* – MCDB 370

Distribution of courses *Standard track* – 3 electives from MCDB numbered 200 or above; 1 addtl MCDB course numbered 350 or above; 2 labs in MCDB; *Neurobiology and biotechnology tracks* – 3 electives and two labs as specified

Senior requirement *B.A.* – MCDB 470 or 475 taken in senior year, or senior essay; *B.S.* – 2 consecutive terms of MCDB 475, at least 1 in senior year, or MCDB 485, 486

Intensive major 1 addtl sem numbered MCDB 350 or higher; MCDB 495, 496 in senior year

INTRODUCTORY COURSES

***MCDB 050a, Immunology and Contagion** Paula Kavathas

Principles of immunology, microbiology, and host-microbe interaction. Innate and adaptive immunity; principles of vaccination. Organisms studied include HIV, influenza, human papilloma virus, polio, and commensal bacteria. SC RP Fr sem

[MCDB 060a and 061b, Topics in Reproductive Biology]

***MCDB 103a or b, Cancer** Alexia Belperron and staff

Introduction to the biology of cancer, with a focus on leukemia, skin cancer, and cancers linked to infection. Topics include genetics, biochemistry, immunity, infection agents, and challenges for prevention and treatment. Intended for non-science majors and underclassmen. SC

MCDB 105a or b/MB&B 105a or b, An Issues Approach to Biology Timothy Nelson, Dieter Söll, and staff

Biological concepts taught in context of current societal issues, such as stem cell research and genetically modified organisms. Emphasis on biological literacy to enable students to evaluate scientific arguments. SC

***MCDB 106b/HLTH 155b, Biology of Malaria, Lyme, and Other Vector-Borne Diseases** Alexia Belperron

Introduction to the biology of pathogen transmission from one organism to another by insects; special focus on malaria and Lyme disease. Biology of the pathogens including modes of transmission and establishment of infection; immune responses and the associated challenges to prevention and treatment. Intended for non-science majors. Prerequisite: high school biology. SC

[MCDB 107a, Human Biology]***MCDB 109b, Immunology and Microorganisms** Paula Kavathas

Introduction to the human immune system, followed by study of microorganisms such as influenza, HIV, human papilloma virus, *Chlamydia trachomatis*, and commensal bacteria. Discussion of the biology of each organism and interaction with the host immune system, reinforcing principles of immune function. Enrollment limited to freshmen and sophomores. SC RP

***MCDB 121La, Laboratory for Principles of Molecular, Cellular, and Developmental Biology** Maria Moreno

An introduction to biological research with an emphasis on the utility of model organisms. Exercises in basic molecular biology techniques, biochemistry, genetic analysis, cell fractionation, microbiology, microscopy and imaging, embryogenesis, and plant and animal development. Introduction to experimental design, data analysis and display, and scientific writing. Concurrently with or after BIOL 101, 102, and 103, or equivalent performance on the placement exam, or by permission of instructor. SC ½ Course cr

MCDB 123b, Genes and Environment Jo Handelsman

The nature of biological thought and inquiry explored through study of the interplay between genes and the environment. Influence of the microbial world on the physiology and evolution of organisms. Tools from molecular biology and genomics are used to examine the effects of internal and external factors on gene expression, how the process of gene expression leads to observable characteristics, and the relationship between bacterial gene expression and human survival. Intended for non–science majors. SC

[MCDB 135b, How the Brain Works]***MCDB 150b^c, Global Problems of Population Growth** Robert Wyman,
Fabian Drixler

The worldwide population explosion in its human, environmental, and economic dimensions. Sociobiological bases of reproductive behavior. Population history and the cause of demographic change. Interactions of population growth with economic development and environmental alteration. Political, religious, and ethical issues surrounding fertility; human rights and the status of women.

INTERMEDIATE AND ADVANCED COURSES

BIOL 101, 102, 103, and 104, or MCDB 200, are prerequisites for MCDB courses numbered 202 and above.

MCDB 200b, Molecular Biology Stephen Dellaporta, Anna Pyle, and staff

A study of the fundamental principles of molecular biology, including the experimental methodologies used in biological research. Topics include the structure, function, and chemical behavior of biological macromolecules (DNA, RNA, and protein), chromosome and genome organization, replication and maintenance of the genome, transcriptional and translational regulation, microRNAs and other noncoding RNAs, RNA processing, and systems biology. Designed to provide an accelerated venue for MCDB majors and other students seeking to understand the molecular basis for gene expression and biological function. Prerequisite: CHEM 112 and 113, or 114 and 115, or 118, or a score of 5 on the Advanced

Placement test in Biology, or BIOL 101 or equivalent performance on the Yale placement exam, or by permission of instructor. SC

MCDB 201Lb, Molecular Biology Laboratory Maria Moreno

Basic molecular biology training in a project-based laboratory setting. Experiments analyze gene function through techniques of PCR, plasmid and cDNA cloning, DNA sequence analysis, and protein expression and purification. Instruction in experimental design, data analysis, and interpretation. For freshmen and sophomores. Concurrently with or after MCDB 200. Special registration procedures apply. Interested students must contact the instructor and attend an organizational meeting during the first week of classes. WR, SC
½ Course cr

***MCDB 202a, Genetics** Shirleen Roeder, Stephen Dellaporta, and staff

An introduction to classical, molecular, and population genetics of both prokaryotes and eukaryotes and their central importance in biological sciences. Emphasis on analytical approaches and techniques of genetics used to investigate mechanisms of heredity and variation. Topics include transmission genetics, cytogenetics, DNA structure and function, recombination, gene mutation, selection, and recombinant DNA technology. Prerequisite: BIOL 103. SC RP

MCDB 203La, Laboratory for Genetics Iain Dawson, William Leiserson

Introduction to laboratory techniques used in genetic analysis. Genetic model organisms – bacteria, yeast, *Drosophila*, and *Arabidopsis* – are used to provide practical experience with various classical and molecular genetic techniques including cytogenetics, mutagenesis and mutant analysis, recombination and gene mapping, isolation and manipulation of DNA, and DNA sequence analysis. Concurrently with or after MCDB 202. SC ½ Course cr

MCDB 205b, Cell Biology Thomas Pollard and staff

A comprehensive introductory course in cell biology. Emphasis on the general principles that explain the molecular mechanisms of cellular function. Prerequisite: BIOL 101 and 102, or MCDB 200, or a score of 5 on the Advanced Placement test in Biology, or a score of 710 or above on the SAT Biology M test. SC

***MCDB 210b, Developmental Biology** Vivian Irish and staff

Cellular differentiation and its genetic and molecular control; fertilization, cleavage, and morphogenesis of plants and animals; polarity and positional information; organogenesis and development of specialized tissues; evolution and development. Prerequisites: BIOL 101, 102, and 103. SC

MCDB 215a/STAT 101a^E, Introduction to Statistics: Life Sciences

Jonathan Reuning-Scherer, Walter Jetz

For description see under Statistics.

***MCDB 230b/MB&B 230b, Rain Forest Expedition and Laboratory** Scott Strobel and staff

For description see under Molecular Biophysics & Biochemistry.

MCDB 240b, Biology of Reproduction Hugh Taylor, Mary Klein

Introduction to reproductive biology, with emphasis on human reproduction. Development and hormonal regulation of reproductive systems; sexuality, fertilization, and pregnancy; modern diagnosis and treatment of reproductive and developmental disorders;

social and ethical issues. Prerequisite: BIOL 101, 102, or 103; or a score of 5 on the Advanced Placement test in Biology; or a score of 710 or above on the SAT Biology M test. SC

MCDB 241Lb, Laboratory for Biology of Reproduction and Development Mary Klein
Laboratory investigation of reproductive and developmental processes in classic vertebrate and invertebrate systems, with emphasis on mammalian reproduction and development. Topics include gametogenesis, ovulation, hormonal control of reproduction, and investigation of embryogenesis in the mouse, frog, and fruit fly. Enrollment limited. Concurrently with or after MCDB 210 or 240. Not open to freshmen. Special registration procedures apply; students must consult the instructor prior to the first week of classes. SC ½ Course cr

MCDB 290b, Microbiology Christine Jacobs-Wagner, Carol Bascom-Slack
Cell structure of microorganisms, bacterial genetics, microbial evolution and diversity, microbial development, microbial interaction, chemotaxis and motility, gene regulation, microbial genomics, host defense systems, infectious diseases, viruses, and biological weapons. After organic chemistry and one term of biochemistry or cell biology or genetics, or with permission of instructor. SC

***MCDB 291Lb, Laboratory for Microbiology** Iain Dawson
Practical approaches used when working with microbes, primarily bacteria. Topics include microscopy, culture techniques, biochemical/metabolic assays, and basic environmental and medical microbiology. Concurrently with or after MCDB 290. Electronic permission key required; students should contact the instructor. SC ½ Course cr

MCDB 300b/MB&B 200b, Biochemistry Ronald Breaker and staff
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. After one term of organic chemistry. SC

***MCDB 301La/MB&B 251La, Laboratory for Biochemistry** William Konigsberg and staff
For description see under Molecular Biophysics & Biochemistry.

***MCDB 303Lb, Advanced Molecular Biology Laboratory** Maria Moreno, Kenneth Nelson
A laboratory course that provides advanced biological research skills. Weekly workshops focus on grantsmanship, experimental design, data analysis, reading of primary literature, scientific presentations, and scientific writing skills. Application of these skills in project-based laboratory training sponsored by a faculty member. For juniors who have completed MCDB 121L or 201L and are planning their senior research projects. No research laboratory experience required. Special registration procedures apply. Interested students must contact the instructors and attend an organizational meeting in October 2012. SC RP

***MCDB 310a^c/BENG 350a^c, Physiological Systems** Mark Saltzman and staff
For description see under Biomedical Engineering.

MCDB 315b, Biological Mechanisms of Reaction to Injury Michael Kashgarian, Joseph Madri, and staff
Human biology and disease as a manifestation of reaction to injury. Organ structure and function, cell injury, circulatory and inflammatory responses, disordered physiology, and

neoplasia. Enrollment limited; preference to junior and senior majors in MCDB or MB&B. Prerequisite: MCDB 205, 300, or 310. SC RP

MCDB 317a/EVST 441a/F&ES 441a/G&G 440a^G, Methods in Geomicrobiology

Ruth Blake

For description see under Geology & Geophysics.

MCDB 320a^G, Neurobiology Haig Keshishian, Paul Forscher

The excitability of the nerve cell membrane as a starting point for the study of molecular, cellular, and systems-level mechanisms underlying the generation and control of behavior. After a year of college-level chemistry; a course in physics is strongly recommended. SC

MCDB 321La^G, Laboratory for Neurobiology Haig Keshishian and staff

Introduction to the neurosciences. Projects include the study of neuronal excitability, sensory transduction, CNS function, synaptic physiology, and neuroanatomy. Concurrently with or after MCDB 320. SC ½ Course cr

***MCDB 341La or Lb, Laboratory in Electron Microscopy** Barry Piekos

Techniques in light and electron microscopy. Enrollment limited; preference to majors in MCDB or MB&B. Students must devote two to three laboratory hours per week in addition to the published meeting time. Students should contact the instructor prior to the first week of classes. After or concurrently with MCDB 205. SC RP ½ Course cr

***MCDB 342La, Laboratory in Nucleic Acids I** Kenneth Nelson

A project from a research laboratory within the MCDB department, using technologies from molecular and cell biology. Laboratories meet twice a week for the first half of the term. Concurrently with or after MCDB 202, 205, or 300. Enrollment limited. Special registration procedures apply; students must consult the instructor prior to the first week of classes. SC ½ Course cr

***MCDB 343La, Laboratory in Nucleic Acids II** Kenneth Nelson

Continuation of MCDB 342L to more advanced projects in molecular and cell biology, such as making and screening cDNA libraries, microarray screening and analysis, or next-generation DNA sequencing. Laboratories meet twice a week for the second half of the term. Prerequisite: MCDB 342L or permission of instructor. Enrollment limited. Special registration procedures apply; students must consult the instructor prior to the first week of classes. SC ½ Course cr

***MCDB 344Lb, Experimental Techniques in Cellular Biology** Joseph Wolenski

A problems-based approach to questions in cell and molecular biology, with emphasis on experimental strategies and techniques. Topics include SDS-PAGE, immunoblots, column chromatography, mammalian cell culture, cell fractionation, phase contrast microscopy, confocal microscopy, drug studies, bacterial cultures, and methods of transfection and transformation. Prepares for MCDB 475 or 485, 486 or 495, 496. Enrollment limited. Meets during January and February. Prerequisite: MCDB 205. Special registration procedures apply; students must contact the instructor 12 to 14 months in advance, and are interviewed prior to enrollment. SC ½ Course cr

***MCDB 345Lb, Experimental Strategies in Cellular Biology** Joseph Wolenski

Continuation of MCDB 344L, with increased emphasis on experimental design and interpretation of data. Research projects involving protein purification are semi-independent.

Focus on developing an independent research project in modern biomedical research. Students participate in journal discussions, formal seminars, and presentations of data to peers. Prepares for MCDB 475 or 485, 486 or 495, 496. Enrollment limited. Meets during March and April. Prerequisite: MCDB 344L. Special preregistration procedures apply; students must contact the instructor 12 months in advance. SC ½ Course cr

[MCDB 356a, Experimental Strategies in Molecular Cell Biology]

[MCDB 361b⁶/AMTH 465b⁶, Systems Modeling in Biology]

***MCDB 370b⁶, Biotechnology** Xing-Wang Deng and staff

The principles and applications of cellular, molecular, and chemical techniques that advance biotechnology. The most recent tools and strategies used by industrial labs, academic research, and government agencies to adapt biological and chemical compounds as medical treatments, as industrial agents, or for the further study of biological systems. Prerequisite: MCDB 200 or 202 or 300. SC

***MCDB 375b, Advances in Plant Molecular Biology** Vivian Irish

Discussion and critical evaluation of selected research papers emphasizing recent advances in plant molecular biology. Topics include molecular genetic approaches to dissecting signaling events, pattern formation, epigenetic control of plant growth, and plant biotechnology. Focus on higher plants and model plant systems. Intended for advanced students after completion of at least one MCDB core course or equivalent. SC

***MCDB 387b, The Eukaryotic Cell Cycle** Iain Dawson

The regulation and coordination of the eukaryotic cell cycle examined by means of a detailed critique of primary literature. Particular attention to the processes of development, differentiation, and oncogenic disease. Enrollment limited, with preference to juniors and seniors. Prerequisite or corequisite: MCDB 202 or 205. Electronic permission key required. Students must contact the instructor prior to the first week of classes. SC

[MCDB 410b⁶, Molecular Basis of Development]

***MCDB 415b⁶, Cellular and Molecular Physiology** Emile Boulpaep,
Frederick Sigworth

Study of the processes that transfer molecules across membranes. Classes of molecular machines that mediate membrane transport. Emphasis on interactions among transport proteins in determining the physiologic behaviors of cells and tissues. Intended for seniors majoring in the biological sciences. Recommended preparation: MCDB 205, 310, 320, or permission of instructor. SC

***MCDB 430a⁶, Biology of the Immune System** Akiko Iwasaki, Carla Rothlin, and staff

The development of the immune system. Cellular and molecular mechanisms of immune recognition. Effector responses against pathogens. Immunologic memory and vaccines. Human diseases including allergy, autoimmunity, immunodeficiency, and HIV/AIDS. After MCDB 300. SC

***MCDB 435a, Landmark Papers in Cell Biology** Joel Rosenbaum, Mark Mooseker

Discussion and critical evaluation of selected research papers that were important in determining the directions of modern cell biological research. Emphasis on the nature of the

problem, evaluation of the experimental approaches and results, and the authors' interpretation of the results. Weekly discussion by all participants required. Students should contact the instructor prior to the first week of classes. Prerequisites: courses in cell biology, biochemistry, and genetics, or permission of instructor. SC

***MCDB 440b^c, Brain Development and Plasticity** Weimin Zhong,
Sreeranga Chandra

Recent advances in scientific understanding of brain development and plasticity, including neuronal determination, axon guidance, synaptogenesis, and developmental plasticity. Prerequisite: MCDB 320 or permission of instructor. SC

***MCDB 450b, The Human Genome** Stephen Dellaporta

A focus on the primary scientific literature covering the principles of genomics and its application to the investigation of complex human traits and diseases. Topics include the technology of genome sequencing and resequencing, the characterization of sequence and structural variation in human populations, haplotype and linkage disequilibrium analysis, genome-wide association studies, the comparative genomics of humans and our closest relatives, and personalized genomics and medicine. Enrollment limited to 15. Students should contact the instructor prior to the first week of classes. Prerequisite: MCDB 202; a course in statistics is strongly recommended. SC

MCDB 452b^c/MB&B 452b^c, Bioinformatics: Practical Application of Simulation and Data Mining Mark Gerstein

For description see under Molecular Biophysics & Biochemistry.

[MCDB 460b^c, Cell Biology of the Neuron]

***MCDB 470a or b, Tutorial** Douglas Kankel

Individual or small-group study for qualified students who wish to investigate a broad area of experimental biology not presently covered by regular courses. A student must be sponsored by a Yale faculty member, who sets the requirements. The course must include one or more written examinations and/or a term paper. Intended to be a supplementary course and, therefore, to have weekly or biweekly discussion meetings between the student and the sponsoring faculty member. To register, the student must prepare a form, available in the office of the director of undergraduate studies, and a written plan of study with bibliography, approved by the adviser. The form and proposal must be uploaded to the Classes server or submitted to the course instructor in 1220B KBT by Friday, September 7, for the fall term and Tuesday, January 15, for the spring term. The final paper is due in the hands of the sponsoring faculty member, with a copy to the course instructor, by the beginning of reading period. In special cases, with approval of the director of undergraduate studies, this course may be elected for more than one term, but only one term will count as an elective for the major. Fulfills the senior requirement for the B.A. degree if taken in the senior year. Additional sections offered in Beijing, China, under the supervision of Xing-Wang Deng. See under Peking University–Yale University Joint Undergraduate Program.

***MCDB 475a or b, Research** Staff

Research projects under faculty supervision, ordinarily taken to fulfill the senior requirement. This course may be taken before the senior year, but it cannot substitute for other requirements. Students are expected to spend approximately ten hours per week in the laboratory, and to make presentations to students and advisers at monthly section meetings.

Written assignments include a short research proposal summary at the beginning of the term, approved by the Yale faculty sponsor and the instructor in charge of the course. A final research report is required at the end of the term. Seniors taking this course to fulfill the senior requirement must give an oral presentation of their research at the end of the term. Students who take this course more than once must reapply each term; students planning to conduct two terms of research should consider enrolling in MCDB 485, 486. Students should line up a research laboratory during the term preceding the research. Guidelines for the course should be obtained from the office of the director of undergraduate studies or downloaded from the Classes server. Written proposals are due Friday, September 7, for the fall term and Tuesday, January 15, for the spring term. Fulfills the senior requirement for the B.A. degree if taken in the senior year. Two consecutive terms of this course fulfill the senior requirement for the B.S. degree if at least one term is taken in the senior year. Additional sections offered in Beijing, China, under the supervision of Xing-Wang Deng. See under Peking University–Yale University Joint Undergraduate Program.

***MCDB 482a, Advanced Seminar in Cell Biology: Intracellular Signal Transduction**

Craig Crews

Discussion of intracellular signal transduction pathways. Detailed critique of experimental approaches, controls, results, and conclusions of selected current and classic papers in this field. sc

***MCDB 485a and 486b, Research in Biology** Staff

Individual two-term laboratory research projects under the supervision of a faculty member. Students are expected to spend ten to twelve hours per week in the laboratory, and to make presentations to students and advisers at monthly discussion groups. Written assignments include a short research proposal summary due at the beginning of the first term, a grant proposal due at the end of the first term, and a research report summarizing experimental results due at the end of the second term. Students are also required to present their research in either the fall or the spring term. A poster session is held at the end of the spring term. Students should line up a research laboratory during the term preceding the research. Guidelines for the course should be obtained from the office of the director of undergraduate studies or downloaded from the Classes server. Written proposals are due Friday, September 7. Fulfills the senior requirement for the B.S. degree if taken in the senior year. Additional sections offered in Beijing, China, under the supervision of Xing-Wang Deng. See under Peking University–Yale University Joint Undergraduate Program.

***MCDB 495a and 496b, Intensive Research in Biology** Staff

Qualified students may undertake directed research in some field of biology during the senior year. Before registering for this course, the student must be accepted for a research project by a Yale faculty member with a research program in experimental biology and obtain the approval of the instructor in charge of the course. Students spend approximately twenty hours per week in the laboratory, and make written and oral presentations of their research to students and advisers. Written assignments include a short research proposal summary due at the beginning of the first term, a grant proposal due at the end of the first term, and a research report summarizing experimental results due at the end of the second term. Students must attend a minimum of three research seminar sessions (including their own) per term. Students are also required to present their research during both the fall and spring terms. A poster session is held at the end of the spring term. Guidelines for the

course are covered in detail in an information sheet that students should obtain from the office of the director of undergraduate studies early in the final term of the junior year. A written proposal must be submitted by Friday, September 7. Fulfills the senior requirement for the B.S. degree with an intensive major. 2 Course cr per term

Music

Director of undergraduate studies: Patrick McCreless, 306 STOECK, 432-2986,
dus.music@yale.edu

FACULTY OF THE DEPARTMENT OF MUSIC

Professors Kathryn Alexander (*Adjunct*), Richard Cohn, Allen Forte (*Emeritus*), Michael Friedmann (*Adjunct*), Daniel Harrison (*Chair*), James Hepokoski, Richard Lalli (*Adjunct*), Patrick McCreless, Leon Plantinga (*Emeritus*), Ian Quinn, Ellen Rosand, Gary Tomlinson, Michael Veal, Craig Wright

Associate Professors Shinik Hahm (*Adjunct*), Gundula Kreuzer, Toshiyuki Shimada (*Adjunct*), Sarah Weiss

Assistant Professors Stephen Gorbos (*Visiting*), Emily Green (*Visiting*), Brian Kane, Michael Klingbeil, Ève Poudrier

Lecturers Daniel Egan, Andrew Gerle, Grant Herreid, Annette Jolles, Jeffrey Klitz, Sarah Kohane, Sarita Kwok, Judith Malafronte, Joshua Rosenblum, Stanley Scott, Wendy Sharp

The Department of Music offers introductory and advanced instruction in the history of music, the theory of music, composition, music technology, and performance. Level I courses, which are introductory courses numbered below 200, are open to all undergraduates and require no previous experience in music. Level II courses, numbered in the 200s, require a familiarity with music notation. Intermediate courses, Level III, are numbered in the 300s; they require the ability to read music. Advanced courses, Level IV, are numbered in the 400s and are for seniors, juniors, and qualified sophomores. Level III and IV courses are intended primarily for students majoring in Music, but they may be elected by others who meet the stated prerequisites.

Qualified students, whether majoring in Music or not, may offer up to four terms of instruction in performance for academic credit toward the 36-course-credit requirement for the bachelor's degree (MUSI 360, 361, 460, and 461). Of these four credits, only two may be applied to the major in Music. See "Individual Instruction in Performance" below for course descriptions.

The major The Music major provides a general music program in the humanities, as well as preparation for graduate studies or for careers in music. The standard major consists of twelve term courses, eleven of which must be numbered 300 or above, excluding the prerequisites, MUSI 210, 211, 218, and 219. To gain a comprehensive familiarity with the history and theory of music, a student majoring in Music completes a survey of music history from the medieval period to the present as well as a two-course music theory

requirement. The three survey courses in music history are MUSI 350, 351, and 352. A fourth survey course in world music is also required, MUSI 353. Students choose two courses from the music theory series numbered 301 through 311 to satisfy the music theory requirement. Also required is one course designated “Senior sem” during the senior year. Five additional term courses in music chosen from Levels II, III, and IV (only one of which is from Level II) complete the major. Prospective majors are advised to begin the required courses by their sophomore year. Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

Students intending to go on to graduate work are advised to study German and French to achieve at least a reading knowledge of those languages. All Music majors are urged to undertake regular studies in musical performance.

The intensive major The intensive major is for students of high standing who are qualified to do independent and original work in the history or theory of music or in composition. Those admitted to this major elect MUSI 490, 491 in the senior year.

Senior requirement Each student majoring in Music must satisfy a senior departmental requirement by electing a senior seminar (designated “Senior sem” in the course listing) during one of the final two terms. The final essay or composition for the senior seminar should provide an appropriate culmination to the student’s work in the major and in Yale College. In exceptional circumstances, a graduate seminar in the Music department may substitute for the senior seminar; this requires permission both from the director of graduate studies and from the director of undergraduate studies. Senior seminars are also open to interested juniors with the permission of the instructor and the director of undergraduate studies, but one designated senior seminar must be taken in the senior year to fulfill the senior requirement.

B.A./M.M. Program Students in Yale College possessing outstanding ability in performance or composition may anticipate, through their undergraduate programs, one year of the Master of Music program in the School of Music, provided they have completed four terms of performance (MUSI 360, 361, 460, and 461) and MUSI 210 and 211 by the end of the junior year.

The program is open to majors both in Music and in other subjects. Majors in subjects other than Music may present four courses toward the M.M. degree in addition to four terms of performance. These courses normally include two from the music theory sequence numbered 301–311 and two from MUSI 350, 351, 352, and 353, taken by the end of the junior year.

Candidates admitted to the B.A./M.M. program are expected to sit for placement examinations and juries in the School of Music at the beginning of their senior year. They must take lessons and MUS 544, the School of Music Seminar in the Major, in that year and they are advised to take two terms of a performance ensemble if their schedules permit. Students seeking the B.A./M.M. degree in an orchestral instrument are required to participate in the Yale Symphony or the School of Music Philharmonia during their senior year. Composers, singers, and keyboard players should consult their principal teacher about requirements in the senior year beyond the lessons and seminar.

Interested students should consult their principal teacher at the beginning of the first term of their junior year and file an application in the Office of Student Affairs at the School of Music.

Students who have accelerated the undergraduate program are ineligible to apply for the B.A./M.M. program.

REQUIREMENTS OF THE MAJOR

Prerequisites MUSI 210, 211, 218, and 219, or equivalents

Number of courses 12 term courses beyond prereqs, 11 numbered 300 or above

Specific courses required MUSI 350, 351, 352, 353, and 2 from 301–311

Distribution of courses 5 addtl courses from Levels II, III, IV, of which only 1 is from Level II

Senior requirement 1 senior sem

Intensive major Senior sem and senior essay or project (MUSI 490, 491)

FRESHMAN SEMINARS

***MUSI 003a, Shakespeare and Music** Judith Malafronte

The use of music in Shakespeare's plays, from the original stagings and seventeenth-century adaptations to modern productions. Consideration of operatic versions of the plays from the nineteenth, twentieth, and twenty-first centuries. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

***MUSI 004b, Russian Music, 1836–1948** Patrick McCreless

A survey of Russian art music from its historic beginning in Glinka's opera *Life of the Tsar* to the official denunciation of Shostakovich and his music in the Soviet Union. Topics include central works in the tradition, individual composers and their lives, and the role of art music in Russian culture. Representative works of Glinka, Tchaikovsky, Mussorgsky, Rimsky-Korsakov, Scriabin, Stravinsky, Rachmaninoff, Prokofiev, and Shostakovich. No prerequisites in music or Russian. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

***MUSI 005b, Opera, Culture, Media** Gundula Kreuzer

An interdisciplinary introduction to opera as both historical and contemporary multimedia. Topics include the "invention" of opera; patronage, architecture, and opera's changing place in society; intersections between high art and entertainment; the thrill of live performance; divas and stardom; visual culture, technologies, and the rise of direction; and the current mediatization via DVD, Internet, and HD broadcasts. Comparisons of different productions on DVD; visit to the Metropolitan Opera and/or HD broadcast. No knowledge of music required. Does not preclude taking MUSI 243. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

***MUSI 009a, Jazz and Architecture** Michael Veal

A conceptual and structural comparison between modern jazz and modern architecture after World War II, focusing on recent experimental currents in each discipline. Effects of digital technology on both sonic and architectural practices. Form, structure, and material used in free jazz; processes in contemporary architecture that can be compared with those

in modern jazz. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

LEVEL I

*MUSI 107a/HUMS 217a, *Exploring the Nature of Genius* Craig Wright

The changing meanings of the term “genius” in Western culture; discussion as to whether genius is a reality. Focus on the special talents needed to respond to and shape the world in a defining fashion, and the quirky patterns of thought exemplified by great minds, principally Leonardo da Vinci, Newton, Mozart, Woolf, Beethoven, van Gogh, Picasso, Joyce, and Hitler. Recent developments in neurobiology that suggest future lines of research into the minds of exceptional individuals. WR, HU

MUSI 110a or b, *Introduction to the Elements of Music* Richard Lalli

The fundamentals of musical language (notation, rhythm, scales, keys, melodies, and chords), including writing, analysis, singing, and dictation. Intended for students who have no music reading ability.

MUSI 112a, *Listening to Music* Craig Wright

Development of aural skills that lead to an understanding of Western music. The musical novice is introduced to the ways in which music is put together and is taught how to listen to a wide variety of musical styles, from Bach and Mozart, to Gregorian chant, to the blues. HU

MUSI 130a, *Introduction to the History of Western Music: 900 to 1800* Emily Green

An introduction to the principal styles of Western art music through an examination of works by outstanding composers, beginning with Gregorian chant and ending with the music of Haydn and Mozart. No prerequisites. HU

MUSI 131b, *Introduction to the History of Western Music: 1800 to the Present*

Gundula Kreuzer

A survey of nineteenth- and twentieth-century composers, genres, and styles of music in Europe and America, with an emphasis on ways of listening. No prerequisites. HU

LEVEL II

*MUSI 205a or b, *Tonal Harmony and Form* Brian Kane

A thorough review of musical rudiments—scales, keys, chords, rhythm, notation—followed by a study of the fundamentals of tonal harmony and form. Emphasis on listening skills—how to hear what is happening harmonically and formally in tonal pieces without following a score. Intended for non-music majors who have proficiency in reading music. Students who have not taken MUSI 110 must take the music theory placement test. See the *Calendar for the Opening Days* or the Music department Web site for information about the placement test. To be followed by MUSI 210. HU

MUSI 210a or b, *Elementary Studies in Analysis and Model Composition I* Staff

Practical investigation of the basic principles of tonal harmony, counterpoint, and composition through exercises in analysis, motivic development, phrase rhythm, texture, form, performance, and model composition. Recommended to be taken concurrently with MUSI 218 or 219. Admission after MUSI 205 or by the music theory placement test. See the

Calendar for the Opening Days or the Music department Web site for information about the placement test. To be followed by MUSI 211. HU RP

MUSI 211a or b, Elementary Studies in Analysis and Model Composition II

Patrick McCreless and staff

Continuation of MUSI 210. Recommended to be taken concurrently with MUSI 218 or 219. Admission after MUSI 210 or by the music theory placement test. See the *Calendar for the Opening Days* or the Music department Web site for information about the placement test. HU RP

***MUSI 214a, Songwriting for Composers and Lyricists** Andrew Gerle,
Joshua Rosenblum

Introduction to elements of music- and lyric-writing for theater songs. Focus on the development of compositional proficiency in the musical theater idiom and on the refinement of each student's compositional voice. Prerequisite: MUSI 205. Enrollment limited to 12. HU RP

***MUSI 218a or b, Elementary Musicianship I** Sarita Kwok and staff

Exercises in melodic and harmonic dictation, sight-singing, keyboard harmony, and aural analysis. Recommended to be taken concurrently with MUSI 210 or 211. RP ½ Course cr

***MUSI 219a or b, Elementary Musicianship II** Sarita Kwok and staff

Continuation of MUSI 218. Prerequisite: MUSI 218. Recommended to be taken concurrently with MUSI 210 or 211. RP ½ Course cr

***MUSI 220a and 221b, The Performance of Chamber Music** Wendy Sharp

Coached chamber music emphasizing the development of ensemble skills, familiarization with the repertory, and musical analysis through performance. Admission by audition only. May be repeated for credit. For audition information e-mail wendy.sharp@yale.edu. RP ½ Course cr per term Cr/year only

***MUSI 222a or b, The Performance of Vocal Music** Richard Lalli

A course for singers and pianists that emphasizes the analysis and musical preparation of classical solo song and operatic repertoire. Examination of structure (poetic, harmonic, motivic), discussion of style, exploration of vocal techniques, and introduction to the International Phonetic Alphabet. Students are strongly encouraged to supplement the course with individual voice instruction. Admission by audition only. May be repeated for credit. For audition information e-mail richard.lalli@yale.edu. HU RP

***MUSI 223a, The Performance of Early Music** Grant Herreid

A study of musical styles of the twelfth through early eighteenth centuries, including examination of manuscripts, musicological research, transcription, score preparation, and performance. Students in this class form the nucleus of the Yale Collegium Musicum and participate in a concert series at the Beinecke Library. Admission by audition only. May be repeated for credit. For audition information e-mail grant.herreid@yale.edu HU RP

***MUSI 228a/THST 224a, Musical Theater Performance I** Annette Jolles

The structure and meaning of traditional and contemporary musical theater repertoire. Focus on ways to "read" a work, decipher compositional cues for character and action, facilitate internalization of material, and elicit lucid interpretations. For singers, pianists,

and directors. Prerequisites: MUSI 211 and 219, or with permission of instructor. Admission by audition only. May be repeated for credit. For audition information e-mail dan.egan@yale.edu. HU RP

***MUSI 229b/THST 226b, Musical Theater Performance II** Andrew Gerle,
Annette Jolles

The collaborative process and its effect on musical theater performance. Choreography, music direction, and origination of new works. Analysis of texts, scripts, and taped or filmed performances; applications in students' own performance. Prerequisites: MUSI 211 and 219, or with permission of instructor. Admission by audition only. May be repeated for credit. For audition information e-mail dan.egan@yale.edu. RP

***MUSI 243a/HUMS 215a, Opera** Gary Tomlinson

A survey of the history of opera from its beginnings in late sixteenth-century Italy to the twentieth century. Selected works examined against the background of changing poetic, musical, aesthetic, and social conventions. Issues of singing, staging, filming, and reviewing this multimedia art form. Counts toward the Music major as a Level III course with permission of instructor. HU

***MUSI 246a/THST 236a, American Musical Theater History** Daniel Egan

Critical examination of relevance and context in the history of the American musical theater. Historical survey, including nonmusical trends, combined with text and musical analysis. WR, HU RP

***MUSI 251b, Queens of Pop** Emily Green

A history of women in popular music. Investigation of the ways in which female pop icons have used music and musical performance either to adhere to or to subvert norms of gender and sexuality. Introduction to feminist criticism and musicology. Artists include Ma Rainey, Madonna, Millie Jackson, MC Lyte, and Lady Gaga. HU

***MUSI 295b, Introduction to Electronic Music** Kathryn Alexander

A survey of basic techniques in synthesis, sampling, MIDI sequencing, and digital mixing. Focus on popular genres of electronic music, including trance, hip-hop, ambient, house, techno, and trip-hop. Compositional exercises in creating electronic music. Prerequisite: familiarity with music notation. Enrollment limited to 30.

LEVEL III

All courses numbered 300 and above require the ability to read music.

***MUSI 302a, Tonal Counterpoint: Analysis and Composition** Daniel Harrison

Intermediate studies in the theory, analysis, and composition of the music of the early and mid-eighteenth century. Prerequisite: MUSI 211. Enrollment limited to 18. Preference to Music majors according to class. HU

***MUSI 304a, Nineteenth-Century Music: Analysis and Model Composition**

Richard Cohn

Studies in the theory, analysis, and composition of music of the nineteenth century. Prerequisite: MUSI 211. Enrollment limited to 18. Preference to Music majors according to class. HU

***MUSI 305b, Twentieth-Century Music: Analysis and Model Composition**

Michael Friedmann

Studies in the theory, analysis, and composition of music of the early and mid-twentieth century. Prerequisite: MUSI 211. Enrollment limited to 18. Preference to Music majors according to class. HU

***MUSI 306b^c, World Music Theories: Practice and Aesthetics** Sarah Weiss

Survey of the musical processes of various mode-based musical systems, selected from the Indian raga, Arabic *maqam*, Irish tune-family, Javanese *pathet*, Persian *dastgah*, and Vietnamese *Dieu*. Survey of the musical cultures; notation and analysis of the music; related aesthetics systems. Prerequisite: MUSI 211. Enrollment limited to 18. Preference to Music majors according to class. HU

***MUSI 312a, Composition Seminar I** Kathryn Alexander

Intermediate project-oriented studies in music composition, acoustic and/or technological. Survey of contemporary techniques in a broad range of styles and syntax, including both concert and vernacular music genres. Prerequisite: MUSI 205, 325, <395>, or equivalent. Admission by audition only. May be repeated for credit. Enrollment limited to 20. To audition, students should upload one or two PDF scores and MP3 recordings in a single zip file by 4 p.m. on Wednesday, September 5, to their personal dropbox on the Composition Seminar Web page at classesv2.yale.edu. Students with questions should contact the instructor at kathryn.alexander@yale.edu.

***MUSI 313b, Composition Seminar II** Stephen Gorbos

Continuation of MUSI 312. Prerequisite: MUSI 312, 325, <395>, or equivalent. Admission by audition only. May be repeated for credit. Enrollment limited to 20. To audition, students should upload one or two PDF scores and MP3 recordings in a single zip file by 5 p.m. on Thursday, January 17, to their personal dropbox on the Composition Seminar Web page at classesv2.yale.edu. Students with questions should contact the instructor at stephen.gorbos@yale.edu. RP

***MUSI 314b, Composition of Musical Theater** Joshua Rosenblum, Andrew Gerle

Intermediate and advanced project-oriented studies in composition of musical theater. Prerequisite: MUSI 210. May be repeated for credit. Enrollment limited to 12. HU RP

***MUSI 319a, Advanced Musicianship II** Michael Friedmann

Development of students' ability to recognize and generate structures and processes particular to music of the twentieth century. Student composers and advanced performers of post-tonal music expand their perceptive skills. Course activities include singing (and playing), dictation, identification, improvisation, and recognition. Musical examples from the works of Schoenberg, Bartók, Debussy, and Stravinsky. Enrollment limited to 14.

***MUSI 322b/THST 318b, Analyzing, Directing, and Performing Early Opera**

Grant Herreid, Ellen Rosand

Study of a seventeenth-century Venetian opera, with attention to structural analysis of text and music. Exploration of period performance practice, including rhetorical expression, musical style, gesture, dance, Italian elocution, and visual design. Production of the opera in conjunction with the Yale Baroque Opera Project. Open to all students, but designed especially for singers and directors. Prerequisites: MUSI 211 and 219. Admission

by audition only. May be repeated for credit. For audition information e-mail grant.herreid@yale.edu. HU RP

***MUSI 323a, Introduction to Conducting** Toshiyuki Shimada

An introduction to conducting through a detailed study of the problems of baton technique. Skills applied to selected excerpts from the standard literature, including concertos, recitatives, and contemporary music.

***MUSI 324b, Intermediate Conducting** Toshiyuki Shimada

Intermediate studies in baton technique and score preparation. After MUSI 323.

***MUSI 325a, Fundamentals of Music, Multimedia Art, and Technology**

Stephen Gorbos

Fundamental principles of electroacoustic music and multimedia technology. Acoustics, psychoacoustics, sound recording and reproduction, digital audio, image processing, and computer graphics. Exercises in synthesis and signal processing, MIDI, animation, and digital video. Enrollment limited to 25. HU

***MUSI 334b, Analysis and Performance of Early Music** Grant Herreid

Continuation of MUSI 223. Analytical techniques applied to interpretation and performance. Emphasis on the development of vocal technique and sight-reading skills. Students in this class form the nucleus of the Yale Collegium Musicum. Prerequisite: MUSI 223 or equivalent. Admission by audition only. May be repeated for credit. For audition information see www.yale.edu/oci. HU RP

***MUSI 337b, Stephen Sondheim and the American Musical Theater Tradition**

Daniel Egan

The musical theater of Stephen Sondheim, both as a popular phenomenon of the contemporary Broadway stage and in relation to models and forms employed in the past. HU RP

MUSI 343a/CGSC 343a, Music Cognition Ian Quinn

Survey of current approaches to the perception and cognition of music. Topics include the cognitive neuroscience of music, relationships between music and language, mental representations of musical knowledge, the emotional dimensions of music, and the nature of absolute pitch. Students engage in debates about aesthetics, evolutionary psychology, and musical universals. In-class experiments demonstrate basic principles of music psychology and the research methods used to study them. Prerequisites: familiarity with musical notation and some experience making music. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. SO

***MUSI 346a, Javanese Gamelan: Analysis and Performance** Sarah Weiss

Javanese musical genres and performance styles from the eighteenth century to the twenty-first. Performance on multiple instruments; study of theoretical, aesthetic, and analytical discourses about gamelan and other Indonesian performance genres. Students in this class form the nucleus of the Yale Javanese Gamelan Ensemble. No previous gamelan experience required. WR, HU

[MUSI 350b, History of Western Music: Middle Ages and Renaissance]

***MUSI 351a, History of Western Music: Baroque and Classical** James Hepokoski
A detailed investigation of the history of musical style from 1600 to 1800. Preference to Music majors according to class. HU

***MUSI 352b, History of Western Music: The Nineteenth and Twentieth Centuries**
James Hepokoski
A detailed investigation of the history of musical style from 1800 to the present. Preference to Music majors according to class. HU

[MUSI 353b/AFST 353b, Topics in World Music]

MUSI 357a/SAST 259a, Indian Music Theory and Practice Stanley Scott
Introduction to the concepts and culture of music in South Asia from Vedic times to the present, with a focus on North Indian classical music. Discussion of history and theory is enriched by practical instruction and live performances. Topics include raga (melody), tala (meter), musical forms, improvisation, patronage, religion, and gender, with forays into folk music and film. No previous experience in Indian classical music required. HU

***MUSI 358b/CGSC 358b, Cognition of Musical Rhythm** Ève Poudrier
An introduction to the study of musical rhythm from the dual perspective of music theory and psychology. The nature of musical temporality explored through study of works from a variety of musical styles and through a survey of relevant experimental work on rhythm perception and production. Topics include cognitive limits on the perception of temporal structures; categorical perception and the role of memory; attention, entrainment, and sensorimotor synchronization; expressive timing; and complex rhythmic structures. HU

***MUSI 365a or b, Folk Hymnody in American Culture** Ian Quinn
Introduction to the folk-song process known as shape-note or Sacred Harp singing, a unique tradition of community music-making among Protestant Christians in parts of the southern United States. The tradition's roots in colonial New England, growth in the southern states between the Civil War and the World Wars, and influence on later musical genres such as bluegrass and gospel. The history of American music and religion; exploration of a way of relating to music that is fundamentally different from the performer-audience relationship; participation in shape-note singing. Fall term offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

LEVEL IV

***MUSI 412a, Composition Seminar III** Stephen Gorbos
Advanced project-oriented studies in music composition, acoustic and/or technological. Prerequisites: MUSI 312 and 313. Admission by audition only. May be repeated for credit. Enrollment limited to 8. To audition, students should upload one or two PDF scores and MP3 recordings of work completed in MUSI 312, 313, 412, or 413 in a single zip file by 4 p.m. on Wednesday, September 5, to their personal dropbox on the Composition Seminar Web page at classesv2.yale.edu. Students with questions should contact the instructor at stephen.gorbos@yale.edu.

***MUSI 413b, Composition Seminar IV** Kathryn Alexander
Continuation of MUSI 412. Prerequisites: MUSI 312 and 313. Admission by audition only. May be repeated for credit. Enrollment limited to 8. To audition, students should upload

one or two PDF scores and MP3 recordings of prior work completed in MUSI 312, 313, 412, or 413 in a single zip file by 5 p.m. on Thursday, January 17, to their personal dropbox on the Composition Seminar Web page at *classesv2.yale.edu*. Students with questions should contact the instructor at *kathryn.alexander@yale.edu*.

***MUSI 424b⁶, Music, Ritual, and Religion in Haiti and Its Diaspora** Melvin Butler
An exploration of Haiti's sonic and religious landscapes, with particular attention to the intersections of musical performance, religious experience, and forms of spiritual and political power. Ethnomusicological, anthropological, and theological approaches to understanding music-making as a contested social practice that informs, and is informed by, various ways of experiencing the supernatural. No prerequisites. HU

***MUSI 454a/THST 454a, Opera on Stage** Gundula Kreuzer
Opera as staged multimedia, traced both in scores and on DVD. The difference in modern productions between visual aspects, which are treated freely, and music and libretto, which are treated as sacrosanct. Topics include the musical work concept, the rise of direction in the nineteenth century, Wagner's ideal of the total work of art, technological influences on composition and dramaturgy, live versus recorded performances, and the mediatization of opera. HU

Senior Seminars

***MUSI 467b, Mahler, Modernism, and the Symphony** James Hepokoski
A study of Mahler's Symphonies 1–4, considered in the context of an emerging European musical modernism. Close analyses of selected movements, linked to larger interpretations of program and structure. Samples of current and influential discussions of this music; introduction to the theory of sonata deformations, rotations, and hermeneutics. HU RP
Senior sem

***MUSI 470a, Noise** Brian Kane
A study of noise from musical, philosophical, and cultural perspectives. Reading and discussion of theoretical, political, ecological, and avant-garde writings on noise; critical study of musical repertoire involving noise, sound art, and recorded sound; introduction to current debates in sound studies and auditory culture; hands-on work with electronic noise. HU Senior sem

INDIVIDUAL STUDY COURSES

***MUSI 471a and 472b, Individual Study** Patrick McCreless
Original essay in ethnomusicology, music history, music theory, or music technology and/or multimedia art under the direction of a faculty adviser. Admission to the course upon submission to the department of the essay proposal by the registration deadline, and approval of the director of undergraduate studies.

***MUSI 490a and 491b, Senior Essay for Intensive Majors in the History, Theory, or Composition of Music** Patrick McCreless
Preparation of an original composition or essay under the direction of a faculty adviser. Music majors enroll for two terms; students in the music track of the Computing and the Arts major elect either term. Admission to the course upon submission to the department

of the senior essay proposal by the fall registration deadline of the senior year, and approval of the director of undergraduate studies. Original composition project proposals also require an audition. Students intending to fulfill the requirements of the intensive major are urged to consult the director of undergraduate studies toward the end of the junior year.

INDIVIDUAL INSTRUCTION IN PERFORMANCE

***MUSI 360a or b, Performance: First Term** Patrick McCreless

Individual instruction in the study and interpretation of musical literature. Academic credit is granted to students who demonstrate an appropriate level of proficiency in audition. For both MUSI 360 and 361, enrollment requires previous completion of or concurrent registration in a required music theory course. Students must take the Music department's music theory placement test to determine their placement in the 200-level music theory sequence. A score of 4 or 5 on the Advanced Placement test in Music Theory does not satisfy the music theory prerequisites for performance instruction. After or concurrently with MUSI 205 or 210, as determined by the music theory placement test. Students register for the section specific to their instrument: see www.yale.edu/oci for section information. Although the faculty of the School of Music attempts to accommodate those who qualify for credit instruction, it cannot guarantee they will be enrolled with the teacher of their choice. Students who do not qualify for academic credit may also receive lessons. Students accepted for noncredit instruction are charged \$550 for twelve hour lessons per term; \$350 is charged for twelve half-hour lessons per term. The fees are added to the Student Financial Services bill and are not refundable after the first two weeks of lessons in each term. The half-hour fee is waived for juniors and seniors who are majors in Music. Auditions (both for credit and not for credit) for assignment to instructors for freshmen and returning students will be held at the beginning of the fall term. To arrange for an audition, students must sign up at <https://apply.music.yale.edu/lessons>.

***MUSI 361a or b, Performance: Second Term** Patrick McCreless

Continuation of MUSI 360. Enrollment requires previous completion of or concurrent registration in an additional required music theory course. Prerequisite: MUSI 360; after or concurrently with MUSI 210 or 211, as determined by the music theory placement test.

***MUSI 460a or b, Performance: Third Term** Patrick McCreless

Continuation of MUSI 361. Prerequisite: MUSI 361.

***MUSI 461a or b, Performance: Fourth Term** Patrick McCreless

Continuation of MUSI 460. Prerequisite: MUSI 460. Students beyond their fourth term of performance instruction register first in MUS 540 in the School of Music, and then in MUS 640. No Yale College degree credit is offered for these courses.

Naval Science

Program chair: Commander James Godwin, USN, james.godwin@yale.edu;

program adviser: Lieutenant Molly Crabbe, USN, molly.crabbe@yale.edu;

program adviser: Captain Christopher Reinke, USMC, christopher.reinke@yale.edu;

Rm. 430, 55 Whitney Ave., 432-8223; nrotc.yalecollege.yale.edu

The Naval Reserve Officers Training Corps (NROTC) program educates and trains young men and women for service as commissioned officers in the United States Navy or Marine Corps. Candidates may apply for either the Scholarship Program or the nonscholarship College Program (see below) and choose either the Navy or the Marine option. Upon conferral of a degree, graduates of the NROTC Scholarship Program are commissioned into the Navy or Marine Corps for a minimum of five years of active duty service. Graduates of the College Program are commissioned for a minimum of three years of active duty service.

Academic requirements The Naval Science curriculum includes courses on topics such as Navy and Marine Corps organization, at-sea navigation, leadership, naval history, amphibious warfare, engineering, and weapons systems. Courses emphasize development of professional knowledge and leadership skills, which are placed in the context of military service immediately following graduation from Yale College.

Students in the NROTC program enroll in one Naval Science course per term. Some courses are required for both Navy and Marine option students, while others are specific to the branch of service. All NROTC students must also enroll in the Naval Science Laboratory each term. Most Naval Science courses count for enrollment credit; none count toward the thirty-six course credits required for the bachelor's degree.

Prior to graduation, Navy option students must also complete eight core curriculum courses through Yale College in fields such as mathematics, physical science, history, and English. These courses count toward the bachelor's degree, and many can be used to fulfill distributional requirements. For more information, see nrotc.yalecollege.yale.edu/academics.

For the Navy option, the usual sequence of Naval Science courses is:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
Introduction to naval science	Organizational leadership	Naval engineering	Naval operations
Navigation	Sea power	Naval weapons systems	Leadership and ethics

For the Marine Corps option, the usual sequence of Naval Science courses is:

<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
Introduction to naval science	Organizational leadership	Evolution of warfare	Amphibious warfare
One elective	Sea power	One elective	Leadership and ethics

Application Students in the Class of 2015 and subsequent classes are eligible for enrollment in the NROTC program. Students who matriculate at Yale without a four-year NROTC scholarship may apply for enrollment in the nonscholarship College Program and compete for scholarships during their first two years. If selected for the Scholarship Program, students receive full tuition, academic fees, a stipend for textbooks, and a monthly subsistence allowance that increases annually. Scholarship students also have the opportunity to attend a training cruise with a U.S. Navy or Marine Corps operational unit for approximately four weeks each summer.

Candidates apply for the national Naval ROTC scholarship on line via the NROTC Web site at www.nrotc.navy.mil. Applications are due by January 31 for activation the following fall. For enrollment in the nonscholarship College Program, students apply directly to the Yale NROTC unit.

Yale's Naval Reserve Officers Training Corps program is a member of a consortium of universities centered at the College of the Holy Cross in Worcester, MA. For additional information about Yale's NROTC program, visit nrotc.yalecollege.yale.edu or send questions to nrotc@yale.edu.

***NAVY 100a or b, Naval Science Laboratory** Christopher Reinke

Leadership and practical application skills from the Professional Core Competency objectives that are not covered in other Naval Science courses. Emphasis on professional training that is not of an academic nature. Includes both classroom instruction and physical training. Topics and special briefings as determined by Naval Science faculty and the Naval Service Training Command. Required for NROTC students each term. Does not count for enrollment credit or toward the thirty-six course credits required for the bachelor's degree.

***NAVY 111a, Introduction to Naval Science** Mary Crabbe

An overview of the naval service for first-year Naval ROTC students and others interested in pursuing the NROTC program. Organization, missions, customs and traditions, leadership principles, ethics, duties of a junior officer, and career options in the U.S. Navy and Marine Corps. Discussion of shipboard organization and procedures, safety, and damage control prepares students for summer training aboard naval vessels. For enrollment credit only; not to be counted toward the thirty-six course credits required for the bachelor's degree.

***NAVY 112b, Navigation** Mary Crabbe and staff

Introduction to surface-ship navigation and practical piloting in both restricted and open water. Celestial navigation theory, navigational charts and instruments, and electronic navigation. Weather and other environmental factors that affect naval operations. Navigation rules and regulations, maneuvering board concepts, and practical exercises. For enrollment credit only; not to be counted toward the thirty-six course credits required for the bachelor's degree.

Near Eastern Languages and Civilizations

Director of undergraduate studies: Colleen Manassa, 321 HGS, 436-8181,
colleen.manassa@yale.edu; nelc.yale.edu

FACULTY OF THE DEPARTMENT OF NEAR EASTERN LANGUAGES AND CIVILIZATIONS

Professors John Darnell, Benjamin Foster, Eckart Frahm, Beatrice Gruendler, Dimitri Gutas, Bentley Layton, Harvey Weiss

Associate Professor Colleen Manassa

Lecturers Adel Allouche, Karen Foster, David Klotz, Kathryn Slanski, Kevin Wilkinson

Senior Lector II Ayala Dvoretzky**Senior Lectors** Muhammad Aziz, Shiri Goren, Shady Nasser**Lectors** Sarab al-Ani, Aaron Butts, Etem Erol, Dina Roginsky, Hasmik Tovmasyan

The major in Near Eastern Languages and Civilizations is a liberal arts major that gives students a sound competence in a Near Eastern language and a broad knowledge of the literatures, civilizations, history, and archaeology of the Near East. The major also provides essential preparation for graduate or professional work in which a knowledge of Near Eastern languages, history, and archaeology is required.

Depending on the student's interests, the major is built around study of one or more Near Eastern languages, leading to a concentration in the ancient Near East (Mesopotamia, Egypt, or Syria-Palestine), in Hebrew language and literature, or in Arabic and Islamic studies.

Requirements of the major Twelve term courses in the department, or their equivalent, are required for the major, including the senior essay course. No more than six course credits from other institutions will be accepted toward this requirement. The course work includes at least two years of study of a Near Eastern language and no fewer than three term courses in the history and civilizations of the Near East, at least one term of which must be in the ancient and one in the Islamic Near East. Students should develop coherent programs of study in one of three areas of concentration:

1. Ancient Near Eastern languages and civilizations, with emphasis on Mesopotamia, Egypt, or Syria-Palestine. Students interested in Mesopotamia take at least two years of Akkadian, as well as courses in the history and civilizations of the ancient Near East. Students interested in Egypt take at least two years of Egyptian, as well as courses in the history and civilizations of ancient Egypt. Students interested in Syria-Palestine take at least two years of biblical Hebrew, as well as courses in the history and civilizations of the ancient Near East.
2. Hebrew language and literature. Students take two years or more of Hebrew (ancient or modern, but in any case at least two years of one period of the language), and courses in Hebrew literature, the history and civilizations of the ancient Near East, and Near Eastern Judaism.
3. Arabic and Islamic studies. ARBC 120 is a prerequisite for this area and counts as one term course toward the twelve required. Students take at least two years of Arabic beyond the prerequisite, and courses selected from Arabic literature, Arab civilization, Islamic religion, Near Eastern history, and Persian or Turkish language. In their senior year, students take NELC 490, Introduction to Arabic and Islamic Studies. Majors in this area of concentration are strongly advised to begin their language training as early as possible, and certainly not later than the sophomore year. Students should consult Dimitri Gutas, 316 HGS, 432-2947.

Well-qualified students who have acquired the requisite background in undergraduate courses may, with the permission of the instructor, the director of undergraduate studies, and the director of graduate studies, be admitted to graduate courses where no suitable undergraduate courses exist. In addition, courses from such other departments and

programs as Archaeological Studies, History, History of Art, Judaic Studies, Political Science, and Religious Studies, as well as college seminars, are routinely accepted for credit toward the major if they deal with Near Eastern topics.

All course schedules must be approved by the director of undergraduate studies.

Senior essay To derive full benefit from the major, students should acquire practical experience in using Near Eastern languages for research purposes. Therefore all students in the major undertake a senior essay that involves substantial use of materials in one or more Near Eastern languages. The senior essay is a research paper of at least thirty pages prepared under the supervision of a departmental faculty member. It may be written under the rubric of NELC 492 and/or 493, or as an extended seminar paper in a departmental seminar course, in which case the instructor serves as the essay adviser. The topic and a prospectus signed by an adviser are to be submitted to the director of undergraduate studies by the end of the fourth week of classes in either term of the senior year. The particular subject matter and theoretical approach of the essay are decided by the student after consultation with the faculty adviser.

In cases in which students demonstrably need more time for an extensive essay, the senior essay may be approved as a year course after consultation with the adviser and the director of undergraduate studies. Only those students who have advanced language skills and whose project is considered to be of exceptional promise are eligible. The requirements for the two-term essay are the same as for the one-term essay, except that the essay should be at least sixty pages.

Languages currently offered by the Department of Near Eastern Languages and Civilizations include Akkadian, Arabic, Egyptian, Hebrew, Persian, Syriac, and Turkish. Students who take a foreign language during a term, year, or summer abroad must complete a departmental placement examination after they return to Yale; there are no exceptions to this requirement.

REQUIREMENTS OF THE MAJOR

Prerequisites *Arabic and Islamic studies*—ARBC 120; *All other areas*—none

Number of courses 12 term courses (incl prereq and senior essay)

Distribution of courses 2 years of a Near Eastern lang; 3 courses in Near Eastern hist and civ, incl 1 in ancient and 1 in Islamic Near East; area of concentration as specified

Specific course required *Arabic and Islamic studies*—NELC 490

Senior requirement Senior essay using materials in 1 or more Near Eastern langs (in NELC 492 and/or 493 or in dept sem)

NEAR EASTERN HISTORY AND CIVILIZATIONS

Introductory and Survey Courses

***NELC 001a/ARCG 001a, Egypt and Northeast Africa: A Multidisciplinary Approach**

Colleen Manassa, John Darnell

Examination of approximately 10,000 years of Nile Valley cultural history, with an introduction to the historical and archaeological study of Egypt and Nubia. Consideration of the Nile Valley as the meeting place of the cultures and societies of northeast Africa. Various

written and visual sources are used, including the collections of the Peabody Museum and the Yale Art Gallery. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem

NELC 101b/HUMS 438b, Origins of Western Civilization: The Near East from Alexander to Muhammad Benjamin Foster

For description see under Humanities.

NELC 102a/HUMS 440a/MMES 102a, Introduction to the Middle East
Benjamin Foster

Introduction to the history and cultures of the Middle East from the rise of Islam to the present, including the Arab world, Iran, Turkey, and Israel. Emphasis on factors important for understanding the Middle East today. HU

Ancient, Classical, and Medieval

NELC 104b⁶/ARCG 239b/HSAR 239b⁶/HUMS 252b, Art of the Ancient Near East and Aegean Karen Foster

For description see under History of Art.

NELC 107a/ARCG 238a/HSAR 238a, Buried Cities: Thera, Pompeii, and Herculaneum
Karen Foster

For description see under History of Art.

NELC 120b⁶/ARCG 221b⁶/HSAR 234b, Egyptomania Colleen Manassa, John Darnell
Conceptual underpinnings of the use of ancient Egyptian motifs in architecture, painting, sculpture, and decorative arts throughout Western Europe, the Middle East, and North America from antiquity to the present. Coordinated with the exhibit *Egyptomania* at the Peabody Museum. HU

NELC 121a/HUMS 441a, The Hero in the Ancient Near East Kathryn Slanski
Exploration of the interaction of religion, history, and literature in the ancient Near East through study of its heroes, including comparison with heroes, heroic narratives, and hero cults in the Bible and from classical Greece. WR, HU

***NELC 158b/JDST 276b⁶/RLST 250b⁶, Jews and Minorities in the Islamic State**
Eve Krakowski

For description see under Judaic Studies.

***NELC 159a/HIST 222a/JDST 263a⁶/WGSS 225a, Marriage and Kinship in Medieval Near East** Eve Krakowski

For description see under Judaic Studies.

NELC 220a⁶/ARCG 223a⁶/WGSS 226a⁶, Lives in Ancient Egypt Colleen Manassa
Introduction to the social history of ancient Egypt from 3,100 to 30 B.C.E. Focus on the lives of particular individuals attested in the textual and archaeological record, from pharaohs and queens to artists, soldiers, and farmers. Reading of primary sources in translation; course projects integrate ancient objects in Yale collections. HU

***NELC 230b/CLCV 113b/HUMS 434b, Mesopotamia's Literary Legacy**
Kathryn Slanski

For description see under Humanities.

NELC 326a/HIST 226a^c/HUMS 422a/RLST 158a^c, Jesus to Muhammad: Ancient Christianity to the Rise of Islam Stephen Davis

For description see under Religious Studies.

NELC 402a/HIST 360a/MMES 171a, The Islamic Near East from Muhammad to the Mongol Invasion Adel Allouche

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. HU

***NELC 403b/HIST 384Jb/MMES 172b, The Middle East between Crusaders and Mongols** Adel Allouche

For description see under History.

***NELC 404b/HIST 398Jb/MMES 173b, Mamluk Egypt** Adel Allouche

For description see under History.

Modern

[NELC 154a^c/JDST 295a/MMES 154a, Israeli Identity and Culture, 1948 to the Present]

NELC 155a, State and Society in Israel Dina Roginsky

The interplay between state and society in Israel; current Israeli discourse on controversial issues such as civil rights in a Jewish-democratic state, Jewish-Arab relations, right and left politics, orthodoxy, military service, globalization, and multiculturalism. Sociopolitical changes that have taken place in Israel since the establishment of the state led to the reshaping of Israeli Zionist ideology. HU

LANGUAGES AND LITERATURES OF THE ANCIENT NEAR EAST

Akkadian

AKKD 110a^c, Elementary Akkadian I Eckart Frahm

Introduction to the language of ancient Babylonia and its cuneiform writing system, with exercises in reading, translation, and composition. Credit only on completion of AKKD 120. L1 RP

AKKD 120b^c, Elementary Akkadian II Eckart Frahm

Continuation of AKKD 110. Prerequisite: AKKD 110. L2 RP

AKKD 130a^c, Intermediate Akkadian I Benjamin Foster

Close reading of selected Akkadian texts; introduction to Akkadian dialects, cuneiform epigraphy, and research techniques of Assyriology. Prerequisite: AKKD 120. L3 RP

AKKD 140b, Intermediate Akkadian II Benjamin Foster and staff

Continuation of AKKD 130. Prerequisite: AKKD 130.

Egyptian

EGYP 110a^c, Introduction to Classical Hieroglyphic Egyptian I Niv Allon, Julia Hsieh
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. Credit only on completion of EGYP 120. L1 RP

EGYP 120b^c, Introduction to Classical Hieroglyphic Egyptian II Niv Allon, Julia Hsieh
Continuation of EGYP 110. Prerequisite: EGYP 110. L2 RP

***EGYP 135a^c, Egyptian Coffin Texts** John Darnell
Readings of the religious texts of Middle Kingdom coffins. Focus on creation accounts, the Shu texts, spells of transformation, and the Book of the Two Ways. Readings in both normalized hieroglyphic transcription and original cursive hieroglyphic writing. Study of coffin panels in the collection of the Yale Art Gallery. Prerequisite: EGYP 120. L3, HU RP

Syriac

Students wishing to study Syriac should consult the director of undergraduate studies.

HEBREW LANGUAGE AND LITERATURE

HEBR 110a^c, Elementary Modern Hebrew I Ayala Dvoretzky
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. Credit only on completion of HEBR 120. L1 RP ½ Course cr

HEBR 120b^c, Elementary Modern Hebrew II Dina Roginsky
Continuation of HEBR 110. Prerequisite: HEBR 110 or equivalent. L2 RP ½ Course cr

HEBR 130a^c, Intermediate Modern Hebrew I Shiri Goren
Review and continuation of grammatical study, leading to a deeper understanding of style and usage. Focus on selected readings, writing, comprehension, and speaking skills. Prerequisite: HEBR 120 or equivalent. L3 RP

HEBR 140b^c, Intermediate Modern Hebrew II Ayala Dvoretzky
Continuation of HEBR 130. Prerequisite: HEBR 130 or equivalent. L4 RP

[HEBR 150b^c/JDST 213b/MMES 150b, Advanced Modern Hebrew: Israeli Society]

***HEBR 151b^c/JDST 301b/MMES 153b, Introduction to Modern Israeli Literature**
Ayala Dvoretzky
Fiction, poetry, films, drama, and magazine articles representative of contemporary cultural, social, and political issues in Israeli life. Conducted in Hebrew. Prerequisite: HEBR 140 or equivalent. L5

***HEBR 152a^c, Reading Academic Texts in Modern Hebrew** Dina Roginsky
Reading of academic texts in modern Hebrew, for students with a strong background in Hebrew. Discussion of grammar and stylistics, with special concentration on the development of accuracy and fluency. Prerequisite: HEBR 150 or permission of instructor. Conducted in Hebrew. L5 RP

***HEBR 156a^c/JDST 405a/MMES 216a, Dynamics of Israeli Culture** Shiri Goren
 Controversies in Israeli society as revealed in novels, films, poetry, newspaper articles, Web sites, art, advertisements, and television shows. Themes include migration and the construction of the Sabra character; ethnicity and race; the emergence of the Mizrahi voice; women in Israeli society; private and collective memory; the minority discourse of the Druze and Russian Jews; and Israeli masculinity and queer culture. Conducted in Hebrew. Papers may be written in English or Hebrew. Prerequisite: HEBR 140 or permission of instructor. L5, HU RP

***NELC 157b^c/JDST 306b/MMES 157b, Israeli Narratives** Shiri Goren
 Close reading of major Israeli novels in translation with attention to how their themes and forms relate to the Israeli condition. Theories of war and peace, migration, nationalism, and gender. Authors include Yehoshua, Grossman, Matalon, Castel-Bloom, and Kashua. No knowledge of Hebrew required. HU Tr

[HEBR 158a^c/JDST 305a, Contemporary Israeli Society in Film]

***HEBR 159b^c/JDST 409b/MMES 159b, Conversational Hebrew: Israeli Media**
 Shiri Goren
 An advanced Hebrew course for students interested in practicing and enhancing conversational skills. Focus on listening comprehension and on various forms of discussion, including practical situations, online interactions, and content analysis. Prerequisite: HEBR 140 or permission of instructor. L5 RP

HEBR 161b/JDST 407b/MMES 156b, Israeli Popular Music Dina Roginsky
 Changes in the development of popular music in Israel explored as representations of changing Israeli society and culture. The interaction of music and cultural identity; modern popular music and social conventions; songs of commemoration and heroism; popular representation of the Holocaust; Mizrahi and Arab music; feminism, sexuality, and gender; class and musical consumption; criticism, protest, and globalization. Conducted in Hebrew. Prerequisite: HEBR 140 or equivalent. L5

Biblical Hebrew

***HEBR 163a/JDST 410a, Mishnaic Hebrew Grammar** Yochanan Breuer
 Introduction to the orthography, phonology, and morphology of Mishnaic Hebrew, the Hebrew employed in rabbinic texts of the first two centuries C.E. Prerequisite: two years of biblical or modern Hebrew. L5

ARABIC AND ISLAMIC STUDIES

Arabic

ARBC 110a, Elementary Modern Standard Arabic I Shady Nasser and staff
 Development of a basic knowledge of Modern Standard Arabic. Emphasis on grammatical analysis, vocabulary acquisition, and the growth of speaking, listening, reading, and writing skills. Credit only on completion of ARBC 120. L1 RP 1½ Course cr

ARBC 120b, Elementary Modern Standard Arabic II Shady Nasser and staff
 Continuation of ARBC 110. Prerequisite: ARBC 110 or equivalent. L2 RP 1½ Course cr

ARBC 130a, Intermediate Modern Standard Arabic I Sarab al-Ani, Muhammad Aziz, and staff

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. Prerequisite: ARBC 120 or permission of instructor. L3 RP 1½ Course cr

ARBC 136a^G, Intermediate Classical Arabic I Matteo Di Giovanni, Hadi Jorati

Introduction to classical Arabic, with emphasis on analytical reading skills, grammar, and prose composition. Readings from the Qur'an, Islamic theology, and literature and history of the Middle East, as well as Jewish and Christian religious texts in Arabic. Prerequisite: ARBC 120 or permission of instructor. May be taken concurrently with ARBC 130 or 150. L3 RP

ARBC 140b, Intermediate Modern Standard Arabic II Shady Nasser, Muhammad Aziz, and staff

Continuation of ARBC 130. Prerequisite: ARBC 130 or equivalent. L4 RP 1½ Course cr

ARBC 146b^G, Intermediate Classical Arabic II Matteo Di Giovanni, Hadi Jorati

Continuation of ARBC 136. Prerequisite: ARBC 136 or permission of instructor. May be taken concurrently with ARBC 140 or 151. L4 RP

***ARBC 150a, Advanced Modern Standard Arabic I** Shady Nasser, Sarab al-Ani, and staff

Further development of listening, writing, and speaking skills. For students who already have a substantial background in Modern Standard Arabic. Prerequisite: ARBC 140 or permission of instructor. L5 RP

***ARBC 151b, Advanced Modern Standard Arabic II** Shady Nasser and staff

Continuation of ARBC 150. Prerequisite: ARBC 150 or permission of instructor. L5 RP

ARBC 158a^G, Advanced Classical Arabic I Shady Nasser

Development of an advanced understanding of Arabic grammar and morphology through close reading of the grammar of Ibn Malik (the *Alfiyyah*). Advanced training in sentence structure through *i'rab*. Prerequisite: ARBC 146 or 151. L5, HU

ARBC 159b^G, Advanced Classical Arabic II Shady Nasser

Continuation of ARBC 158. Prerequisite: ARBC 158. L5, HU

ARBC 160a^G, Business Arabic Shady Nasser and staff

Language learning combined with an introduction to trends, practices, and problems in the business environment of the Arab world. Emphasis on vocabulary, common phrases, and other linguistic conventions relevant to topics in business and commerce. Discussion and analysis of articles on business and economics in Arab-speaking countries. Prerequisite: ARBC 151. L5 RP

ARBC 161a^G, Arabic Prose Narrative Muhammad Aziz

Close reading of *Palace Walk*, the first book of the Cairo Trilogy by Naguib Mahfouz. Attention to the vocabulary, idiomatic expressions, and structural patterns of the novel. Includes literary analysis, discussion, and weekly position papers. Prerequisite: ARBC 151. May be repeated for credit. L5 RP

***ARBC 165a^G or b^G/MMES 465a or b, Arabic Seminar** Dimitri Gutas [F],
Beatrice Gruendler [Sp]

Study and interpretation of classical Arabic texts for advanced students. Prerequisite: ARBC 146, 151, or permission of instructor. May be repeated for credit. L5

ARBC 191a, Egyptian Arabic Muhammad Aziz and staff

A basic course in the Egyptian dialect of Arabic. Principles of grammar and syntax; foundations for conversation and listening comprehension. Prerequisite: ARBC 130 or equivalent.
RP

ARBC 192b, Iraqi and Gulf Arabic Sarab al-Ani

A basic course in the Iraqi/Gulf dialect of Arabic. Principles of grammar and syntax; foundations for conversation and listening comprehension. Prerequisite: ARBC 130 or equivalent. RP

***ARBC 471a or b, Directed Reading and Research** Dimitri Gutas [F],
Beatrice Gruendler [Sp]

For students who wish to pursue a topic or body of texts not available in the department's regular curriculum. Approval of the plan of study by both the director of undergraduate studies and a member of the department who agrees to serve as instructor is required. Student and instructor meet regularly throughout the term. The course culminates in either a piece of written work or a final examination.

Persian

PERS 110a^G, Elementary Persian I Farkhondeh Shayesteh and staff

An introduction to modern Persian, with emphasis on grammar and syntax as well as writing and reading simple prose. Students are introduced to colloquial Persian and are encouraged to speak the language from the outset. Credit only on completion of PERS 120. L1 RP 1½ Course cr

PERS 120b^G, Elementary Persian II Farkhondeh Shayesteh and staff

Continuation of PERS 110. Prerequisite: PERS 110. L2 RP 1½ Course cr

PERS 130a^G, Intermediate Persian I Farkhondeh Shayesteh and staff

Intermediate study of grammar and readings in Persian, emphasizing rules and usage of colloquial Persian. Prerequisite: PERS 120. L3 RP 1½ Course cr

PERS 140b^G, Intermediate Persian II Farkhondeh Shayesteh and staff

Continuation of PERS 130. Prerequisite: PERS 130. L4 RP 1½ Course cr

***PERS 150b^G, Thematic Survey of Modern Persian Literature** Farkhondeh Shayesteh
and staff

A survey of modern Persian literature. Themes include the depiction of women, minorities, the West, and Westerners. Discussion of language and society in works by Jalal Al-Ahmad, Sadeq Chubak, Simin Daneshvar, and Sadiq Hedayat. Prerequisite: PERS 140 or equivalent. L5, HU RP

***PERS 471a or b, Directed Reading in Persian** Colleen Manassa and staff

Independent study of Persian texts at an advanced level.

*Turkish***TKSH 110a⁶, Elementary Modern Turkish I** Etem Erol

Development of a basic knowledge of modern Turkish, with emphasis on grammatical analysis, vocabulary acquisition, and reading and writing skills. Credit only on completion of TKSH 120. L1 RP 1½ Course cr

TKSH 120b⁶, Elementary Modern Turkish II Etem Erol

Continuation of TKSH 110. Prerequisite: TKSH 110 or permission of instructor. L2 RP 1½ Course cr

TKSH 130a⁶, Intermediate Turkish I Etem Erol

Continued study of modern Turkish, with emphasis on advanced syntax, vocabulary acquisition, and the beginnings of free oral and written expression. Prerequisite: TKSH 120 or permission of instructor. L3 RP

TKSH 140b⁶, Intermediate Turkish II Etem Erol

Continuation of TKSH 130. Prerequisite: TKSH 130. L4 RP

TKSH 150a⁶, Advanced Turkish I Etem Erol

An advanced language course focused on improving students' reading, writing, listening, and speaking skills in modern Turkish. Extensive study of vocabulary and idiomatic expressions. Readings from genres including academic articles, critical essays, literature, newspaper articles, and formal business writing. Screening of films, documentaries, and news broadcasts. Prerequisite: TKSH 140. L5 RP

TKSH 151b⁶, Advanced Turkish II Etem Erol

Continuation of TKSH 150. Focus on primary materials from Turkish media, short stories, and Turkish films. Development of proficiency sufficient for conducting research and presenting findings and evaluations in Turkish. Prerequisite: TKSH 150. L5 RP

***TKSH 471a or b, Directed Reading and Research** Benjamin Foster [F],
Etem Erol [Sp]

For students who wish to pursue a topic or body of texts not available in the department's regular curriculum. Approval of the plan of study by both the director of undergraduate studies and a member of the department who agrees to serve as instructor is required. Student and instructor meet regularly throughout the term. The course culminates in either a piece of written work or a final examination. RP

COURSES FOR MAJORS***NELC 490a⁶/MMES 490a, Introduction to Arabic and Islamic Studies**

Dimitri Gutas

Comprehensive survey of subjects treated in Arabic and Islamic studies, with representative readings from each. Methods and techniques of scholarship in the field; emphasis on acquiring familiarity with bibliographical and other research tools. Enrollment limited to senior majors in Near Eastern Languages and Civilizations, except by permission of instructor.

***NELC 492a and 493b, The Senior Essay** Colleen Manassa

Preparation of a research paper of at least thirty pages (sixty pages for a two-term essay) under the supervision of a departmental faculty member, in accordance with the following

schedule: (1) by the end of the second week of classes of the first term, students meet with advisers to discuss the topic, approach, sources, and bibliography of the essay. Note: students planning to write the essay in the second term (NELC 493) should also meet with their prospective advisers by this deadline; (2) by the end of the fourth week of classes a prospectus with outline, including an annotated bibliography of materials in one or more Near Eastern languages and of secondary sources, is signed by the adviser and submitted to the director of undergraduate studies. The prospectus should indicate the formal title, scope, and focus of the essay, as well as the proposed research method, including detailed indications of the nature and extent of materials in a Near Eastern language that will be used; (3) at the end of the tenth week of classes (end of February for yearlong essays), a rough draft of the complete essay is submitted to the adviser; (4) two copies of the finished paper must be submitted to the director of undergraduate studies, 314 HGS, by 4 p.m. on the last day of reading period. Failure to comply with the deadline will be penalized by a lower grade. Senior essays will be graded by departmental faculty unless, for exceptional reasons, different arrangements for an outside reader are made in advance with the director of undergraduate studies and the departmental adviser.

GRADUATE AND PROFESSIONAL SCHOOL COURSES OF INTEREST TO UNDERGRADUATES

Some Graduate School courses are open to qualified undergraduates with permission of the instructor and of the director of graduate studies. For course descriptions see www.yale.edu/oci. (Also see "Courses in the Yale Graduate and Professional Schools" in chapter II, section K, of this bulletin.)

Operations Research

Coordinator: Eric Denardo, 502 DL, 432-7276, eric.denardo@yale.edu

Professors Eric Denardo, Edward Kaplan, Herbert Scarf, Arthur Swersey

Operations research is concerned with the organization and management of productive activities. Operations research includes mathematical analysis of techniques of optimization, efficient organization of production, calculation of operating characteristics of complex systems, and application of these and other techniques to operating problems throughout business and government. The subject, also known as management science, is closely related to computer science, economics, statistics, engineering, and pure and applied mathematics.

To practice operations research, one must identify the objectives of the operation under study, describe alternative actions, define measures of effectiveness for them, create a model of the system under study, and select the action that best meets the stated objectives.

Operations research has four major subfields. Mathematical programming concerns the optimal operation of systems with many variables that are linked by simple relationships. Stochastic processes describes the evolution over time of systems whose "laws of motion" are affected by chance. Game theory describes models of cooperation and competition between members of an organization or participants in a market. Production and inventory control is a family of models that applies to manufacturing and service systems. Operations

research can prepare the mathematically inclined student for a career in the management of technology or in administration, for graduate study in the mathematical sciences, or for graduate study in management. Yale College offers no major in this subject.

OPRS 235a/AMTH 235a, Optimization Eric Denardo

Resource allocation problems solved by linear programming and its generalizations: the simplex method, duality, the Karush-Kuhn-Tucker conditions for nonlinear programs, economic equilibria, and selected applications. Prerequisite: MATH 118, 222, or 225, or equivalent. QR

[OPRS 237a/AMTH 237a, Stochastic Models of Decision Making]

Peking University–Yale University Joint Undergraduate Program

The Peking University–Yale University Joint Undergraduate Program in Beijing is open to Yale College sophomores, juniors, and, in some cases, first-term seniors, and to students in the Peking University Yuanpei College. Yale students from all majors who are in good academic standing may apply for a fall term, a spring term, or an academic year. The program carries full Yale course credit and counts as a term of enrollment. No prior Chinese language knowledge is required for Yale participants, although each student must take an appropriate level language course while enrolled in the program. All other courses are taught in English by Yale and Peking University faculty members. Further information about the program, the courses offered, and the application process can be found on the Web at www.yale.edu/ypku or at the Center for International and Professional Experience, 55 Whitney Avenue, third floor.

***CHNS 110a, Elementary Modern Chinese I** Jianhua Shen and staff
For description see under East Asian Languages & Literatures.

***CHNS 120b, Elementary Modern Chinese II** Jianhua Shen and staff
For description see under East Asian Languages & Literatures.

***CHNS 130a, Intermediate Modern Chinese I** Ling Mu and staff
For description see under East Asian Languages & Literatures.

***CHNS 140b, Intermediate Modern Chinese II** Ling Mu and staff
For description see under East Asian Languages & Literatures.

***CHNS 150a, Advanced Modern Chinese I** Haiwen Wang and staff
For description see under East Asian Languages & Literatures.

***CHNS 151b, Advanced Modern Chinese II** Rongzhen Li and staff
For description see under East Asian Languages & Literatures.

***ECON 180a or b, Introduction to the Chinese Economy** Staff

- *ECON 278a, **Law and Economics** Marc Chan
- *EENG 235a and 236b, **Special Projects** Mark Reed
- HSAR 321a, **Global Contemporary Art** David Joselit
- *HSAR 467a, **Art, Media, and Space** David Joselit
- *MCDB 470a or b, **Tutorial** Douglas Kankel
- *MCDB 475a or b, **Research** Staff
- *MCDB 485a and 486b, **Research in Biology** Staff
- MUSI 343a/CGSC 343a, **Music Cognition** Ian Quinn
For description see under Music.
- *MUSI 365a, **Folk Hymnody in American Culture** Ian Quinn
- PLSC 395b, **Topics in Ethnic Politics** Jian Zhang
- *RLST 104b, **World Religions in Beijing** Gerhard Böwering
- *RLST 142b, **Islam along the Silk Road** Gerhard Böwering
- *WGSS 305b/AMST 482b, **History of Feminist Thought** Laura Wexler
For description see under Women's, Gender, & Sexuality Studies.
- *WGSS 451b⁶/AMST 449b, **Photography and Memory: Public and Private Lives**
Laura Wexler
For description see under Women's, Gender, & Sexuality Studies.
- *YPKU 470a and 471b, **Direct Enrollment in Peking University** Staff
Direct enrollment in a course offered by Peking University.

Persian

(See under Near Eastern Languages and Civilizations.)

Perspectives on Science and Engineering

(See under Science.)

Philosophy

Director of undergraduate studies: Kenneth Winkler, 406A C, 432-1679,
kenneth.winkler@yale.edu; *philosophy.yale.edu*

FACULTY OF THE DEPARTMENT OF PHILOSOPHY

Professors George Bealer, Seyla Benhabib, Stephen Darwall, Michael Della Rocca, Keith DeRose, Paul Franks, Tamar Gendler (*Chair*), John Hare, Karsten Harries, Verity Harte, Laurence Horn, Shelly Kagan, Thomas Pogge, Scott Shapiro, Sun-Joo Shin, Steven Smith, Zoltán Szabó, Kenneth Winkler

Associate Professor Joshua Knobe

Assistant Professors Barbara Sattler, Raul Saucedo, Bruno Whittle

Senior Lecturer Susanne Bobzien

Lecturers Scott Edgar, Sonny Elizondo, Benjamin George

Courses numbered 100 through 199 are introductory. They are open to all students and have no prerequisites. Courses numbered 200 through 399 are intermediate. Some have prerequisites; others do not, and may be taken as a student's first course in philosophy, though such a student should consult the instructor first. In general, it is a good idea to take a broadly based course in any area of philosophy before taking a specialized course.

Courses numbered 400 through 479 are seminars. These advanced courses are intended primarily for juniors and seniors, though other students may be admitted with the instructor's permission. Undergraduates should be sure they have enough background to take such a course, including previous work in the same area of philosophy. Students with questions should consult the instructor.

The standard major Prerequisite to the Philosophy major are two introductory or intermediate philosophy courses. The major requires twelve courses (including the prerequisites and the senior requirement) that collectively expose students to a wide range of philosophy and philosophers. The Philosophy curriculum is divided into three broad groups: history of philosophy (PHIL 125–174, 200–264, 400–424), metaphysics and epistemology (PHIL 265–319, 425–449), and ethics and value theory (PHIL 175–199, 320–399, 450–479). In history of philosophy, majors are required to take (a) either PHIL 125 and 126 or both terms of Directed Studies, and (b) an additional, third course in history of philosophy. Majors are encouraged to take PHIL 125 and 126 as early as possible; these courses may be taken in either order. Majors must take two courses in metaphysics and epistemology and two courses in ethics and value theory. Majors must also take two seminars and satisfy the senior requirement as described below.

All courses in Philosophy count toward the twelve-course requirement. With approval from the director of undergraduate studies, courses offered by other departments may be counted toward the major requirements, though no more than two such courses will normally be allowed. For the Class of 2014 and subsequent classes, no more than one course taken Cr/D/F may be counted toward the major.

Specific regulations for the group requirements are as follows:

1. Some introductory courses, including PHIL 115, First-Order Logic, do not count toward a group requirement. Other courses count toward a group requirement unless they are otherwise designated.
2. Courses automatically count toward the group under which they are listed in this bulletin. In rare cases, a course will be designated as counting toward a second group (though no single course can be counted by the same student toward two group requirements). In addition, students may petition to have a course count toward a group other than the one it is listed under in this bulletin, though the presumption will be against such petitions.

3. Courses taken in other departments and applied to the major will not normally count toward a group requirement. Students may petition for credit toward a group requirement, though the presumption will be against such petitions.

Beginning with the Class of 2015, majors are also required to complete a course in logic, such as PHIL 115, and they are encouraged to do so by the fall of their junior year.

The senior requirement The senior requirement is normally satisfied by completing a third philosophy seminar. Students taking a seminar to satisfy the senior requirement are expected to produce work superior in argument and articulation to that of a standard seminar paper. To this end, students taking a seminar for the senior requirement must satisfy additional requirements that are delineated in the syllabus or during the first class session, and that may include (a) additional readings, (b) submission of a complete draft of the final paper by the eighth week of the term that will then be significantly revised, and (c) one-on-one or small-group meetings with the instructor to discuss class material, the additional readings, and drafts in preparation. In special cases, students may meet the senior requirement through either a one-term or a two-term independent project supervised by an instructor (PHIL 490, 491). Students must petition to fulfill the senior requirement through an independent project, and approval is not guaranteed. Applicants must submit a proposal to the director of undergraduate studies, in consultation with an appropriate supervisor, by the end of the term prior to beginning the independent study.

Each major should, by October 1 of the junior year, secure the agreement of a member of the Philosophy department to serve as adviser for the year. The adviser aids the student in choosing courses and in planning for the senior year. All senior majors must have their schedules signed by the director of undergraduate studies.

Psychology track The psychology track is designed for students interested in both philosophy and psychology. Prerequisite to the major in the psychology track are two courses in philosophy or psychology. Majors in the track must take seven courses in philosophy and five in psychology, for a total of twelve, including the prerequisites and senior requirement. The seven philosophy courses must include (a) two courses in the history of philosophy, usually PHIL 125 and 126 or DRST 003 and 004, (b) two seminars, one of which may be in the Psychology department, with the approval of the director of undergraduate studies, and (c) at least two courses at the intermediate or advanced level that bear on the intersection of philosophy and psychology, at least one of which must be a philosophy seminar. Courses satisfying (c) must be approved by the director of undergraduate studies. The five psychology courses must include PSYC 110 or its equivalent. Each major must also satisfy the senior requirement as described above for the standard major. For the Class of 2014 and subsequent classes, no more than one course taken Cr/D/F may be counted toward the requirements of the major.

Beginning with the Class of 2015, majors in the psychology track are also required to complete a course in logic, such as PHIL 115, and they are encouraged to do so by the fall of their junior year.

Students interested in philosophy and psychology should also consider the major in Cognitive Science.

Other majors involving philosophy Majors in Mathematics and Philosophy and in Physics and Philosophy are also available. For information, see under those headings.

REQUIREMENTS OF THE MAJOR

Prerequisites *Standard track*—any 2 intro or intermediate phil courses; *Psychology track*—any 2 courses in phil or psych

Number of courses *Both tracks*—12 term courses, incl prereqs and senior req

Distribution of courses *Standard track*—3 courses in hist of phil (incl DRST 003 and 004, or PHIL 125 and 126), 2 in metaphysics and epistemology, and 2 in ethics and value theory; 2 phil sems; *Psychology track*—7 courses in phil, as specified; 5 in psych; *Both tracks—Class of 2015 and subsequent classes*—1 course in logic

Specific courses required *Standard track*—PHIL 125 and 126, or DRST 003 and 004; *Psychology track*—PSYC 110 or equivalent

Senior requirement *Both tracks*—a third sem in phil, or a one- or two-term independent project (PHIL 490, 491)

INTRODUCTORY COURSES

PHIL 115a, First-Order Logic Raul Saucedo

An introduction to formal logic. Study of the formal deductive systems and semantics for both propositional and predicate logic. Some discussion of metatheory. QR

History of Philosophy

PHIL 125a/CLCV 125a, Introduction to Ancient Philosophy Verity Harte

An introduction to ancient philosophy, beginning with the earliest pre-Socratics, concentrating on Plato and Aristotle, and including a brief foray into Hellenistic philosophy. Intended to be taken in conjunction with PHIL 126. HU

PHIL 126b, Introduction to Modern Philosophy from Descartes to Kant

Kenneth Winkler

An introduction to major figures in the history of modern philosophy, with critical reading of works by Descartes, Malabranche, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. Intended to be taken in conjunction with PHIL 125 although PHIL 125 is not a prerequisite. HU

Ethics and Value Theory

PHIL 175b, Introduction to Ethics Shelly Kagan

What makes one act right and another wrong? What am I morally required to do for others? What is the basis of morality? These are some of the questions raised in moral philosophy. Examination of two of the most important answers, the theories of Mill and Kant, with brief consideration of the views of Hume and Hobbes. Discussion of the question: Why be moral? HU

PHIL 176a, Death Shelly Kagan

There is one thing I can be sure of: I am going to die. But what am I to make of that fact? An examination of a number of issues that arise once we begin to reflect on our mortality. Consideration of the possibility that death may not actually be the end. Are we, in some

sense, immortal? Would immortality be desirable? An attempt to get a clearer notion of what it is to die. And, finally, an evaluation of different attitudes to death. Is death an evil? Is suicide morally permissible? Is it rational? In short: how should the knowledge that I am going to die affect the way I live my life? Authors include Fischer, Perry, Plato, and Tolstoy. HU

PHIL 178a, Introduction to Political Philosophy Thomas Pogge

A survey of social and political theory, beginning with Plato and continuing through modern philosophers such as Rawls, Nozick, and Cohen. Emphasis on tracing the development of political ideas; challenges to political theories. HU

PHIL 180b/PLSC 191b, Ethics and International Affairs Thomas Pogge

Moral reflection taken beyond state boundaries. Traditional questions about state conduct and international relations as well as more recent questions about intergovernmental agencies, nongovernmental organizations, and the design of global institutional arrangements. HU

PHIL 182b/CGSC 282b/PSYC 182b, Perspectives on Human Nature Joshua Knobe

Comparison of philosophical and psychological perspectives on human nature. Nietzsche on morality, paired with contemporary work on the psychology of moral judgment; Marx on religion, paired with systematic research on the science of religious belief; Schopenhauer paired with social psychology on happiness. HU

INTERMEDIATE COURSES

Metaphysics and Epistemology

PHIL 267b^G, Mathematical Logic Sun-Joo Shin

An introduction to the metatheory of first-order logic, up to and including the completeness theorem for the first-order calculus. Introduction to the basic concepts of set theory. Prerequisite: PHIL 115 or permission of instructor. QR

PHIL 270b, Epistemology Keith DeRose

Introduction to current topics in the theory of knowledge. The analysis of knowledge, justified belief, rationality, certainty, and evidence. HU

PHIL 271b/LING 271b, Philosophy of Language Bruno Whittle

An introduction to contemporary philosophy of language, organized around four broad topics: meaning, reference, context, and communication. Introduction to the use of logical notation. HU

PHIL 281b, Infinity Zoltán Szabó

The idea of infinity. Traditional and contemporary versions of the paradoxes of space, time, and motion, as well as the paradoxes of classes, chances, and truth. Some elementary arithmetic, geometry, probability theory, and set theory. QR, HU

Ethics and Value Theory

PHIL 326b/RLST 402b, The Philosophy of Religion John Hare

The relation between religion and ethics, traditional arguments for the existence of God, religious experience, the problem of evil, miracles, immortality, science and religion, and faith and reason. HU

PHIL 327a^G/HUMS 364a, Existentialism Scott Edgar

A survey of major existentialist thinkers from the mid-nineteenth century to the mid-twentieth. Questions about the nature of freedom available to human beings, and how to express that freedom authentically. HU

PHIL 331a, Morality and Its Critics Sonny Elizondo

An examination of the place of morality in a good human life. Topics include the nature of the moral, the unity or diversity of human goods, and the relation between human goods and human nature. HU

PHIL 336a, History of Aesthetics Karsten Harries

Historical introduction to aesthetics, focusing on Plato, Aristotle, Kant, Hegel, and Heidegger. Some consideration of other philosophers, including Plotinus, Augustine, Baumgarten, Hume, Schopenhauer, and Nietzsche. HU

SEMINARS

*History of Philosophy****PHIL 400a^G, Plato's *Timaeus*** Barbara Sattler

An examination of one of the most influential texts in Western thought, Plato's *Timaeus*, which gives an account of the universe from the setup of the stars and planets down to human beings, fish, and atoms. Topics include Plato's theory of time and history, the mathematical nature of the physical world, the notion of space, the nature of the human soul and body, and the metaphysical foundations of what there is. HU

***PHIL 401a^G/CLSS 404a^G, Plato's *Laws*, Book X** Verity Harte, Raphael Woolf

Study of the Greek text of Plato's *Laws*, Book X, which offers one of the earliest surviving characterizations of atheism. Evaluation of the book's argument that gods exist, that they have concern for human beings, and that they are just. Prerequisites: GREK 141 and PHIL 125 or equivalents, or permission of instructor. HU

***PHIL 402b^G, Ancient Notions of Time** Barbara Sattler

An examination of the rich array of temporal notions and their development in antiquity. Passages from epic, lyric, and tragedy illustrate the earliest temporal notions in Western thought. How the requirements of historiography and philosophy led to a unified conception of time, which is the precursor to our notion of time. Authors include Homer, Hesiod, Pindar, Sophocles, Thucydides, Plato, and Aristotle. HU

***PHIL 404b^G, The Philosophy of Leibniz** Michael Della Rocca, Thomas Feeney,
Julia Von Bodelschwingh

A close examination of Leibniz's vast, intricate, and still poorly understood philosophical system. Topics include substance, necessity, freedom, psychology, teleology, and the problem of evil. Attention to philosophical and theological antecedents (Spinoza, Descartes, Suarez, Aquinas, Aristotle) and to Leibniz's relevance to contemporary philosophy. HU

***PHIL 403a^G/PLSC 299a^G, The Political Philosophy of Hobbes** Steven Smith

For description see under Political Science.

***PHIL 405a/JDST 281a, Jewish Philosophy in the Twentieth Century**

Michael Morgan

For description see under Judaic Studies.

Metaphysics and Epistemology

***PHIL 425a^c, Belief** Keith DeRose, Bruno Whittle

An investigation of the nature of belief and the meaning of belief reports. Topics include the role of belief in practical deliberation, the effects of high stakes on what subjects believe, whether belief reports are context-sensitive, the aim of belief, and the normativity of logic. Readings focus on recent philosophical literature. HU

***PHIL 426b^c, Logic and Metaphysics in Eastern Philosophy** Raul Saucedo

A systematic study of various logical and metaphysical doctrines in Eastern thought, using the tools of contemporary analytic philosophy. Special attention to issues about truth, contradiction, plurals, parts and wholes, and ontological dependence in ancient Indian philosophy. Readings from both classic and contemporary sources. HU

***PHIL 427b^c, Computability and Logic** Sun-Joo Shin

A technical exposition of Gödel's first and second incompleteness theorems and of some of their consequences in proof theory and model theory, such as Löb's theorem, Tarski's undefinability of truth, provability logic, and nonstandard models of arithmetic. Prerequisite: PHIL 267 or permission of instructor. QR, HU

***PHIL 428a^c, Philosophy of Philosophy** George Bealer

An examination of the central aims of philosophy, the methods used in philosophizing, their epistemological grounds, and the prospects for success. Also considered are the role of intuitions in philosophy and philosophy's relationship to empirical science. Prerequisites: PHIL 115 and either DRST 003, 004 or PHIL 125, 126. HU

***PHIL 429a^c/CGSC 429a/PSYC 426a, Philosophical Implications of Social Psychology**
Tamar Gendler

The philosophical implications of recent work in social psychology showing the important role that social structures play in influencing human behavior. Topics include authority and obedience, and implicit racial attitudes. Prerequisites: two courses in philosophy and one in psychology, or equivalents. HU

***PHIL 430b^c, Philosophy and Psychology in the Nineteenth Century** Scott Edgar

Questions of what the mind is and how it produces cognition. Study of attempts to answer these questions scientifically. Special attention to answers given by the founders of experimental psychology and their philosophical contemporaries. HU

***PHIL 431b, Personal Identity** Kenneth Winkler

The nature of persons, their unity, and the conditions of their identity over time. Readings in classical and contemporary sources, among them Locke, Hume, Shaftesbury, Butler, Reid, Bernard Williams, Derek Parfit, Charles Taylor, Sally Haslanger, and David Lewis. Consideration of the metaphysics of kinds; social construction; philosophical methodology; and the bearing of ethics on metaphysics. HU

***PHIL 432b, Philosophy of Mathematics** Bruno Whittle

Metaphysical and epistemological issues raised by mathematics. Questions concerning the notion of a set, whether one can quantify absolutely everything, and whether there are infinite sets of different sizes; the significance of Gödel's incompleteness theorems; arguments designed to show that certain mathematical terms are referentially indeterminate. HU

***PHIL 433b/LING 376b^G, Implicature and Pragmatic Theory** Laurence Horn

For description see under Linguistics.

***PHIL 434b, Stoic Logic** Susanne Bobzien

The contributions of Stoic philosophers to various areas of logic, such as speech act theory, theory of meaning, propositional logic, deductive systems, relevance and modal logic, truth theories, and semantic paradoxes. HU

***PHIL 435a^G, Logical Foundations of Metaphysics** George Bealer

Examination of the thesis that logic provides the foundations of metaphysics. Topics include definition, essence, logical constant, logical form, categories, reduction, and grounding. Prerequisite: PHIL 115; PHIL 271 recommended. HU

Ethics and Value Theory

***PHIL 450a^G, Recent Work in Ethical Theory: Derek Parfit** Stephen Darwall,
Shelly Kagan

Selected topics in contemporary ethical theory. The topic for fall 2012 is an extended study of Derek Parfit's *On What Matters*. May be repeated for credit. HU

***PHIL 451a^G/CGSC 451a/EP&E 444a, Violence and Human Dignity** Stephen Darwall
Examination of the deep connections between concepts of violence and the distinctive kind of value we suppose human beings to have: a dignity that grounds basic human rights. Perspectives from philosophy, history, psychology, and sociology. HU

***PHIL 452b^G, History of Early Modern Ethics** Stephen Darwall

An examination of seventeenth- and eighteenth-century ethical philosophy, including Hobbes, Hutcheson, Hume, Butler, Rousseau, Kant, Smith, and Bentham. HU

***PHIL 453b^G/EP&E 445b, Contemporary Kantian Ethics** Sonny Elizondo

An examination of contemporary Kantian ethics. Different interpretations of the key Kantian claim that rational beings are ends in themselves. HU

***PHIL 454a^G/JDST 294a^G, Emmanuel Levinas: Ethics as First Philosophy**
Michael Morgan

For description see under Judaic Studies.

***PHIL 455b^G/EP&E 334b, Normative Ethics** Shelly Kagan

For description see under Ethics, Politics, & Economics.

***PHIL 456a^G/PLSC 292a^G, Rethinking Sovereignty** Seyla Benhabib, J. Adam Tooze

For description see under Political Science.

***PHIL 457a^G/EP&E 235a/PLSC 283a^G, Recent Work on Justice** Thomas Pogge

In-depth study of one contemporary book, author, or debate in political philosophy, political theory, or normative economics. Focus varies from year to year based on student interest and may include a ground-breaking new book, the life's work of a prominent author, or an important theme in contemporary political thought. HU

TUTORIAL AND SENIOR ESSAY COURSES

*PHIL 480a or b, Tutorial Kenneth Winkler

A reading course supervised by a member of the department and satisfying the following conditions: (1) the work of the course must not be possible in an already existing course; (2) the course must involve a substantial amount of writing, i.e., a term essay or a series of short essays; (3) the student must meet with the instructor regularly, normally for at least an hour a week; (4) the proposed course of study must be approved by both the director of undergraduate studies and the instructor.

*PHIL 490a and 491b, The Senior Essay Kenneth Winkler

The essay, written under the supervision of a member of the department, should be a substantial paper; a suggested length is between 8,000 and 12,000 words for one-term projects, and between 12,500 and 15,000 words for two-term projects. Students completing a one-term project should enroll in either 490 in the fall or 491 in the spring. Students completing a two-term project should enroll in both 490 and 491. The deadline for senior essays completed in the fall is December 7; the deadline for both one- and two-term senior essays completed in the spring is April 26.

GRADUATE, DIVINITY, AND LAW SCHOOL COURSES THAT COUNT TOWARD THE MAJOR

Some Graduate, Divinity, and Law School courses are open to qualified undergraduates with permission of the instructor and the director of graduate studies or the dean or registrar of the Divinity or the Law School. (See "Courses in the Yale Graduate and Professional Schools" in chapter II, section K.) With permission of the director of undergraduate studies, relevant Graduate, Divinity, and Law School courses may count toward the major. Course descriptions appear in the Graduate, Divinity, and Law School bulletins.

Philosophy and Mathematics

(See under Mathematics and Philosophy.)

Philosophy and Physics

(See under Physics and Philosophy.)

Physics

Director of undergraduate studies: Peter Parker, 652 JWG, 432-3601, dus.physics@yale.edu; physics.yale.edu/undergraduate-studies

FACULTY OF THE DEPARTMENT OF PHYSICS

Professors †Charles Ahn, Yoram Alhassid, Thomas Appelquist, †Charles Bailyn, O. Keith Baker, Charles Baltay, Sean Barrett, Cornelius Beausang (*Adjunct*), †Hui Cao, Richard Casten, †Richard Chang (*Emeritus*), †Paolo Coppi, David DeMille, †Michel Devoret, †Paul Fleury, Moshe Gai (*Adjunct*), Steven Girvin, Leonid Glazman, †Robert

Grober (*Adjunct*), Martin Gutzwiller (*Adjunct*), John Harris, †Victor Henrich, Jay Hirshfield (*Adjunct*), Francesco Iachello, Dmitry Kharzeev (*Adjunct*), Steven Lamoreaux, William Marciano (*Adjunct*), Simon Mochrie, Vincent Moncrief, †Priyamvada Natarajan, Peter Parker (*Associate Chair*), †Daniel Prober, Nicholas Read, †Vladimir Rokhlin, Jack Sandweiss, †Robert Schoelkopf, Ramamurti Shankar, †A. Douglas Stone, Paul Tipton, †John Tully, Thomas Ullrich (*Adjunct*), C. Megan Urry (*Chair*), †Pieter van Dokkum, †Xiao-Jing Wang, †John Wettlaufer, Michael Zeller (*Emeritus*)

Associate Professors Helen Caines, †Eric Dufresne, Bonnie Fleming, Walter Goldberger, Jack Harris, †Sohrab Ismail-Beigi, Daniel McKinsey, †Corey O’Hern, †A. Elizabeth Rhoades, Witold Skiba, Volker Werner

Assistant Professors Sarah Demers, †Thierry Emonet, †Marla Geha, Tobias Golling, Daisuke Nagai, Nikhil Padmanabhan

Lecturers Sidney Cahn, Stephen Irons, †Frank Robinson

†A joint appointment with primary affiliation in another department.

Physics forms a foundation for all other sciences. The various undergraduate courses and degree programs offered by the Physics department provide students with a thorough preparation in physics for any career. To satisfy the needs of science students and to provide the general background in physics that should be part of a liberal education, the department offers four different introductory sequences and two different degree programs for Physics majors. Combined majors are also available in mathematics and physics (see Mathematics and Physics), astronomy and physics (see Astronomy), and philosophy and physics (see Physics and Philosophy). Applied Physics is a closely related major (see Applied Physics).

Introductory courses with no calculus requirement Physics courses numbered 120 or below are for students with little or no previous experience in physics who do not plan to major in the natural sciences. These courses have no college-level mathematics requirement and do not satisfy the medical school requirement.

Introductory calculus-based lecture sequences

1. PHYS 170, 171 is for students with little background in physics and mathematics who will probably not major in the physical sciences but who may be interested in the medical and biological sciences. There is no mathematics prerequisite other than high school mathematics, but MATH 112 and 115 should be taken concurrently.
2. PHYS 180, 181 is for students with some previous background in physics and mathematics who plan to major in the physical sciences. Calculus at the level of MATH 112 is a prerequisite; MATH 115 and 120 should be taken concurrently.
3. PHYS 200, 201 is for students with a strong background in mathematics and physics who plan to major in the physical sciences. Calculus at the level of MATH 115 is presumed. MATH 120 should be taken concurrently with PHYS 200. It is suggested that MATH 222 or 225 be taken concurrently with PHYS 201.
4. PHYS 260, 261 is intended for students who have had excellent training in and have a flair for mathematical methods and quantitative analysis; a solid foundation in physics is required. MATH 230, 231 or the equivalent should be taken concurrently with PHYS 260, 261.

If students have the appropriate mathematics background, they are advised to take a calculus-based physics course. Sir Isaac Newton developed calculus while trying to describe the world around him; it is the natural language of physics. Students enrolled in one of the calculus-based introductory courses will be invited to a series of Chairman's Teas, which provide an opportunity to discuss topics on the frontiers of physics with faculty and peers. Completion of a calculus-based course also prepares students for the 340-level series of advanced physics electives, which cover special topics of interest to both majors and nonmajors.

PHYS 170, 180, 200, and 260 meet at the same time so that students are easily able to change levels if necessary. Questions about placement should be addressed to the director of undergraduate studies.

Introductory laboratories Two different introductory laboratory sequences are offered: PHYS 165L, 166L, and PHYS 205L, 206L. Each of these laboratory courses earns one-half course credit. Students normally take the laboratory courses associated with the introductory physics sequence in which they are enrolled. Students should register for a section of the appropriate laboratory course during the first week of classes by logging onto classesv2.yale.edu.

1. PHYS 165L, 166L is an introductory laboratory for students without a strong high school physics laboratory preparation. Related lecture courses are PHYS 170, 171, and PHYS 180, 181.
2. PHYS 205L, 206L is for students who plan to major in the physical sciences. Related lecture courses are PHYS 180, 181, PHYS 200, 201, and PHYS 260, 261. Students who take the lecture courses in freshman year are advised to start this laboratory sequence with PHYS 205L in the spring of freshman year or in the fall of sophomore year.

Advanced electives A series of 340-level electives explores special topics of interest to both majors and nonmajors. The electives are open to any student in Yale College who has completed a year of introductory calculus-based physics (PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261). The offerings for 2012–2013 include PHYS 342, Introduction to Earth and Environmental Physics, 343, Gravity, Astrophysics, and Cosmology, and 344, Quantum and Nanoscale Physics.

Major degree programs Two different majors are offered in Physics: the B.S. and the B.S. with an intensive major. Students in either program acquire advanced training in physics, mathematics, and related topics through the core courses. They use electives to design individualized programs with more depth or breadth, depending on their needs and interests. Both degree programs require research experience through PHYS 471 and 472—one term for the B.S. degree and two terms for the B.S. degree with an intensive major. Both programs are excellent preparation for a wide variety of postgraduate activities, including professional school in business, law, or medicine; graduate school in engineering or other sciences; or careers in business, consulting, financial services, government service, or teaching.

The B.S. program with an intensive major is distinguished by depth of study in advanced physics courses and prepares students to study physics or closely related physical sciences in graduate school. The director of undergraduate studies can help students

in the B.S. program prepare for graduate school in physics by recommending appropriate electives to supplement the core courses.

Courses taken Credit/D/Fail may not be counted toward the requirements of the major.

B.S. degree program The prerequisites are an introductory lecture course sequence with a mathematics sequence equivalent to, or more advanced than, the corequisite of the physics sequence. The following options are appropriate: PHYS 170, 171 with MATH 112, 115; or PHYS 180, 181 with MATH 115, 120; or PHYS 200, 201 with MATH 120 and either 225 or 222; or PHYS 260, 261 with MATH 230, 231 or equivalent. In addition, the laboratory sequence PHYS 205L, 206L or PHYS 165L, 166L is required. Students who take these physics and mathematics courses starting in their freshman year may satisfy the prerequisites by the middle of their sophomore year. Students who begin taking physics courses in their sophomore year may also complete either the standard or the intensive major. Students are advised to take mathematics courses throughout their freshman year at the appropriate level.

Eight courses are required beyond the prerequisites, including the senior project. Students must take a mathematics course at the level of, or more advanced than, PHYS 301. Three courses at the core of the major involve advanced study of fundamental topics common to all branches of physics, and must be taken in order. The first two, PHYS 401 and 402, pertain to advanced classical physics (mechanics, statistical physics and thermodynamics, and electromagnetism), and the third, APHY 439 or PHYS 440, covers quantum mechanics. Three advanced elective courses are also required. Suitable advanced courses include the PHYS 340-level electives, an advanced laboratory such as PHYS 382L, and 400-level courses in Physics. Students may also find suitable advanced courses in other departments in the sciences, engineering, and mathematics. Courses taken to satisfy these requirements must be approved by the director of undergraduate studies. In order to pursue their individual interests in sufficient depth, many students choose to take more than the required number of advanced courses.

Senior requirement for the B.S. degree program The senior requirement for the regular B.S. degree is fulfilled by receiving a passing grade on a one-term research project in PHYS 471 or 472 or equivalent. Students should consult the director of undergraduate studies for further information.

B.S. degree program, intensive major The prerequisites for the B.S. degree with an intensive major are the same as for the standard program. Ten courses are required beyond the prerequisites, including the senior project. Students must take a mathematics course at the level of, or more advanced than, PHYS 301. Five courses at the core of the major involve advanced study of fundamental topics common to all branches of physics. Three of the courses pertain to advanced classical physics: mechanics (PHYS 410), statistical physics and thermodynamics (PHYS 420), and electromagnetism (PHYS 430). Two other courses incorporate quantum mechanics (PHYS 440 and 441). These courses must be taken in order because the ideas build progressively: PHYS 410 precedes 440, which precedes 441, 420, and 430.

Because experiment is at the heart of the discipline, the intensive major requires one term of advanced laboratory (PHYS 382L or equivalent) and at least two terms of

independent research (PHYS 471, 472 or equivalent). One advanced elective course is required to complete the program. Suitable advanced courses include the PHYS 340-level electives and 400-level courses in Physics. Students may also find suitable advanced courses in other departments in the sciences, engineering, and mathematics. Courses taken to satisfy these requirements must be approved by the director of undergraduate studies. In order to pursue their individual interests in sufficient depth, many students choose to take more than ten advanced courses.

Senior requirement for the B.S. degree program, intensive major The senior requirement for the intensive major is fulfilled by receiving a passing grade on a two-term research project in PHYS 471, 472 or equivalent. Students should consult the director of undergraduate studies for further information.

Sequence of courses For both the regular B.S. degree and the B.S. degree with an intensive major, students are advised to begin the program in their freshman year to allow the greatest amount of flexibility in course selection. It is possible, however, to complete either program in a total of six terms, as illustrated below.

A program for a student completing the Physics B.S. in three years might be:

<i>Freshman or Sophomore</i>	<i>Sophomore or Junior</i>	<i>Senior</i>
PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261	PHYS 206L	APHY 439 or PHYS 440
PHYS 205L	PHYS 301	PHYS 471 or 472
Mathematics corequisites	PHYS 401	Two advanced electives
	PHYS 402	
	One advanced elective	

A program for a student completing the intensive major in three years might be:

<i>Freshman or Sophomore</i>	<i>Sophomore or Junior</i>	<i>Senior</i>
PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261	PHYS 206L	PHYS 441
PHYS 205L	PHYS 301	PHYS 420
Mathematics corequisites	PHYS 410	PHYS 430
	PHYS 440	PHYS 471
	PHYS 382L	PHYS 472
		One advanced elective

Approval of programs All Physics majors in the sophomore, junior, and senior classes must have their programs approved by the director of undergraduate studies. Freshmen and undeclared sophomores who are interested in Physics or related majors are encouraged to meet with the director of undergraduate studies to discuss their questions and proposed programs.

REQUIREMENTS OF THE MAJOR

B.S. DEGREE

Prerequisites PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, with appropriate math coreqs; PHYS 205L, 206L, or PHYS 165L, 166L

Number of courses 8 term courses beyond prereqs (incl senior req)

Distribution of courses 3 advanced electives approved by DUS

Specific courses required PHYS 301 or other advanced math course; PHYS 401, 402, and either APHY 439 or PHYS 440, in sequence

Senior requirement PHYS 471 or 472 or equivalent

B.S. DEGREE, INTENSIVE MAJOR

Prerequisites PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, with appropriate math coreqs; PHYS 205L, 206L, or PHYS 165L, 166L

Number of courses 10 term courses beyond prereqs (incl senior req)

Distribution of courses 1 advanced elective approved by DUS

Specific courses required PHYS 301 or other advanced math course; PHYS 410, 440, 441, 420, 430, in sequence; PHYS 382L

Senior requirement PHYS 471 and 472 or equivalent

***PHYS 050a/APHY 050a, Science of Modern Technology** Daniel Prober

For description see under Applied Physics.

***PHYS 060b/APHY 060b/ENAS 060b, Energy Technology and Society** Paul Fleury

For description see under Applied Physics.

***PHYS 095a, Radiation and the Universe** Peter Parker

An exploration of nuclear physics in the cosmos and on Earth, without intense mathematics. Nuclei as the heart of matter and the cores of stars; nuclear reactions as they power the stars and are responsible for the existence of every element; the role of radioactivity in our lives, including nuclear medicine, X rays, nuclear power, nuclear weapons, and terrorism. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, SC Fr sem

***PHYS 101a or b, Movie Physics** Frank Robinson [F], Stephen Irons [Sp]

A critical evaluation of Hollywood action movies, using the laws of physics and Fermi-type estimation techniques to distinguish between fictional and real movie physics. Enrollment limited to freshmen and sophomores. QR, SC

***PHYS 110b, Developments in Modern Physics** Paul Tipton

An introduction to modern physics and quantitative reasoning. Topics include subatomic particles, electromagnetic waves, black holes, galaxies, and the fate of the universe. The stages of descriptive modeling, with examples ranging from Newtonian physics to Einstein's theory of relativity. See comparison of introductory sequences and laboratories in the text above. QR, SC

[PHYS 115a/THST 115a, The Physics of Dance]

***PHYS 116a, Understanding the World through Physics** Richard Casten

Introduction to basic principles of physics through exploration of the physics involved in daily life. Sports, music, radiation, natural disasters, relativity, alternative energy, and recent innovations. Methods used by physicists to approach problems; application of these methods to problems outside the field. SC

[PHYS 118b/MUSI 200b, The Physics of Music]***PHYS 120b, Quantum Physics and Beyond** John Harris, Helen Caines

Current topics in modern physics, beginning with quantum physics and continuing through subatomic physics, special and general relativity, cosmology, astrophysics, and string theory. See comparison of introductory sequences and laboratories in the text above. SC

PHYS 165La and 166Lb, General Physics Laboratory Richard Casten and staff

A variety of individually self-contained experiments are roughly coordinated with the lectures in PHYS 170, 171, and 180, 181 and illustrate and develop physical principles covered in those lectures. SC ½ Course cr per term

***PHYS 170a and 171b, University Physics for the Life Sciences** Simon Mochrie

An introduction to classical physics with special emphasis on applications drawn from the life sciences and medicine. Fall-term topics include vectors, kinematics, Newton's laws of motion, oscillations and waves, gravitation, elasticity, statics, diffusion, fluids, and thermodynamics. Spring-term topics include electricity and magnetism, circuits, light and optics, sound, and modern physics. Essential calculus is introduced as needed. Concurrently with MATH 112, 115. See comparison of introductory sequences and laboratories in the text above. QR, SC

PHYS 180a and 181b, University Physics Sean Barrett

A broad introduction to classical and modern physics for students who have some previous preparation in physics and mathematics. Fall-term topics include Newtonian mechanics, gravitation, waves, and thermodynamics. Spring-term topics include electromagnetism, optics, special relativity, and quantum physics. Concurrently with MATH 115 and 120 or equivalents. See comparison of introductory sequences and laboratories in the text above. May not be taken for credit after PHYS 170, 171. QR, SC

PHYS 200a and 201b, Fundamentals of Physics Tobias Golling

A thorough introduction to the principles and methods of physics for students who have good preparation in physics and mathematics. Emphasis on problem solving and quantitative reasoning. Fall-term topics include Newtonian mechanics, special relativity, gravitation, thermodynamics, and waves. Spring-term topics include electromagnetism, geometrical and physical optics, and elements of quantum mechanics. Prerequisite: MATH 115 or equivalent. See comparison of introductory sequences and laboratories in the text above. QR, SC

PHYS 205La or Lb and 206La or Lb, Modern Physical Measurement

Daniel McKinsey and staff

A two-term sequence of experiments in classical and modern physics for students who plan to major in Physics. In the first term, the basic principles of mechanics, electricity, and magnetism are illustrated in experiments designed to make use of computer data handling and teach error analysis. In the second term, students plan and carry out experiments illustrating aspects of wave and quantum phenomena and of atomic, solid state, and nuclear physics using modern instrumentation. May be begun in either term. SC ½ Course cr per term

***PHYS 260a and 261b, Intensive Introductory Physics** Charles Baltay

The major branches of physics—classical and relativistic dynamics, gravitation, electromagnetism, heat and thermodynamics, statistical mechanics, quantum physics—at a sophisticated level. For students majoring in the physical sciences, Mathematics, and Philosophy who have excellent training in and a flair for mathematical methods and quantitative analysis. Concurrently with MATH 230 and 231, or PHYS 301, or equivalent. QR, SC

PHYS 295a/ASTR 255a, Research Methods in Astrophysics Marla Geha

For description see under Astronomy.

PHYS 301a, Introduction to Mathematical Methods of Physics Nikhil Padmanabhan

Topics include multivariable calculus, linear algebra, complex variables, vector calculus, and differential equations. Designed to give accelerated access to 400-level courses by providing, in one term, the essential background in mathematical methods. Recommended to be taken concurrently with PHYS 401 or 410. Prerequisite: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, or permission of instructor. QR

PHYS 320a, Science and Public Policy Bonnie Fleming

Case studies in the science and technology enterprise in the United States and selected foreign countries; how science and technology affect public policy and in turn are affected by it; how research is planned, supported, evaluated, and utilized; how criteria for selection of research areas are developed and used in the executive and legislative branches of government. No detailed background in physical science or mathematics required. WR, SO

PHYS 342a/G&G 342a, Introduction to Earth and Environmental Physics

Steven Lamoreaux

A broad introduction to the physical, chemical, and biological processes that affect the climate and other features of the Earth. Emphasis on anthropogenic activity that affects the environment; attention to issues of energy extraction from natural resources and subsequent waste disposal. Recommended preparation: familiarity with basic calculus. Prerequisite: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, or permission of instructor. QR, SC

PHYS 343b/ASTR 343b, Gravity, Astrophysics, and Cosmology Nikhil Padmanabhan

In-depth discussion of the physics underlying several recent discoveries in astrophysics and cosmology, including extrasolar planets, black holes, and the accelerating universe. Prerequisite: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, or permission of instructor. QR, SC

PHYS 344b, Quantum and Nanoscale Physics Sean Barrett

An introduction to cutting-edge developments in physics involving quantum information and/or nanotechnology. Background concepts in quantum mechanics, electromagnetism, and optics are introduced as necessary. Prerequisite: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261, or permission of instructor. PHYS 301 or other advanced mathematics course recommended. QR, SC

***PHYS 382Lb^c, Advanced Physics Laboratory** Steven Lamoreaux, Volker Werner

Laboratory experiments with some discussion of theory and techniques. An advanced course focusing on modern experimental methods and concepts in atomic, optical, nuclear, and condensed matter physics. Intended to prepare students for independent research. For

majors in the physical sciences. Prerequisite: PHYS 206L. After or concurrently with PHYS 439 or 440, or with permission of instructor. SC

PHYS 401a and 402b, Advanced Classical Physics from Newton to Einstein

Ramamurti Shankar

Advanced physics as the field developed from the time of Newton to the age of Einstein. Topics include mechanics, electricity and magnetism, statistical physics, and thermodynamics. The development of classical physics into a “mature” scientific discipline, an idea that was subsequently shaken to the core by the revolutionary discoveries of quantum physics and relativity. Prerequisite: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261. Concurrently with PHYS 301 or other advanced mathematics course. QR, SC

PHYS 410a, Classical Mechanics Witold Skiba

An advanced treatment of mechanics, with a focus on the methods of Lagrange and Hamilton. Lectures and problems address the mechanics of particles, systems of particles, and rigid bodies, as well as free and forced oscillations. Introduction to chaos and special relativity. Prerequisite: PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261. Concurrently with PHYS 301 or other advanced mathematics course. QR, SC

***PHYS 420a, Thermodynamics and Statistical Mechanics** A. Douglas Stone

An introduction to the laws of thermodynamics and their theoretical explanation by statistical mechanics. Applications to gases, solids, phase equilibrium, chemical equilibrium, and boson and fermion systems. Prerequisites: PHYS 301 and 410 or equivalents. QR, SC

PHYS 430b, Electromagnetic Fields and Optics Francesco Iachello

Electrostatics, magnetic fields of steady currents, electromagnetic waves, and relativistic dynamics. Provides a working knowledge of electrodynamics. Prerequisites: PHYS 301 and 410 or equivalents. QR, SC

PHYS 439a/APHY 439a^G, Basic Quantum Mechanics Robert Schoelkopf

For description see under Applied Physics.

PHYS 440b, Quantum Mechanics and Natural Phenomena I David DeMille

The first term of a two-term sequence covering principles of quantum mechanics with examples of applications to atomic physics. The solution of bound-state eigenvalue problems, free scattering states, barrier penetration, the hydrogen-atom problem, perturbation theory, transition amplitudes, scattering, and approximation techniques. Prerequisite: PHYS 410 or 401. QR, SC

PHYS 441a, Quantum Mechanics and Natural Phenomena II David DeMille

Continuation of PHYS 440. Prerequisite: PHYS 440. QR, SC

[PHYS 442b, Introduction to Nuclear and Elementary Particle Physics]

PHYS 448a^G/APHY 448a^G, Solid-State Physics I Victor Henrich

For description see under Applied Physics.

PHYS 449b^G/APHY 449b^G, Solid-State Physics II A. Douglas Stone

For description see under Applied Physics.

PHYS 460a^G, Mathematical Methods of Physics Nicholas Read

Survey of mathematical techniques useful in physics. Physical examples illustrate vector and tensor analysis, group theory, complex analysis (residue calculus, method of steepest

descent), differential equations and Green's functions, and selected advanced topics. Prerequisite: PHYS 301 or other advanced mathematics course. QR

***PHYS 471a and 472b, Independent Projects in Physics** Sean Barrett

Each student works on an independent project under the supervision of a member of the faculty or research staff. Students participate in a series of seminar meetings in which they present a talk on their project or research related to it. A written report is also submitted. For students with a strong background in Physics course work. RP

Physics and Astronomy

(See under Astronomy.)

Physics and Mathematics

(See under Mathematics and Physics.)

Physics and Philosophy

Prospective majors in Physics and Philosophy are advised to begin taking the prerequisites during their freshman year, and to take at least two of the required Philosophy courses by the end of their sophomore year. Prerequisites for this major are as follows: mathematics through calculus at the level of MATH 120; any introductory Physics lecture sequence numbered 170 or higher; PHYS 165L and 166L, or 205L and 206L; one introductory Philosophy course.

Beyond the prerequisites, students take fourteen term courses, including the senior requirement. Seven courses in Physics approved by the director of undergraduate studies and numbered 301 or higher are required, including (1) PHYS 301 or the equivalent, (2) PHYS 439 or 440, and (3) PHYS 382L. Six courses in Philosophy or in History of Science, History of Medicine are required, including PHIL 125 and 126, one course in logic above the introductory level, and a Philosophy seminar selected with the approval of the directors of undergraduate studies.

Senior requirement Seniors must complete one of the following: (1) PHYS 471 or 472; (2) PHIL 490 or 491 (senior essay); (3) PHIL 480 (tutorial) in an appropriate subject; (4) an appropriate Philosophy seminar with the approval of the director of undergraduate studies in Philosophy.

Majors should consult Peter Parker (Physics), 206B WNSL, 432-3601, dus.physics@yale.edu, and Kenneth Winkler (Philosophy), 406A C, 432-1679, kenneth.winkler@yale.edu.

REQUIREMENTS OF THE MAJOR

Prerequisites MATH 120; PHYS 170, 171, or 180, 181, or 200, 201, or 260, 261; PHYS 165L, 166L, or 205L, 206L; 1 intro Phil course

Number of courses 14 term courses beyond prereqs, incl senior req

Distribution of courses 7 Physics courses numbered 301 or higher approved by DUS; 6 courses in Phil or HSHM, incl 1 in logic above intro level and a Phil sem, as specified

Specific courses required PHYS 301 or equivalent; PHYS 439 or 440; PHYS 382L; PHIL 125, 126

Senior requirement 1 from PHYS 471 or 472, PHIL 490 or 491, PHIL 480 on appropriate topic, or approved Phil sem

Polish

(See under Slavic Languages and Literatures.)

Political Science

Director of undergraduate studies: David Cameron, 115 Prospect St., 432-5236, david.r.cameron@yale.edu; www.yale.edu/polisci

FACULTY OF THE DEPARTMENT OF POLITICAL SCIENCE

Professors Bruce Ackerman, Akhil Amar, Seyla Benhabib, Paul Bracken, David Cameron, Bryan Garsten, Alan Gerber, Jacob Hacker, Oona Hathaway, Jolyon Howorth (*Visiting*), Gregory Huber, Stathis Kalyvas, Joseph LaPalombara (*Emeritus*), David Mayhew, Douglas Rae, John Roemer, Susan Rose-Ackerman, Frances Rosenbluth, Bruce Russett (*Emeritus*), Nicholas Sambanis, James Scott, Prakash Sethi (*Visiting*), Sallama Shaker (*Visiting*), Ian Shapiro, Stephen Skowronek, Steven Smith, Susan Stokes (*Chair*), Alec Stone Sweet, Peter Swenson, John Wargo, Steven Wilkinson, Elisabeth Wood

Associate Professors Thad Dunning, Susan Hyde, Ellen Lust, Karuna Mantena, Andrew March, Jennifer Ruger

Assistant Professors John Bullock, Daniel Butler, Seok-ju Cho, Allan Dafoe, Alexandre Debs, Samuel DeCanio, Ana De La O, Eitan Hersh, Sigrun Kahl, H  l  ne Landemore, Adria Lawrence, Jason Lyall, Nuno Monteiro, Paulina Ochoa Espejo, Ato Kwamena Onoma, Eleanor Powell, Kelly Rader, Elihu Rubin (*Visiting*), Thania Sanchez, Tariq Thachil, Vesla Weaver, Jessica Weiss

Senior Lecturers Boris Kapustin, David Smith

Lecturers Harry Blair, Elizabeth Carlson, Thomas Donahue, Alexandra Dufresne, Michael Fotos, Elizabeth Hanson, Cynthia Horan, Pablo Kalmanovitz, Matthew Kocher, Jean Krasno, Paul Lagunes, Stephen Latham, Christopher Lebron, Nikolay Marinov, Gwyneth McClendon, Mark Oppenheimer, Danilo Petranovich, Alan Plattus, David Simon, James Sleeper, Sean Smith, John Bryan Starr

Advising Students majoring in Political Science are expected to choose a member of the Political Science faculty as an adviser. Majors should consult the department's Web site at www.yale.edu/polisci/faculty/index.html to find an adviser whose research and teaching coincide with their own interests. Students are also encouraged to seek advice from other members of the department who work in their particular field of interest. Majors must secure written approval of course selections each term from the adviser or another member of the department. All subsequent changes in a student's major program must also be approved. Seniors' schedules must be approved by the director of undergraduate studies.

Students are urged to take the initiative in shaping a coherent program suited to their interests. If they intend to write a senior essay requiring substantial empirical analysis, they should plan to acquire sufficient training in statistics or other methods, as appropriate. Students should consult with their advisers frequently. The director of undergraduate studies and other members of the department can give advice about special programs or problems. Opportunities for two majors, study abroad, and work-and-study arrangements are normally discussed with the director of undergraduate studies. More information on advising can be found on the department's Web site at www.yale.edu/polisci/undergrad/advising.html.

The standard major Eleven term courses of political science are required. (One term of Directed Studies, DRST 005 or 006, may count as a political science course, with the approval of the director of undergraduate studies.) To fulfill the standard major's distributional requirement, students must take two courses each in three of the five departmental fields—international relations, American government, political philosophy, analytical political theory, and comparative government. Students expecting to major in Political Science should take several introductory-level courses in the department early in their college careers. This allows a student to make an informed choice of a field for specialization. Introductory courses count toward the overall course requirement and toward the distributional requirement.

Beginning with the Class of 2016, students may apply no more than two Political Science courses taken Credit/D/Fail toward the major. Students are allowed to take related offerings in other departments, and may petition to have up to three appropriate courses from other departments count toward the requirements of the major. College seminars count only when taught by a member of the Political Science faculty.

Senior requirement Students majoring in Political Science are required to take at least two seminars taught by members of the Political Science department. One seminar must be taken in the senior year. Admission to seminars is at the instructor's discretion. Students must complete a substantial paper, as described in "Senior essays" below, in at least one course taken during the senior year, either a seminar or a course specifically designated for that purpose (e.g., PLSC 480). Fall-term senior essays are due by 4 p.m. on November 30, 2012; spring-term and yearlong senior essays are due by 4 p.m. on April 19, 2013. In order to graduate from Yale College, a student majoring in Political Science must achieve a passing grade on the senior essay.

Seminar preregistration Political Science majors are given first preference for admission to departmental seminars. The department has instituted a preregistration system that allows instructors of seminars to preregister up to twelve majors prior to the start of each term. The system is administered by the office of the director of undergraduate studies. For fall-term seminar preregistration, a notice is sent to majors in July; for spring-term preregistration, it is sent in November. Only students who are declared Political Science majors at the time the initial preregistration notice is sent are eligible to participate.

Senior essays The senior essay provides an appropriate intellectual culmination to the student's work in the major and in Yale College. It should ordinarily be written on a topic in an area in which the student has previously done course work. It should rest on extensive research that is appropriate to the subject matter. Essays must be at least twenty-five

double-spaced pages. At the beginning of the term in which the essay is written, students must have their senior essay topic approved by a faculty member who has agreed to advise them. The student must consult regularly with the seminar instructor or adviser and take the initiative in developing a mutually acceptable plan of research, regular meetings, and preliminary drafts. More extensive information about the senior essay can be found on the department's Web site at www.yale.edu/polisci/undergrad/senior_essay.html.

The yearlong senior essay Students who wish to undertake a more extensive research project than is possible in a single term may fulfill the senior requirement by enrolling in the two-term course sequence PLSC 490, The Senior Colloquium, and 491, The Senior Essay. In PLSC 490 students develop a research prospectus for the senior essay and begin their research. PLSC 490 counts as a seminar in the major. In PLSC 491 students write the essay under the supervision of a member of the faculty who specializes in the area being investigated. Yearlong senior essays are expected to be substantially longer than a regular term paper. While there is no fixed length, they are normally fifty to sixty pages long. Yearlong senior essays are due by 4 p.m. on April 19, 2013.

Admission to the yearlong senior essay Majors who wish to enroll in the yearlong senior essay apply for admission in the spring of their junior year. The deadline for the Class of 2014 is 4 p.m. on March 28, 2013. Students should submit to the office of the director of undergraduate studies: (1) the yearlong senior essay prospectus form signed by a faculty adviser who has agreed to supervise the student's essay, (2) a two-page statement of project, and (3) an up-to-date transcript. Normally a successful candidate will have at least an A- average in political science courses and a B+ average outside the major. It is expected that no more than fifteen students will be admitted.

The major with an interdisciplinary concentration Students majoring in Political Science may choose an interdisciplinary concentration, which allows them to pursue an area of study that crosses conventional disciplinary and department boundaries. Examples of interdisciplinary concentrations are international studies, urban studies, health politics and policy, and political economy. Students choosing such a concentration are required to take twelve term courses toward the major, at least seven of which must be in the field of concentration. As many as three courses in the concentration may be taken in other departments, with the approval of the director of undergraduate studies. In addition to taking seven courses in their field of concentration, interdisciplinary concentration majors must take two courses in each of two other fields in the department. Two of these courses may be taken in other departments with the approval of the director of undergraduate studies. The senior requirement is the same as for the standard major, with the proviso that the essay must be written on a subject that falls within the field of concentration.

Admission to the major with an interdisciplinary concentration Students who wish to pursue the major with an interdisciplinary concentration must submit an application and meet with the director of undergraduate studies to discuss their proposed program of study. The application is due prior to the beginning of fall recess in the student's final year.

The intensive major The intensive major gives students an opportunity to undertake extensive research on a topic of interest. To carry out this research, the student takes PLSC

474, a directed reading and research course, in the sixth term of enrollment. In the seventh term the student takes PLSC 490, The Senior Colloquium (see above under “The yearlong senior essay”). In the eighth term the student takes PLSC 493, the independent senior essay course for intensive majors. All other requirements for the intensive major are identical to those for the standard major or interdisciplinary concentration major.

Admission to the intensive major Juniors wishing to pursue an intensive major must apply to the director of undergraduate studies by 4 p.m. on November 16, 2012. Students should submit to the office of the director of undergraduate studies: (1) the intensive major application signed by the faculty adviser who has agreed to supervise the student for his or her final three terms, (2) a plan of study for those three terms, and (3) a senior essay topic. Admission is based on performance and promise. The director of undergraduate studies and the prospective senior essay adviser serve as advisers to intensive majors in the junior year.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses *Standard major*—11 term courses; *Interdisciplinary concentration*—12 term courses

Distribution of courses *Standard major*—2 courses in each of 3 of the 5 departmental fields; *Interdisciplinary concentration*—2 courses each in 2 fields in addition to 7 in field of concentration

Substitution permitted *Standard major*—relevant courses by petition to DUS; *Interdisciplinary concentration*—up to 3 courses in other depts with DUS approval; other courses by petition to DUS

Intensive major 11 term courses; 2 courses in each of 3 fields; PLSC 474, 490, 493; *Intensive major with interdisciplinary concentration*—12 term courses as specified, up to 3 of which may be from other depts; PLSC 474, 490, 493

Senior requirement 2 seminars, 1 in senior year, and senior essay

INTRODUCTORY COURSES

PLSC 111a, Introduction to International Relations Jolyon Howorth

World affairs in the unsettled aftermath of a half-century of Cold War traumas. The relative positions of the United States, Japan and Germany, Russia, China, and the Third World. The spread of capitalistic markets and democratic forms; nongovernmental activity across nation-state boundaries; and the precariousness of the status quo. SO

PLSC 113a, Introduction to American Politics Staff

Introduction to American national government. The Constitution, American political culture, civil rights, Congress, the executive, political parties, public opinion, interest groups, the media, social movements, and the policy-making process. SO

PLSC 114b, Introduction to Political Philosophy Bryan Garsten

Fundamental issues in contemporary politics investigated through reflection on classic texts in the history of political thought. Emphasis on topics linked to modern constitutional

democracies, including executive power, representation, and political parties. Authors include Plato, Machiavelli, Hobbes, Locke, Rousseau, Madison and Hamilton, Lincoln, and Tocqueville, in addition to recent articles on contemporary issues. SO

PLSC 116b, Introduction to Comparative Politics David Simon

Introduction to the study of politics and political life in the world outside the United States. State formation and nationalism, the causes and consequences of democracy, the functioning of authoritarian regimes, social movements and collective action, and violence. SO

PLSC 118a, The Moral Foundations of Politics Ian Shapiro

An introduction to contemporary discussions about the foundations of political argument. Emphasis on the relations between political theory and policy debate (e.g., social welfare provision and affirmative action). Readings from Bentham, Mill, Marx, Burke, Rawls, Nozick, and others. SO

INTERNATIONAL RELATIONS

***PLSC 120a/EP&E 381a, Ethics in the Age of Globalization and Multinational Corporations** Prakash Sethi

For description see under Ethics, Politics, & Economics.

PLSC 128b/GLBL 247b, Development under Fire Jason Lyall

The recent emergence of foreign assistance as a tool of counterinsurgency and post-conflict reconciliation. Evaluation of the effects of aid in settings such as Afghanistan, Iraq, Colombia, and the Philippines. Examination of both theory and practice of conducting development work in the shadow of violence. Strengths and weaknesses of different evaluation methods, including randomized control trials (RCTs) and survey experiments. SO

PLSC 129a, Introduction to International Law Thania Sanchez

Introduction to the field of public international law. Human rights, humanitarian law, use of force, and environmental law. International law as a tool of statecraft. SO

PLSC 130b, Nuclear Politics Alexandre Debs

The pursuit, use, and non-use of nuclear weapons from the Manhattan Project to the present. The effect of the international system, regional dynamics, alliance politics, and domestic politics in the decision to pursue or forgo nuclear weapons. The role of nuclear weapons in international relations, the history of the Cold War, and recent challenges in stemming nuclear proliferation. SO

***PLSC 135a/GLBL 371a, U.S. National Security and the Media** Sean Smith

Foreign policy priorities since the beginning of the Obama administration, including counterterrorism, nuclear nonproliferation, climate change and oil dependence, and relations with the Middle East and East Asia. The role of media in shaping policy; complexities of communicating national security policies to multiple audiences; devising strategies and writing strategic options memos. SO

***PLSC 138b^c/GLBL 344b, International Institutions** Nikolay Marinov

The role of international institutions in structuring cooperation between nations. The theory of cooperation. Examples drawn from the post-World War II era. SO

***PLSC 141a, Ethics of Humanitarian Intervention** Annalisa Zinn

Key ethical dilemmas accompanying the practice of humanitarian intervention. Ethical and political obligations of states to protect citizens of other states, justifications for “killing in order to save,” who can legitimately make the decision to intervene, and what criteria should guide humanitarian interventions in the twenty-first century. SO

PLSC 146b/EVST 245b/F&ES 245b, International Environmental Policy and Governance Benjamin Cashore

For description see under Environmental Studies.

***PLSC 147b, The United Nations and Collective Security** Jean Krasno

The role of the United Nations in global politics. Analysis of the workings of the UN Security Council, the General Assembly, the International Court of Justice, and other UN agencies, funds, and programs. Topics include the International Criminal Court, cases of UN peacekeeping, and the imposition of sanctions. SO

***PLSC 149b^G/GLBL 364b, Economic Sanctions** Nikolay Marinov

A study of economic sanctions, including questions of their effectiveness and appropriate use. Development of an appropriate analytical apparatus; study of the empirical record. SO

***PLSC 151a^G/EP&E 280a/GLBL 245a, International Dimensions of Democratization**
Nikolay Marinov

For description see under Ethics, Politics, & Economics.

***PLSC 152b/EP&E 245b, Global Firms and National Governments**
Joseph LaPalombara

Challenges for political policy makers, governmental regulators, and managers of global corporations when corporations make direct investments in foreign countries. Special attention to emergent exclusionary measures in advanced industrial countries. SO

PLSC 165b, International Security Matthew Kocher

An introduction to international security. General theories of state interests and behavior; the causes, conduct, and regulation of violence among nations. SO

PLSC 166b, The New Europe David Cameron

European politics since World War II, with emphasis on postwar geopolitical settlement, the development of the European Community and Union, the demise of the Soviet Union and other communist regimes, and current challenges facing Europe. SO

***PLSC 169b, Classics of World Politics** Bruce Russett

Examination of classic political theory from Thucydides to the present. Attention to historical context and contemporary relevance. Enrollment limited to sophomores. SO

PLSC 172a^C, Strategy, Technology, and War Paul Bracken

A comprehensive examination of technology and strategy in the field of national security, using concepts from management, politics, and economics. Topics include technology strategy, macro-organizational behavior, and strategic posture. The changing structure of defense in light of a second nuclear age, network and information warfare, private equity investment in defense and intelligence, a shifting locus of innovation to lower-tier firms, and the spread of advanced technologies to China, India, and militia groups. SO

PLSC 174b/GLBL 265b/HIST 133b, Strategic, Political, and Moral Dilemmas of the Nuclear Age Jonathan Schell

For description see under Global Affairs.

PLSC 176a/HIST 261a, The Cold War John Gaddis

For description see under History.

PLSC 179a, China in World Politics Jessica Weiss

China's rise to prominence and its foreign relations from 1949 to the present, focusing on the post-Mao period. SO

***PLSC 181b/EP&E 425b/SAST 342b, South Asia in World Politics** Elizabeth Hanson
Relations of the countries of South Asia—Afghanistan, Bangladesh, Bhutan, India, Pakistan, Nepal, and Sri Lanka—with each other and with the rest of the world. Broad issues of world politics, including problems of development and security that confront developing countries. SO

***PLSC 183b/EP&E 259b, Europe, the United States, and the Iraq Crisis**

Jolyon Howorth

Examination of the contrasting relations between the main European powers and the United States in their approaches to Iraq in order to understand the divisions attending the 2003 war and the subsequent transfer of sovereignty. Topics include the Iran-Iraq War (1980–88), the first Persian Gulf crisis (1990–91), the sanctions regime (1991–2002), problems of peacekeeping and nation building, and the Obama exit strategy. SO

***PLSC 184a/GLBL 378a, The United Nations and the Maintenance of International Security** Jean Krasno

For description see under Global Affairs.

PLSC 191b/PHIL 180b, Ethics and International Affairs Thomas Pogge

For description see under Philosophy.

***PLSC 192a, Development of the International Human Rights Regime**

Pablo Kalmanovitz

The development of the human rights regime from the first appearance of the laws of war in Grotius, through the Hague conventions of 1899 and 1907, the Nuremberg Tribunal, the Universal Declaration of Human Rights, and the Covenant on Civil and Political Rights. Formation of the Yugoslav and Rwanda Tribunals; creation of the International Criminal Court. The politics of human rights law; effects of the Cold War on the human rights regime; the rise of the NGO community; the role of the great power states. SO

AMERICAN GOVERNMENT

PLSC 201b/PSYC 332b, Political Psychology John Bullock

Examination of mental processes that underpin political judgments. The origins of political views, the influence of political parties and other groups, reactions to political news, common decision-making heuristics and biases, and causes and effects of political ignorance. Emphasis on the political thinking of ordinary citizens, with some attention to political elites. SO

PLSC 205a, The American Presidency Stephen Skowronek

The historical development and current operations of the American presidency. Topics include constitutional powers, the organization of popular support, the modern executive establishment, and the politics of presidential leadership. SO

***PLSC 206b^c, Theorizing about Congress** David Mayhew

Theorizing about the U.S. Congress from *The Federalist* and Woodrow Wilson through a line of political scientists of recent times. Historicization of selected texts and interpretations. SO

***PLSC 207a, Representation in the United States** Daniel Butler

Ways in which institutions affect the functioning of democracy in the United States. Focus on representation of citizens' preferences in the public sphere. Institutions studied include primary elections, redistricting, campaign finance, early voting, multimember districts, term limits, and term lengths. SO

PLSC 209a, The United States Congress Eleanor Powell

A critical investigation of the United States Congress, the primary democratic institution in the American political system. Focus on individual members of Congress, institutional features, and the role of Congress within the larger separation-of-powers system. SO

***PLSC 210a^c, Political Preferences and American Political Behavior** John Bullock

Introduction to research methods and topics in American politics. Focus on ideas about choice that are useful for the study of politics. Topics include utility theory, heuristics and biases, proximity vs. directional voting, Bayesian updating, retrospective voting, priming and framing, the role of emotion, and the consequences of political ignorance. SO

***PLSC 212a/EP&E 390a, Democracy and Sustainability** Michael Fotos

Democracy, liberty, and the sustainable use of natural resources. Concepts include institutional analysis, democratic consent, property rights, market failure, and common pool resources. Topics of policy substance are related to human use of the environment and to U.S. and global political institutions. SO

PLSC 215b/EVST 255b/F&ES 255b, Environmental Politics and Law John Wargo

For description see under Environmental Studies.

PLSC 218b/ECON 275b, Public Economics Ebonya Washington

For description see under Economics.

PLSC 219b, Press, Politics, and Policy Sean Smith

Effects of the media on politics and policy making in the United States. Methods used by actors in the political and policy-making arenas to shape media coverage in their favor and advance their own agendas. Case studies drawn from current events and the 2012 presidential campaign. SO

***PLSC 221a/EP&E 323a, U.S. Immigration Law and Policy** Alexandra Dufresne

For description see under Ethics, Politics, & Economics.

***PLSC 230b, Parties and Leaders in Congress** Eleanor Powell

Political parties, party leaders, and committee leaders in the legislative policy-making process. The strengths and weaknesses of parties, agenda setting, and paths to congressional leadership. Individuals from Sam Rayburn to Nancy Pelosi and from LBJ to Harry Reid. WR, SO

PLSC 231b/EVST 123b/PSYC 123b, The Psychology, Biology, and Politics of Food

Kelly Brownell

For description see under Psychology.

PLSC 233b, Constitutional Law Akhil Amar

An introduction to the main themes of the American Constitution – popular sovereignty, separation of powers, federalism, and rights – and to basic techniques of constitutional interpretation. Special emphasis on the interplay of constitutional text, judicial doctrine, and constitutional decision making outside the judiciary. SO

***PLSC 234b⁶/EP&E 389b, The Politics, Law, and Economics of Affirmative Action**

Ian Shapiro

The politics, law, and economics of affirmative action, principally in the United States. Arguments for and against affirmative action. Focus on education, employment, and political representation. SO

***PLSC 238a, Public Opinion and Representation in the United States** John Bullock

Americans' views on political issues and the extent to which their views influence, and are influenced by, elected officials. Special attention to opinion polarization, the roles of political knowledge and partisanship, and the effects of public opinion on legislators. Online datasets help answer questions about politics and public opinion. SO

***PLSC 239b⁶, Introduction to Experimental Methods in Political Science**

Alan Gerber

An introduction to experimental methods as they can be used to study politics. Strengths and weaknesses of experimental and nonexperimental studies. Applications include effects of television advertising, formation of political attitudes, and causes of voter turnout. Design and implementation of an experiment. Recommended preparation: introductory statistics. SO

***PLSC 240b/EP&E 443b, Public Schools and Public Policy** John Bryan Starr

Exploration of policy options on controversial education issues. Case studies from both districts and states. Preference to students with training and experience in national, state, and local public policy. SO RP

***PLSC 245a, Urban Politics and Policy** Cynthia Horan

Approaches to urban politics and political economy. Application of theories to contemporary policy issues such as policing, metropolitan disparities, and inner-city revitalization. SO

***PLSC 246a/EP&E 369a, Ethics and American Business** Prakash Sethi

For description see under Ethics, Politics, & Economics.

***PLSC 248b/EP&E 367b, The Political Economy of Health Care** Peter Swenson

Economic and political factors affecting the quality, financing, and delivery of health care in America from the early twentieth century to the present, with some international comparisons. Topics include the century-long struggle for guaranteed health insurance, the emergence of the private, employer-based system, and the politics of quality and cost-effectiveness of health care delivery. Recommended preparation: introductory microeconomics. SO

***PLSC 250a/ARCH 347a, Infrastructure: Politics and Design** Elihu Rubin

Infrastructures – the physical frameworks for human settlement, urbanization, and social life, including networks for transportation, water, energy, and communication. Current debates on infrastructure spending in the context of historical investments in the modern American city. SO

PLSC 252a, Crime and Punishment Gregory Huber

The theory and practice of crime and punishment in contemporary America from the standpoint of politics and political theory and in light of debates about empirical evidence, the politicization of crime, civil rights issues, abortion, psychiatry and the law, and arguments about punishment and prison reform. SO

***PLSC 255b, Politics and the Media in the United States** Daniel Butler

Major ideas, theories, and evidence in the study of political communication, in particular the effects of the mass media on public discourse, politics, and American government. Democracy and deliberation; the political economy of news production; the creation and effects of political campaigns; and the use of critical and scientific methods in the study of politics and communication. SO

***PLSC 256b/EP&E 248b, American Political Institutions** Michael Fotos

The origins and development of American political institutions, especially in relation to how institutions shape the policy process. Issues of temporality, policy feedback, and policy substance. SO

PLSC 257b, Bioethics and Law Stephen Latham

The treatment by American law of major issues in contemporary biomedical ethics: informed consent, assisted reproduction, abortion, end-of-life care, research on human subjects, stem cell research, and public health law. Readings include legal cases, statutes, and regulations. No background in law assumed. SO

***PLSC 260a, Public Schools and Politics** John Bryan Starr

Investigation of how political decisions that affect public schools are made at local, state, and federal levels. Case studies from both districts and states. Preference to students with training and experience in national, state, and local politics. SO RP

***PLSC 264b, Big City Politics in America: New York, Los Angeles, Chicago**

Cynthia Horan

How globalization and responses to it are changing the politics of New York, Los Angeles, and Chicago. Focus on economic restructuring, government reorganization, transformations of urban space, immigration, racial conflicts, and grassroots mobilization. SO

***PLSC 265b/ENGL 279b, Classics of Political Journalism** Mark Oppenheimer

The history of political writing by American journalists, with emphasis on lasting works of literature. Ways that journalists have represented the political process; narratives that have come and gone over time. Authors include H. L. Mencken, Murray Kempton, Walter Lippmann, David Halberstam, Hunter S. Thompson, Garry Wills, Rick Perlstein, and Timothy Crouse. SO

PLSC 279a/ARCH 385a/HIST 152a/SOCY 149a, New Haven and the American City

Alan Plattus, Elihu Rubin

New Haven as a window on the problems and promise of American urbanism. New Haven compared with New York, New Orleans, Louisville, Cleveland, Houston, Denver, and San Francisco. Emphasis on the historical development of transportation, manufacturing, housing, governance, and culture. Problems of planning, education, class, and race. SO

***PLSC 280b, Poverty, Politics, and Policy in the American City** Cynthia Horan

Examination of how politics informs the formulation and implementation of policies to address urban poverty. Consideration of alternative explanations for poverty and alternative government strategies. Focus on efforts by local organizations and communities to improve their situations within the context of government actions. SO

POLITICAL PHILOSOPHY**PLSC 281a/RLST 273a^G, Moral, Religious, and Social Issues in Bioethics**

Stephen Latham

A selective survey of issues in biomedical ethics. Comparison of different points of view about biomedical issues, including religious vs. secular and liberal vs. conservative. Special attention to issues in research and at the beginning and end of life. SO

***PLSC 282a, The Idea of Power** Christopher Lebron

An intensive survey of the theoretical literature on power. Questions such as how to identify the sociopolitical manifestations of power that exert influence in society; when power is legitimate; and the relationship between power and injustice. Enrollment limited to sophomores. SO

***PLSC 283a^G/EP&E 235a/PHIL 457a^G, Recent Work on Justice** Thomas Pogge

For description see under Philosophy.

***PLSC 284a^G/EP&E 459a/HUMS 325a, Modern Liberty** Bryan Garsten

European political theorists on commercial society, representative democracy, and liberty during the Age of Revolution. Authors include Montesquieu, Adam Smith, Emmanuel Sieyès, Benjamin Constant, François Guizot, Alexis de Tocqueville, G. W. F. Hegel, and Karl Marx. SO

PLSC 290a/HUMS 302a/SOCY 151a, Foundations of Modern Social Theory

Sadia Saeed, Emily Erikson

For description see under Sociology.

***PLSC 292a^G/PHIL 456a^G, Rethinking Sovereignty** Seyla Benhabib, J. Adam Tooze

Discussion of the crises of sovereignty and the end of sovereignty. Post-nationalist, cosmopolitan, and neoliberal criticisms of sovereignty. Traditional models of sovereignty compared with cosmopolitan alternatives; implications of these models for the definition and enforcement of rights. Readings include works by Hobbes, Kant, Rousseau, Austin, Schmitt, Kelsen, Habermas, Waldron, Pogge, Sassen, and Aleinikoff. SO

***PLSC 297b/EP&E 312b, Moral Choices in Politics** Boris Kapustin

For description see under Ethics, Politics, & Economics.

***PLSC 299a^G/PHIL 403a^G, The Political Philosophy of Hobbes** Steven Smith

A close reading of the major works of Thomas Hobbes. Consideration of Hobbes as the founder of modern political science. Special attention to the problem of political theology and the status of the Bible in Hobbes's political thought. SO

PLSC 301a, Anarchy and Authority Paulina Ochoa Espejo

Introduction to the philosophy and history of anarchism. Relations to traditional views of legitimacy and authority in the history of political thought. Texts by Hobbes, Rousseau, Nietzsche, Arendt, Wolff, Godwin, Kropotkin, Proudhon, Bakunin, and Nozick. SO

***PLSC 304b/EP&E 410b, Business Ethics** Charles Ellis

For description see under Ethics, Politics, & Economics.

***PLSC 305a/EP&E 353a, Critique of Political Violence** Boris Kapustin

For description see under Ethics, Politics, & Economics.

***PLSC 310b^G/EP&E 461b, Borders** Paulina Ochoa Espejo

Examination of the concept of borders by relating theoretical debates to historical and contemporary political problems. Topics include the question of what a border is, under what conditions borders are appropriate, how borders are indicated (signs, lines, barbed-wire fences, walls), who governs borders, and how they should be governed. SO

PLSC 316b, International Political Thought Pablo Kalmanovitz

Theories and conceptions of international order and justice in the history of Western political thought. Emphasis on questions of state sovereignty, interstate conflict, international law, and human rights. Readings include works by Cicero, Vitoria, Machiavelli, Hobbes, Grotius, Vattel, Rousseau, and Kant. SO

***PLSC 319a/EP&E 452a, Theory and Practice in Recent Bioethics** David Smith

For description see under Ethics, Politics, & Economics.

***PLSC 322b^G/EP&E 354b/HUMS 386b, Empire and Modern Political Thought**

Karuna Mantena

The development of modern political thought examined as it relates to the history of empire. Focus on how the imperial experience shaped central concepts of political theory such as reason, liberty, rights, sovereignty, property, and progress. Readings from the works of Montaigne, Locke, Diderot, Kant, Herder, Burke, Marx, Mill, Tocqueville, and others. SO

***PLSC 327a/EP&E 220a, Collective Choice and Political Morality** Thomas Donahue

For description see under Ethics, Politics, & Economics.

***PLSC 328a/LAST 328a, Latin American Political Thought** Paulina Ochoa Espejo

Examination of exemplars of Latin American political thought. Questions of identity, race, culture, and political and economic development from the colonial period to the twentieth century. Texts by Las Casas, Vitoria, Bolívar, Alamán, Sarmiento, Mariátegui, Vasconcelos, Cardoso and Faletto, and Paz. SO

***PLSC 330a, Liberal and Conservative Traditions in America** Danilo Petranovich

Liberal and conservative understandings of America from the founding generation to the current era, with special attention to the place of patriotism in modern liberalism and

conservatism. The intellectual roots of the two traditions; differing visions of the American way of life; the fundamental philosophic and moral differences at stake; comparison of ways in which American liberals and conservatives conceive of belonging in a national tradition. SO

***PLSC 333b^G/EP&E 395b, Non-Domination as a Political Ideal** Ian Shapiro

Defining the concept of non-domination as it operates in political theory and argument. How non-domination relates to other values such as freedom, equality, and justice. Readings from the works of Aristotle, Machiavelli, Nietzsche, Weber, Foucault, Habermas, Sen, Skinner, and others. Priority to juniors and seniors. SO

ANALYTICAL POLITICAL THEORY

***PLSC 341b/EP&E 282b, Positive Political Theory** Seok-Ju Cho

Introduction to rational choice theory and game theory in political science. Exploration of game theoretic analysis of political outcomes and citizen welfare under alternative institutions. Topics include campaign strategies and voting behavior in elections, legislative politics, representation and distribution, and international bargaining. SO

PLSC 342a/GLBL 185a, Cause and Effect: Research Methods Thad Dunning

The crucial but challenging process of answering questions about cause and effect in the social sciences. Survey of research methods that facilitate causal inference, including tools for conceptualization and measurement, field and natural experiments, qualitative methods, and mixed-method research. SO

***PLSC 343b/ECON 473b/EP&E 227b, Equality** John Roemer

For description see under Ethics, Politics, & Economics.

COMPARATIVE GOVERNMENT

PLSC 347a/AFST 347a/LAST 348a, Post-Conflict Politics David Simon

Consideration of a range of issues and challenges faced by countries emerging from domestic conflict. Focus on elements of peace-building—demilitarization, post-conflict elections, institution-building, and reconstruction—as well as modes of transitional justice and mechanisms for truth and reconciliation. SO

[PLSC 354a^G/EP&E 250a, The European Union]

***PLSC 355b^G/LAST 352b, Armed Groups and Patterns of Violence** Elisabeth Wood
Characteristics of armed organizations such as state militaries, police forces, insurgent groups, secessionist movements, and terrorist organizations. The patterns of political violence (including torture and sexual violence) used by these groups. Readings from political science, history, anthropology, and sociology. SO

PLSC 359a/GLBL 269a, Violence and Civil Strife Stathis Kalyvas

An examination of political violence with an emphasis on civil wars, presently the dominant form of war. SO

***PLSC 364b^G/AFST 364b, Identities** Ato Kwamena Onoma

The formation of identities, their evolution over time, and their deployment in political economic life. Why some identities are more salient than others. SO

***PLSC 366a^G, European Politics** David Cameron

Comparison of the political systems of the major European countries. Topics include political institutions, electoral politics and political parties, public policies, and contemporary problems. SO

***PLSC 368b, Global Politics** Stathis Kalyvas

Major issues in current international politics, from political economy to international security, with a broad geographic focus. Emphasis on analytic and synthetic skills. Themes include the politics of economic crisis, global governance, state failure, and political and economic development. SO

***PLSC 370a/AFST 345a^G/GLBL 319a/SAST 343a, Political Economy of Natural Disasters** Jennifer Bussell

For description see under South Asian Studies.

***PLSC 372b/EP&E 242b, Politics and Markets** Peter Swenson

Examination of the interplay between market and political processes in different substantive realms, time periods, and countries. Inquiry into the developmental relationship between capitalism and democracy, including the developmental and functional relationships between the two. Investigation of the politics of regulation in areas such as property rights, social security, international finance, and product, labor, and service markets. Topics include the economic motives of interest groups and coalitions in the political process. SO

***PLSC 376a, Democracy and the Psychology of Inequality** Gwyneth McClendon

Consideration of why democratic citizens react to economic inequality at some times with outrage and at other times with complacency. Examination of the consequences of such reactions for democratic politics. Examples from the United States, South Africa, India, and Europe, including special consideration of the recent Occupy movement. SO

***PLSC 383b^G/GLBL 339b, Political Parties in the Developing World** Tariq Thachil

Introduction to key issues surrounding political parties and party systems, with emphasis on the non-Western world. The formation of different kinds of parties; ways in which political parties seek to forge links with ordinary citizens; the effects of parties' competition on democratic institutions. Examples drawn from countries in Latin America, Asia, the Middle East, and sub-Saharan Africa. SO

PLSC 384a/SAST 244a, Indian Democracy in Comparative Perspective Tariq Thachil

Introduction to the major dimensions of Indian democracy; comparison with the political experiences of other developing nations such as China, South Africa, Brazil, and Egypt. Topics include colonial legacies, identity politics, social movements, and social and human development. SO

PLSC 385a/AFST 385a, Introduction to African Politics Elizabeth Carlson

Themes in contemporary African politics, including the impact of colonialism, the challenges of geography, and the effects of economic and political reform attempts and of efforts at resistance. Comparative introduction to the politics of various African countries. SO

***PLSC 389b/AFST 389b/MMES 181b, Middle East Exceptionalism** Adria Lawrence
The Middle East and North Africa in comparative perspective. Evaluation of claims that the region's states are exceptionally violent, authoritarian, or religious. Themes include gender, Islam, nation and state formation, oil wealth, terrorism, and war. SO

***PLSC 390b^G/EAST 357b, State and Society in Post-Mao China** Jessica Weiss
State-society relations in the People's Republic of China. Popular protest and social mobilization, media commercialization and the Internet, and prospects for political reform and democratization. SO

PLSC 395b, Topics in Ethnic Politics Jian Zhang
Readings in the literature of nationalism and nation building. Emphasis on the building of the Chinese nation in the past century and a half. Topics include theoretical perspectives on national and ethnic identities; nation building in the Western world; the late imperial Chinese state; origins of Chinese nationalism; urbanization of ethnic people in China; and education, language, and identity formation. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. SO

***PLSC 397a/ER&M 397a/RSEE 205a/SLAV 205a^G, Language, Nationalism, and Ethnic Conflict in the Balkans** Robert Greenberg
For description see under Slavic Languages & Literatures.

***PLSC 401b/EP&E 252b/GLBL 366b, Promoting Democracy in Developing Countries** Harry Blair
Western efforts to promote democratization in developing countries in the past twenty years through foreign aid programs. Emphasis on “applied democracy” – putting theory into action. SO

***PLSC 407a, The Politics of Nationalism and Ethnicity** Matthew Kocher
Ethnicity and nationalism studied in the context of alternative social bases of political and social mobilization. Focus on the null hypothesis, that ethnicity and nationalism should not be treated as distinctive social forms. Discussion of what is distinctive about ethnicity and nationalism, and how it might be beneficial to separate nationalism and ethnicity from the study of other identity types. SO

***PLSC 412a/EP&E 447a, Global Journalism, National Identities** James Sleeper
Changes in the relationship between journalism and nationalism as new technologies, capital flows, and human migrations alter public understandings of political legitimacy. The consequences of these shifts for national identity and liberal public spheres in the United States, Europe, and selected Middle Eastern and Asian nations. Implications for a global public sphere. SO

***PLSC 413a/MMES 482a/SOCY 351a, The Arab Spring of 2011** Rabab El Mahdi
For description see under Modern Middle East Studies.

***PLSC 414b/AFST 432b, Development and Democracy in Africa** Elizabeth Carlson
Introduction to development challenges in Africa. Use of current social science research to examine the driving forces behind Africa's poor development outcomes and to explore options for changing Africa's development trajectory. The effectiveness of democratization as a broad development tool. Evaluation of micro-level projects designed to tackle specific problems. SO

PLSC 415b/SOCY 188b, Religion and Politics Sigrun Kahl

Challenges to the view of religion as an archaic force destined to dwindle away in a secularized society. A historical and comparative investigation of the relationship between religion and politics in Europe and the United States, with comparisons to the Muslim world. SO

***PLSC 419b, Issues in the Study of Forced Migration** Ato Kwamena Onoma

Themes in the study of forced migration, including the definition of the phenomenon, investigation of its causes, relations between forced migrants and host communities, and dynamics of the return home. SO

***PLSC 420a/ANTH 406a/EVST 424a, Rivers: Nature and Politics** James Scott

The natural history of rivers and river systems and the politics surrounding the efforts of states to manage and engineer them. SO

***PLSC 423a/EP&E 243a/GLBL 336a/LAST 423a, Political Economy of Poverty Alleviation** Ana De La O

Overview of classic and contemporary approaches to the question of why some countries have done better than others at reducing poverty. Emphasis on the role of politics. SO

PLSC 424a, Gandhi and the Politics of Nonviolence Karuna Mantena

A study of the theory and practice of nonviolent political action, as proposed and practiced by M. K. Gandhi. The origins and development of nonviolent politics in Gandhian thought and action; legacies and lessons for contemporary political life. SO

***PLSC 425b, Transitional Justice** Pablo Kalmanovitz

Study of transitional justice cases in comparative perspective, with a focus on their characteristic ethical dilemmas and their progressive international legalization. Social and political mechanisms that have pushed forward or hindered transitional justice mechanisms; evaluation of the lawfulness and justice of these mechanisms. SO

***PLSC 430a/AFST 420a/EP&E 246a/LAST 406a, The Politics of Development**

Assistance David Simon

For description see under Ethics, Politics, & Economics.

PLSC 435a/MMES 290a/RLST 290a, Islam Today: Jihad and Fundamentalism

Frank Griffel

For description see under Religious Studies.

***PLSC 436b/GLBL 361b^c, Violence: State and Society** Matthew Kocher

For description see under Global Affairs.

***PLSC 442b/SAST 341b, Development in South Asia** Tariq Thachil

Introduction to issues surrounding political and economic development in South Asia. Successes and failures of modernization, including the influence of intellectual trends and their derivative policy prescriptions. Foundational perspectives on development and the policies they yielded; empirical treatments of the experiences of South Asian countries in the postcolonial era. SO

***PLSC 446b/EP&E 258b/SOCY 369b, Welfare States across Nations** Sigrun Kahl

How different societies counterbalance capitalism and deal with social risks. Welfare state regimes and their approaches to inequality, unemployment, poverty, illness, disability, child rearing, and old age. Why the United States has an exceptionally small welfare state.

SO

***PLSC 447b^G/AFST 447b^G/EP&E 271b/ER&M 271b, The Rwandan Genocide in Comparative Context** David Simon

For description see under Ethics, Politics, & Economics.

***PLSC 451b/GLBL 324b, Social, Economic, and Political Dimensions of Development**
Jennifer Ruger

Aspects of development explored with a focus on the health and well-being of disadvantaged and at-risk populations. The philosophical foundations underlying the field of development; how to distinguish different paradigms of development. SO

***PLSC 455a/MMES 189a, Religion, Empowerment, and the Role of Women in Nationalist Movements** Sallama Shaker

Challenges to Western narratives about women's passive role in Middle Eastern and North African societies. Exploration of women's engagement in nationalist movements and political processes; women's responses to war, occupation, and conflicts; the role of religion and culture in influencing gender issues. SO

***PLSC 460b^G, Legacies of Empire** Steven Wilkinson

Comparative examination of major colonial empires and their successor states in Asia, Africa, and the Americas. Focus on ways in which different patterns of colonization affected post-independence levels of democracy, instability, and conflict. Readings from recent work in political science, history, sociology, and economics. SO

STATISTICAL AND MATHEMATICAL METHODS

PLSC 452a/EP&E 203a/STAT 102a^G, Introduction to Statistics: Political Science

Jonathan Reuning-Scherer, Alan Gerber

For description see under Statistics.

PLSC 453a/EP&E 209a/STAT 103a^G, Introduction to Statistics: Social Sciences

Jonathan Reuning-Scherer

For description see under Statistics.

ADVANCED COURSES

***PLSC 471a and 472b, Individual Reading for Majors** David Cameron and staff

Special reading courses may be established with individual members of the department. They must satisfy the following conditions: (1) a prospectus describing the nature of the program and the readings to be covered must be approved by both the instructor and the director of undergraduate studies; (2) the student must meet regularly with the instructor for an average of at least two hours per week; (3) the course must include a term essay, several short essays, or a final examination; (4) the topic and/or content must not be substantially encompassed by an existing undergraduate or graduate course. All coursework must be submitted no later than the last day of reading period.

***PLSC 474b, Directed Reading and Research for Junior Intensive Majors**

David Cameron and staff

For juniors preparing to write yearlong senior essays as intensive majors. The student acquires the methodological skills necessary in research, identifies a basic reading list pertinent to the research, and prepares a research design for the project. All coursework must be submitted no later than the last day of reading period.

***PLSC 480a or b, One-Term Senior Essay** Staff

For seniors writing the senior essay who do not wish, or are unable, to write the essay in a department seminar. Students must receive the prior agreement of a member of the department who will serve as the senior essay adviser, and must arrange to meet with that adviser on a regular basis throughout the term.

***PLSC 490a, The Senior Colloquium** Peter Swenson

Presentation and discussion of students' research proposals, with particular attention to choice of topic and research design. Each student frames the structure of the essay, chooses research methods, begins the research, and presents and discusses a draft of the introductory section of the essay. Enrollment limited to Political Science majors writing a yearlong senior essay.

***PLSC 491b, The Senior Essay** David Cameron and staff

Each student writing a yearlong senior essay establishes a regular consultation schedule with a department member who, working from the prospectus prepared for PLSC 490, advises the student about preparation of the essay and changes to successive drafts. Enrollment limited to Political Science majors writing a yearlong senior essay.

***PLSC 493b, Senior Essay for Intensive Majors** David Cameron and staff

Each student writing a yearlong senior essay establishes a regular consultation schedule with a department member who, working from the prospectus prepared for PLSC 490, advises the student about preparation of the essay and changes to successive drafts, as well as reporting the student's progress until submission of the final essay. Enrollment limited to Political Science intensive majors.

Portuguese

Director of undergraduate studies: K. David Jackson, 82–90 Wall St., 432-1158,
k.jackson@yale.edu; www.yale.edu/span-port

Portuguese is taught at Yale as part of the Department of Spanish and Portuguese; the names of departmental faculty members teaching Portuguese courses appear in the faculty list under "Spanish."

The major in Portuguese is a liberal arts major intended to develop competence in the Portuguese language and to provide students with a comprehensive knowledge of the literatures and cultures of Portugal, Brazil, and African and Asian lands of Portuguese language or influence.

Students begin the study of Portuguese with PORT 110. After two years of Portuguese language study, students have sufficient proficiency to take advanced courses in Luso-Brazilian literature and culture.

The standard major, for which the prerequisite is PORT 140 or the equivalent, consists of twelve term courses. Students must take at least two term courses each in the literatures of Portugal and of Brazil. In completing their programs, students may elect up to four courses in other languages and literatures, anthropology, history, or history of art, or from study abroad, that are related to their field of study and approved by the director of

undergraduate studies. Juniors and seniors majoring in Portuguese may, with the permission of the instructor and the director of graduate studies, enroll in graduate courses in Portuguese.

Senior requirement All majors must either present a senior essay or take the departmental examination. The essay is written in PORT 491 or 492. A maximum of two credits counts toward the major. The examination is both written and oral and covers three periods of Portuguese and Brazilian literatures.

Placement All students who have not yet taken Portuguese at Yale are expected to take the departmental placement test, with the exception of students who have no previous knowledge of Portuguese whatsoever. The departmental placement test covers reading, writing, speaking, and listening skills. The placement test will be given at the beginning of the fall term; see the *Calendar for the Opening Days of College* and the departmental Web site for details.

REQUIREMENTS OF THE MAJOR

Prerequisite PORT 140 or equivalent

Number of courses 12 term courses beyond prereq (incl senior essay course, if elected)

Distribution of courses At least 2 courses in lit of Portugal, 2 in lit of Brazil

Substitution permitted With DUS permission, up to 4 relevant courses from other depts or from study abroad

Senior requirement Senior essay (PORT 491 or 492) or dept exam

***PORT 001b/LAST 001b/SPAN 050b, Latin American Short Fiction** Paulo Moreira
Introduction to Latin American literature through one of its highest achievements: the short narrative from Brazil and Spanish America. Works of Brazilian authors (Machado de Assis, Guimarães Rosa, Graciliano Ramos, Clarice Lispector) compared with short stories from Spanish America (Quiroga, Rulfo, Carpentier, Borges) and the United States (Faulkner, Ellison, Chopin). Narrative structure and expressive qualities of the texts; literary currents; and social, psychological, and existential themes. Readings and discussion in English; texts available in the original languages. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem Tr

PORT 110a, Elementary Portuguese I Marta Almeida, Paulo Moreira
Basic vocabulary and fundamentals of grammar through practice in speaking, reading, and writing, with stress on audiolingual proficiency. Introduces Brazilian and Portuguese culture and civilization. Credit only on completion of PORT 120. L1 RP 1½ Course cr

PORT 120b, Elementary Portuguese II Marta Almeida
Continuation of PORT 110. To be followed by PORT 130. Prerequisite: PORT 110. Qualifies students for summer study abroad. L2 RP 1½ Course cr

PORT 130a, Intermediate Portuguese I Marta Almeida
Contemporary and colloquial usage of Portuguese in the spoken and written language of Brazil. Grammar review and writing practice. Readings on Brazilian society and history used to build vocabulary. Exercises develop students' oral command of the language. L3 RP 1½ Course cr

PORT 140b, Intermediate Portuguese II Marta Almeida

Continuation of PORT 130. Grammar review, conversation, cultural topics, and readings from Brazilian literature. Prerequisite: PORT 130. L4 RP 1½ Course cr

***PORT 220b, Reading Contemporary Poetry** K. David Jackson and staff

Oral practice, reading, interpretation, and performance of Portuguese poetry from literary modernism to the present. Emphasis on contemporary Brazilian poetry; attention to historical and critical background. Prerequisite: PORT 140 or equivalent. L5, HU

***PORT 249a, Current Issues in Brazilian Culture** Paulo Moreira

Introduction to current cultural issues in Brazil, with an overview of the country's music, art, dance, theater, literature, and cinema. Source materials include literary and nonliterary texts in Portuguese, Web pages, music, and films. Conducted in Portuguese. L5, HU

***PORT 350a^G/LITR 252a, Machado de Assis** K. David Jackson

The place of Machado de Assis in world literature explored through close reading of his nine novels and selected stories in translation. Machado's hybrid literary world, skeptical critique of empire in Brazil, and narrative constructions. Readings and discussion in English; reading of texts in Portuguese for Portuguese majors. WR, HU Tr

***PORT 375b^G, Brazilian Narrative** Paulo Moreira

Introduction to twentieth-century Brazilian prose. Narrative structure and expressive qualities of the texts; literary currents; social, psychological, and existential themes. Authors include Machado de Assis, Mário de Andrade, Graciliano Ramos, Guimarães Rosa, and Clarice Lispector. Prerequisite: PORT 140 or equivalent. L5, HU

***PORT 385b^G/LITR 260b, Brazilian Literature in the New Republic** K. David Jackson

Changing narratives, themes, styles, and aesthetic ideals in current Brazilian prose and poetry. The writers' attempts to express or define a personal, national, and global consciousness influenced by the return of political democracy to Brazil. Focus on readings published within the last five years. Readings and discussion in English; texts available in Portuguese. WR, HU Tr

***PORT 410a/LITR 291a, The Brazilian Short Story in Translation** K. David Jackson

The Brazilian short story from Machado de Assis to the present, confronting the European literary background with Brazilian linguistic, indigenous, and cultural realities. Authors from four literary periods, including Guimarães Rosa and Clarice Lispector, and dominant critical and thematic currents. Conducted in English. WR, HU Tr

***PORT 471a and 472b, Directed Reading or Directed Research** K. David Jackson

Individual study for qualified students under the supervision of a faculty member selected by the student. Approval of the director of undergraduate studies required.

***PORT 491a or b and 492a or b, The Senior Essay** K. David Jackson

A research project designed under a faculty director, resulting in a substantial paper written in Portuguese, submitted to the DUS and a second designated reader.

Psychology

Director of undergraduate studies: Laurie Santos, 213 SSS, 432-4524, psychdus@yale.edu; senior thesis director: Julia Kim-Cohen, 317 K, 432-7581, julia.kim-cohen@yale.edu; psychology.yale.edu

FACULTY OF THE DEPARTMENT OF PSYCHOLOGY

Professors Woo-kyoung Ahn, J. Truett Allison, Stephen Anderson, Amy Arnsten, John Bargh, Linda Bartoshuk, Sidney Blatt, Paul Bloom, Thomas Brown, Kelly Brownell, Ty Cannon, Joseph Chang, Marvin Chun, Margaret Clark, Ravi Dhar, John Dovidio, Carol Fowler (*Adjunct*), Laurence Horn, Marcia Johnson, Alan Kazdin, Frank Keil, Marianne LaFrance, James Leckman, Lawrence Marks, Gregory McCarthy, Susan Nolen-Hoeksema, Nathan Novemsky, Donald Quinlan, Peter Salovey, Brian Scholl, Tom Tyler, Fred Volkmar, Victor Vroom, Karen Wynn

Associate Professors Jeremy Gray, Jeannette Ickovics, Robert Kerns, Jr., Joshua Knobe, Linda Mayes, Maria Piñango, Laurie Santos, Glenn Schafe, Mary Schwab-Stone, Jane Taylor

Assistant Professors June Gruber, Dan Kahan, Julia Kim-Cohen, Hedy Kober, James McPartland, Jaime Napier, Kristina Olson

Lecturers Nancy Close, Nelson Donegan, Carla Horwitz, David Klemanski, Kristi Lockhart, Michael Pantaloni, Benjamin Toll, Marney White

The introduction to psychology is PSYC 110, the general survey course. All other courses have PSYC 110 as a prerequisite, except the courses listed under “Survey Courses without Prerequisite.”

Courses in the department are organized so that they are best taken in several parallel sequences. Courses numbered from 120 to 190 and ending in a zero are core survey courses that introduce students to major areas of psychology and provide additional background for more advanced courses. These courses represent major content areas of psychology; students should sample broadly from them before specializing. Courses numbered from 200 to 209 focus on statistics and general methodology. Courses numbered from 210 to 299 teach data collection in various areas of psychology. Courses numbered from 300 to 399 are more advanced courses in a particular specialization. Senior seminars, whose enrollment is limited to twenty students, are numbered from 400 to 489. These seminars are best taken once a student has appropriate background. Courses numbered from 490 to 499 are special tutorial courses that require permission of the adviser and the director of undergraduate studies.

The standard major The major in Psychology requires twelve term courses beyond PSYC 110, including the senior requirement. No more than two term courses taken Credit/D/Fail may be applied toward the major; no 200-level course taken Credit/D/Fail may be applied toward the major.

1. Because psychology is so diverse a subject, every student is required to take at least two courses from the social science point of view in psychology (List A) and at least two

from the natural science point of view (List B). At least one course from each list must be a core course numbered from 120 to 190 and ending in zero. Students are expected to take those two core courses as early as possible in the major, normally within two terms after declaring their major.

List A: PSYC 123, 125, 127, 128, 150, 180, 231, 304, 306, 330, 355, 356

List B: PSYC 130, 137, 149, 170, 230L, 240, 270, 318, 327, 350

2. Because statistical techniques and the mode of reasoning they employ are fundamental in psychology, a course in statistics (PSYC 200 or equivalent) is required, preferably prior to the senior year. A student may substitute an examination arranged with the instructor of PSYC 200 for this requirement. Students may take such an examination only one time.
3. To assure some direct experience in collecting and analyzing data, students must elect at least one course, preferably prior to the senior year, in which research is planned and carried out. Courses numbered between 210 and 299 fulfill this requirement. (The same course may satisfy both this and the first requirement.)
4. To encourage consideration of the relation between psychology and other disciplines, students may count toward the major as many as three term courses in other related departments, including college seminars. Appropriate courses are offered in anthropology, cognitive science, computer science, philosophy, political science, sociology, and the biological sciences. Some students may find courses in other subjects related to their major. Students should consult with the director of undergraduate studies in Psychology about selecting outside courses. In all cases, courses in other departments must have substantial psychological content or clear links to topics in psychology.
5. Students interested in research are encouraged to take an independent study course (PSYC 490, 491, 492, 493) as early as the sophomore year. Students may also take PSYC 495 for one-half course credit per term with prior permission of the faculty adviser and the director of undergraduate studies. No more than a total of three credits from PSYC 490–495 combined may count toward the major.

Senior requirement Majors are required to earn two course credits from courses numbered PSYC 400–495. At least one of these course credits must be taken during the senior year and, for the B.S. degree, at least one must be a directed research course (PSYC 492 or 493) taken during the senior year. Juniors may preregister for senior seminars at the end of the junior year. In order to count credits obtained from PSYC 400–495 toward the senior requirement, a student must submit a substantial final paper (a minimum of 20 pages for a one-credit course, 10 pages for a half-credit course).

Distinction in the Major To be considered for Distinction in the Major, students must submit a senior essay to the Psychology department at least one week before the last day of classes in the final term of enrollment. The senior essay must be written during the senior year and must be a product of one or two of the 400-level courses taken to fulfill the senior requirement. Before submitting a senior essay, students must have an approved proposal and an essay adviser. Senior essays that are submitted after the deadline will be subject to grade penalties.

B.S. requirement The B.S. degree is typically awarded to students who conduct empirical research through a directed research course. B.S. candidates must fulfill the research methods and statistics requirements before starting the senior year. An empirical research project normally includes designing an experiment and collecting and analyzing the data. To be considered for a B.S. degree with Distinction, a student must submit a research proposal of one to two single-spaced pages, signed by the senior essay adviser, by the end of the registration period in the fall term of the senior year. The proposal must specify a research hypothesis, a rationale for the hypothesis, and proposed methods for collecting and analyzing data.

B.A. requirement The B.A. degree is typically awarded to students who conduct a non-empirical literature review, but there are no restrictions in the research format. To be considered for a B.A. degree with Distinction, a student must submit a senior essay proposal of one to two pages, signed by the essay adviser and specifying the research topic, by the end of the registration period in the fall term of the senior year.

Computer Science and Psychology major The interdepartmental major in Computer Science and Psychology may be considered by students with interests lying squarely between the two disciplines. See under Computer Science and Psychology for more information.

Departmental advisers Schedules for all majors must be discussed with, and approved by, the director of undergraduate studies or the advisers for the neuroscience and philosophy tracks in Psychology. Only then may a schedule be submitted to the residential college dean's office. For questions concerning credits for courses taken at other institutions or at Yale but outside the Department of Psychology, students should consult with the director of undergraduate studies. For questions concerning special tracks, students should consult with the advisers for the neuroscience and philosophy tracks in Psychology.

Neuroscience track in Psychology Students with a major interest in neuroscience may wish to elect the neuroscience track. Such students are considered Psychology majors for whom the requirements have been modified to accommodate their interests, and to reflect the multidisciplinary nature of modern neuroscience and psychology. Given the broad nature of the field of neuroscience, students may wish to concentrate their studies in one area of the field (e.g., behavioral, cellular and molecular, cognitive, affective, social, clinical, or developmental). Interested students are encouraged to meet with the track adviser, Glenn Schafe, DL 204, 432-3461, glenn.schafe@yale.edu. Majors in the neuroscience track meet with the track adviser at the beginning of each term in their junior and senior years.

Students in the Class of 2014 and previous classes may fulfill the requirements for the neuroscience track in Psychology as described below for the Class of 2015 and subsequent classes. Alternatively, they may fulfill the requirements for the neuroscience track that were in place when they entered the major, as described in previous editions of this bulletin.

Requirements for the neuroscience track for the Class of 2015 and subsequent classes are the same as for the standard major, with the following exceptions:

1. Two terms of introductory biology are required for the major, either MCDB <120> or BIOL 101 and 102, and either E&EB <122> or BIOL 103 and 104. Students who have scored 5 on the Advanced Placement test in Biology may place out of these courses; such students are required to replace the introductory courses with two additional term

courses in Psychology, Ecology and Evolutionary Biology, or Molecular, Cellular, and Developmental Biology.

2. Students must take PSYC 170 and a data-collection course chosen from PSYC 230L, 240, or 270. PSYC 235 does not count as a data-collection course except with additional neuroscience lab experience and approval of the neuroscience track adviser. MCDB 320 may substitute for the PSYC 170 requirement, or MCDB 320 and 321L may substitute for the PSYC 230L, 240, or 270 requirement, but not both. If MCDB 320 is substituted for a Psychology course, it cannot be counted as one of the two advanced science courses outside the department (see item 4 below).
3. At least seven courses must be taken in the Psychology department. As required for the standard major, two courses from List A are required for the neuroscience track, at least one of which must be a core course numbered from 120 to 190 and ending in zero. Students in the neuroscience track must also take a course from List B in addition to the courses specified in item 2 above.
4. At least two advanced science courses must be chosen from Molecular, Cellular, and Developmental Biology and Ecology and Evolutionary Biology courses numbered 200 and above that deal with human and/or animal biology; recommended courses include MCDB 200, 202, 205, 210, 240, 300, 315, 320, E&EB 220, 225, 240, and 390. Certain courses outside of these departments may also meet the advanced science requirement, including BENG 350, 421, CPSC 475, MB&B 300, 301, 420, 421, 435, 443, 452, MATH 222, 225, 230, 231, and STAT 241. Other courses may qualify for this requirement with permission of the neuroscience track adviser. Laboratory courses do not count toward the advanced science requirement. Students should note that many advanced science courses have prerequisites that must be taken first.
5. The senior requirement for the neuroscience track is the same as for the standard major, except that the two required course credits from PSYC 400–495 must have neuroscience content. Students pursuing the B.S. degree in the track must carry out a neuroscientific empirical project in PSYC 492 or 493 and must be supervised by a faculty member within the neuroscience area of the Psychology department. Students who wish to work with an affiliated faculty member studying neuroscience outside the department must obtain permission from the neuroscience track adviser.

Philosophy track in Psychology Students in the Class of 2014 and previous classes who have elected the philosophy track in Psychology may fulfill its requirements as described in previous editions of this bulletin. The adviser for the philosophy track is Brian Scholl, 304 SSS, 432-4629, brian.scholl@yale.edu.

Students in the Class of 2015 and subsequent classes whose interests encompass both philosophy and psychology should consider the psychology track offered by the Philosophy department.

REQUIREMENTS OF THE MAJOR

STANDARD MAJOR

Prerequisite PSYC 110

Number of courses At least 12 term courses beyond prereq (incl senior req)

Specific course required PSYC 200

Distribution of courses *B.A.* – 2 courses from List A, 2 courses from List B as specified; 1 Psych course numbered 210–299; *B.S.* – Same, with completion of the statistics and research methods reqs before senior year

Substitution permitted For PSYC 200, exam arranged with instructor; up to 3 relevant courses in other depts, with DUS permission

Senior requirement *B.A.* – 2 course credits from PSYC 400–495, 1 during senior year; *B.S.* – PSYC 492 or 493 taken during senior year; 1 addtl course credit from PSYC 400–495

NEUROSCIENCE TRACK

Prerequisite PSYC 110

Number of courses At least 12 term courses beyond prereq (incl senior req)

Specific courses required PSYC 170; PSYC 200; PSYC 230L, 240, or 270; MCDB <120> or BIOL 101 and 102; E&EB <122> or BIOL 103 and 104

Distribution of courses *B.A.* – At least 7 courses in Psych, incl 2 from List A and 1 addtl course from List B, as specified; at least 2 advanced science courses, as specified; *B.S.* – Same, with completion of the statistics and research methods reqs before senior year

Substitution permitted MCDB 320 for PSYC 170, or MCDB 320 and 321L for PSYC 230L, 240, or 270; for PSYC 200, exam arranged with instructor

Senior requirement *B.A.* – 2 course credits from PSYC 400–495 with neuroscience content, 1 during senior year; *B.S.* – PSYC 492 or 493 taken during senior year, with neuroscience content in research project; 1 addtl course credit from PSYC 400–495 with neuroscience content

INTRODUCTORY COURSE

PSYC 110a or b, Introduction to Psychology Paul Bloom [F], Kristina Olson [Sp]

A survey of major psychological approaches to the biological, cognitive, and social bases of behavior. SO

SURVEY COURSES WITHOUT PREREQUISITE

***PSYC 120a/CGSC 201a, Brain and Thought: An Introduction to the Human Brain**

Amy Arnsten

For description see under Cognitive Science.

PSYC 123b/EVST 123b/PLSC 231b, The Psychology, Biology, and Politics of Food

Kelly Brownell

A study of eating as it affects the health and well-being of every human. Taste preferences, food aversions, the regulation of hunger and satiety, food as comfort, friendship, and social ritual; the politics of food, including sustainable agriculture, organic farming, genetically modified foods, nutrition policy, and food and agriculture industries; malnutrition, eating disorders, and the global obesity epidemic; food advertising aimed at children, poverty and food, and effects of the modern environment on eating. SO

***PSYC 125b/CHLD 125b/EDST 125b, Child Development** Nancy Close,
Carla Horwitz

For description see under Child Study Center.

***PSYC 127a/CHLD 127a/EDST 127a, Early Childhood Education: Implications of Curriculum and Policy** Carla Horwitz

For description see under Child Study Center.

***PSYC 128b/CHLD 128b/EDST 128b, Language, Literacy, and Play** Nancy Close,
Carla Horwitz

For description see under Child Study Center.

PSYC 130a/CGSC 110a, Introduction to Cognitive Science Brian Scholl

For description see under Cognitive Science.

PSYC 137a/LING 117a^c, Language and Mind Maria Piñango

For description see under Linguistics.

PSYC 147a, Animal Models of Clinical Disorders Nelson Donegan

An interdisciplinary approach to understanding and treating psychiatric disorders, integrating clinical psychology, psychiatry, and advances in basic neuroscience. Focus on how research with animal models can advance our understanding of psychiatric disorders and generate more effective treatments for patients. Topics include drug addiction, depression, Parkinson's disease, and schizophrenia. SC, SO

PSYC 149b/LING 149b, Animal Communication and Human Language

Stephen Anderson

For description see under Linguistics.

SURVEY COURSES WITH PREREQUISITE

PSYC 110 is a prerequisite for the courses in this group.

PSYC 150b, Social Psychology Marianne LaFrance and staff

Study of social cognition, attitudes and persuasion, group processes, intergroup processes, prosocial behavior, aggression, and conformity. Theories, methodology, and applications of social psychology. SO

PSYC 170a, Fundamentals of Neuroscience Thomas Brown

Examination of the way the nervous system controls behavior. Biological insights about neural cell function are applied to processes such as learning, emotion, and perception. SC, SO

PSYC 180b, Abnormal Psychology Susan Nolen-Hoeksema and staff

The major forms of psychopathology that appear in childhood and adult life. Topics include the symptomatology of mental disorders; their etiology from psychological, biological, and sociocultural perspectives; and issues pertaining to diagnosis and treatment. WR, SO

PSYC 182b/CGSC 282b/PHIL 182b, Perspectives on Human Nature Joshua Knobe

For description see under Philosophy.

STATISTICS AND GENERAL METHODOLOGY

***PSYC 129a, Statistics as a Way of Knowing** Nelson Donegan

An introduction to basic concepts of statistics and probability that allow us to describe, evaluate, and understand aspects of the world and make informed choices. Exploration of relationships among statistical reasoning, cognitive psychology, and philosophical theories of knowledge. Enrollment limited to freshmen and sophomores. QR

PSYC 200b, Statistics Jaime Napier

Measures of central tendency, variability, association, and the application of probability concepts in determining the significance of research findings. QR

DATA COLLECTION

PSYC 230La, Research Methods in Human Neuroscience Gregory McCarthy

Methods of human neuroscience research. Focus on functional magnetic resonance imaging, electroencephalography, and evoked potentials. Students design experiments, acquire data, and perform analyses. Extensive use of MATLAB. Prerequisites: PSYC 160 or 170 and a course in statistics, or permission of instructor. SC

***PSYC 231a^c, Research Methods in Happiness** June Gruber

Methods of research in the study of happiness and human emotion. Psychophysiology, behavioral observation and coding, and self-report assessment instruments. Attention to experimental design, data acquisition, computerized methods of analysis, and writing research reports. Prerequisites: PSYC 110 and a course in statistics, or with permission of instructor. Recommended preparation: research experience. SO

***PSYC 235b, Research Methods in Psychology** Woo-kyoung Ahn

Introduction to general principles and strategies of psychological research. Topics include generating and testing hypotheses, laboratory and field experiments, scale construction, sampling, archival methods, case studies, ethics and politics of research, and Internet and cross-cultural methods. Hands-on research experience in laboratories. Prerequisites: PSYC 200 or STAT 103, or permission of instructor. WR, SO

[PSYC 240a, Research Methods in Conditioning and Learning]

***PSYC 260b, Research Methods in Behavior Genetics** Tyrone Cannon

Methods of human behavioral genetics research. Focus on the genetics of psychiatric disorders, personality, and cognition. Students design and perform genetic-association analyses of behavioral traits, using existing datasets supplied by the instructor. SO

***PSYC 270b, Research Methods in Behavioral Neuroscience** Nelson Donegan

Laboratory course in which students design and conduct research to study brain function and behavior. Emphasis on hands-on participation in behavioral and neuroscience techniques. Prerequisites: PSYC 170 and a course in statistics. SC

ADVANCED COURSES

PSYC 304a/CGSC 304a, The Mental Lives of Babies and Animals Karen Wynn

Interdisciplinary exploration of the cognitive, social, and emotional capacities of creatures lacking language and culture. The extent to which our complex psychology is unique to

mature humans; the relative richness of a mental life without language or culture. Some attention to particular human populations such as children with autism and adults with language disorders. SO

***PSYC 306a, Nature, Nurture, and Human Behavior** Julia Kim-Cohen

Study of genetic and nongenetic contributions to individual differences in human behavior and development. Topics include cognitive abilities, personality, violence, homosexuality, and psychopathology. Research methods for identifying genetic and environmental influences and for investigating gene-environment interaction. Some discussion of the bioethical implications of behavior genetics. SO

PSYC 311b, Affective Neuroscience Glenn Schafe

Introduction to the study of affective neuroscience. Topics include the neurobiology of motivation and reward, fear and stress, helplessness and depression, affiliation and attachment, maternal influences on emotional development, the interaction between emotion and cognition, and brain mechanisms of emotion regulation. Recommended preparation: PSYC 170 or equivalent. SO

PSYC 318a/LING 220a^C, General Phonetics Jelena Krivokapić

For description see under Linguistics.

PSYC 327a/LING 227a^C, Language and Computation Gaja Jarosz

For description see under Linguistics.

PSYC 330b, Psychology and the Law Kristi Lockhart

Contributions of psychological theory and research to our understanding of the law and the criminal justice system. Topics include criminality, eyewitness testimony, lie detection, jury decision making, the death penalty, the insanity defense, civil commitment, prisons, repressed memories, children as witnesses and defendants, and the role of psychologists as expert witnesses and trial consultants. SO

PSYC 331b/LING 231b^C, Neurolinguistics Maria Piñango

For description see under Linguistics.

PSYC 332b/PLSC 201b, Political Psychology John Bullock

For description see under Political Science.

***PSYC 350a or b/CHLD 350a or b, Autism and Related Disorders** James McPartland,
Fred Volkmar

For description see under Child Study Center.

***PSYC 355a and 356b, Clinical Psychology in the Community** Kristi Lockhart

Mental disorders as they are treated within a community setting. Students participate in a fieldwork placement, working either one-on-one or in groups with the psychiatrically disabled. Seminar meetings focus on such topics as the nature of severe mental disorders, the effects of deinstitutionalization, counseling skills, and social policy issues related to mental health. Prerequisite: PSYC 180. Cr/year only

***PSYC 372a/LING 490a^C, Research Methods in Linguistics** Maria Piñango

For description see under Linguistics.

SENIOR SEMINARS

The seminars below may be used to fulfill the senior requirement.

***PSYC 405a, Social Emotions** Margaret Clark

The nature and function of emotions in social context. How emotions such as happiness, sadness, fear, and anger shape how we relate to others; how the ways in which we relate to others shape our experience and expression of these emotions. The nature and functions of additional emotions that seem to arise only within the context of social relationships: feelings of hurt, guilt, gratitude, empathic joy, and empathic sadness. SO

***PSYC 407b/CGSC 407b, Cognitive Science of Causality** Frank Keil

Examination of how people and animals track causal patterns in the world around them. Topics include the perception of causality; mechanistic, teleological, and psychological causation; variations in causal thinking across domains; the role of counterfactuals; biases and heuristics in causal thought; and the development of causal thinking. SO

***PSYC 413b/CGSC 413b, Mind, Brain, and Society** Marvin Chun

Recent advances in modern neuroscience as they inform or complicate issues in society. Views from disciplines such as psychology, philosophy, economics, political science, law, and religion. SO

***PSYC 418b^G, The Social Brain** Gregory McCarthy

Selected topics in social neuroscience, including animacy and the attribution of intention from motion, thinking about the self and others, and moral judgments. Prerequisite: PSYC 160, 170, or permission of instructor. SO

***PSYC 425b^G/CGSC 425b, Social Perception** Brian Scholl

Connections between visual perception, among the earliest and most basic of our cognitive processes, and social cognition, among the most advanced forms of higher-level cognition. The perception of animacy, agency, and goal-directedness; biological motion; face perception (including the perception of facial attractiveness); gaze processing and social attention; “thin-slicing” and “perceptual stereotypes”; and social and cultural influences on perception. SO

***PSYC 426a/CGSC 429a/PHIL 429a^G, Philosophical Implications of Social Psychology**

Tamar Gendler

For description see under Philosophy.

***PSYC 454b^G, Sensory Information Processing** Lawrence Marks

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. SC, SO

***PSYC 456b, Developmental Psychopathology** Julia Kim-Cohen

Overview of the theoretical and empirical literature in developmental psychopathology. Models of atypical development that can elucidate underlying mechanisms of stability and change. Prerequisite: PSYC 180. SO

***PSYC 466a, Neurobiology of Emotion** Glenn Schafe

A study of the brain circuitries involved in emotion and emotional learning and memory. Emotion research in a historical context; progress that has been made in understanding the neurobiology of emotion in both laboratory animals and humans. SO

***PSYC 479a, Thinking** Woo-kyoung Ahn

A survey of psychological studies on thinking and reasoning, with discussion of ways to improve thinking skills. Topics include judgments and decision making, counterfactual reasoning, causal learning, inductive inferences, analogical reasoning, problem solving, critical thinking, and creativity. SO

TUTORIALS***PSYC 490a and 491b, Directed Reading** Laurie Santos

Individual study for qualified students, primarily seniors, who wish to investigate an area of psychology not covered by regular departmental offerings. A student must be sponsored by a faculty member, who sets requirements and meets regularly with the student. To register, the student must submit a written plan of study approved by the adviser to the director of undergraduate studies. The normal minimum requirement is a term paper, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms.

***PSYC 492a and 493b, Directed Research** Laurie Santos

Empirical research projects for qualified students, primarily seniors. A student must be sponsored by a faculty member, who sets the requirements and supervises research. To register, the student must submit a written plan of study approved by the adviser to the director of undergraduate studies. The normal minimum requirement is a written report of the completed research, but individual faculty members may set alternative equivalent requirements. May be elected for one or two terms.

***PSYC 495a or b, Research Topics** Laurie Santos

Discussion of current and advanced topics and/or ongoing research projects. Specific areas of research correspond to 700-level courses. Students sign up for sections at www.yale.edu/oci, using the last two digits of the corresponding 700-level course number. Enrollment forms, which must be signed by the instructor of the section, are available at the office of undergraduate studies. May be repeated for credit. ½ Course cr

Psychology and Computer Science

(See under Computer Science and Psychology.)

Psychology and Philosophy

(See under Philosophy.)

Public Health

For information about Yale College course offerings related to health, see under Global Health Studies.

B.A.–B.S./M.P.H. degree program The Select Program in Public Health gives Yale College students interested in the field of public health the opportunity to earn a bachelor's degree from Yale College and an M.P.H. degree from the Yale School of Public Health in a five-year joint program. During four years of Yale College enrollment, students complete a standard Yale College major and six course credits applicable toward the M.P.H. degree. Students are placed in a public health internship between the fourth and fifth years of the program and study at the School of Public Health (YSPH) full time in the fifth year, when they complete the master's thesis and the remaining ten courses for the master's degree.

Students apply to YSPH for the joint program in the fall term of their junior year. Candidates must present evidence of a commitment to public health, as well as a record of one year of college-level mathematics and either biology, chemistry, or physics. Applicants must complete YSPH application forms and submit transcripts, SAT scores, three letters of recommendation, and a personal statement. Financial aid, if provided during the fifth year, comes from YSPH.

Further information about this program may be obtained from the YSPH Office of Student Affairs, 60 College Street, P.O. Box 208034, New Haven, CT 06520-8034, 785-6260, or on the Web at publichealth.yale.edu.

Religious Studies

Director of undergraduate studies: Stephen Davis, Rm. 308, 451 College St., 432-6532, stephen.davis@yale.edu

FACULTY OF THE DEPARTMENT OF RELIGIOUS STUDIES

Professors Harold Attridge, Gerhard Böwering, Yochanan Breuer (*Visiting*), Adela Yarbro Collins, John J. Collins, Vasudha Dalmia, John Darnell, Stephen Davis, Carlos Eire, Steven Fraade, Bruce Gordon, Philip Gorski, Phyllis Granoff, Frank Griffel, John Hare, Christine Hayes (*Chair*), Jennifer Herdt, Richard Kalmin (*Visiting*), Bentley Layton, Ivan Marcus, Dale Martin, Sally Promey, Harry Stout, Kathryn Tanner, Emilie Townes, Denys Turner, Miroslav Volf, Robert Wilson

Associate Professors Christopher Beeley, Hindy Najman, Carolyn Sharp

Assistant Professors Zareena Grewal, Kathryn Lofton, Andrew Quintman, Eliyahu Stern

Senior Lecturers Koichi Shinohara, David Smith

Lecturers Hugh Flick, Jr., Margaret Olin, George Syrimis

The study of religion investigates religious traditions, institutions, cultural practices, texts, and ideas in many different ways. Courses in the Religious Studies department concentrate on the history of religious traditions (Western and Eastern, ancient and modern) and the

role of religion in shaping past human cultures and current events; on textual traditions and religious literatures of various kinds; and on ethical and philosophical issues central to religious reflection, such as the nature of the divine or the problem of evil and suffering. Because religious studies is an interdisciplinary field, it makes use of a wide variety of methods and academic disciplines. Students who want a broad introduction to the study of religions can choose courses listed under Groups A or B below, though courses listed under Group C are also open without prerequisite. Religious Studies majors develop specialized concentrations as they plan a major program in consultation with the director of undergraduate studies and other members of the faculty.

Religious Studies course offerings, other than freshman seminars, are arranged in four categories. Group A features general, comparative, and thematic courses that engage more than one religious tradition. Group B includes survey courses that provide a broad introduction to a particular religious tradition or scripture in historical context. Group C includes courses on specialized topics in religious studies, both introductory and intermediate. Group D offers advanced courses on specialized topics. Normally, courses in Groups A to C have no prerequisites while courses in Group D have a specific prerequisite or require the permission of the instructor.

The department offers two programs for students majoring in Religious Studies: the standard major and a major in which religious studies is combined with another subject closely related to the senior essay. Both programs require a core of courses and a two-term senior essay.

Core requirement A core of six term courses in Religious Studies is required of all majors. One core course examines world religions; for qualifying courses in 2012–2013, consult the director of undergraduate studies. Three core courses are in the historical or textual study of a specific religion, most commonly from Group B; each of the three courses must be on a different religion, and at least one must be focused on Judaism, Christianity, or Islam and one on Buddhism or Hinduism. One core course, selected in consultation with the director of undergraduate studies, focuses on systematic thought (ethics, philosophy of religion, or theology). The final core course is RLST 490, the junior seminar on approaches to the study of religion. Before the end of the junior year, students must also complete a seminar (in addition to the junior seminar) that requires a major research paper. In Program I, this seminar must be an elective in Religious Studies. In Program II, it may be a course in Religious Studies, or it may constitute one of the four term courses outside the department.

PROGRAM I. THE STANDARD MAJOR

Program I consists of twelve term courses in Religious Studies, including the core of six required courses, the two-term senior essay, and four electives. The electives are usually selected from Groups C and D and form a coherent unit to help the student prepare for the senior essay. Certain cognate courses in other departments that investigate religious phenomena or literature and are integral to the student's area of concentration may count toward the major with permission of the director of undergraduate studies. Normally the maximum number of cognate courses that may be applied is two. Two terms of an ancient language related to the study of religion may, with permission of the director of undergraduate studies, be counted.

PROGRAM II. RELIGIOUS STUDIES WITH ANOTHER SUBJECT

Program II consists of eight term courses in Religious Studies (the core of six required courses and the two-term senior essay) and four term courses outside the department, one of which may fulfill the seminar requirement outlined above. The four courses outside the department need not directly concern religion, but they must form a coherent unit. Through them students can develop expertise in a single methodological approach, cultural area, historical period, or body of literature contributing to the senior essay. Examples of successful combinations might be: four courses in Chinese history, language, and literature with a senior essay topic on Chinese Buddhism; four courses in early American history and literature with a topic on colonial American religion; four courses in a specific area of biology and medical science with a topic on biomedical ethics. Each student's petition to take this program will be judged on its contribution to the student's senior essay. Normally introductory courses in other departments may not count among the outside courses; appropriate language courses at a higher level may. Students electing Program II must, at the end of the junior year and in no case later than the beginning of the senior year, obtain approval for their proposed program from the director of undergraduate studies. Students who think they may elect this program should consult the director of undergraduate studies as early as possible in their studies to begin suitable selection of courses.

Senior requirement Students in both programs must write a senior essay under the supervision of a faculty adviser in the student's area of concentration. In selecting a senior essay topic, students normally choose a topic on which they have completed course work before commencing the senior year. The essay counts as two term courses toward the major and is taken in both terms of the senior year. The student should begin choosing a senior essay topic during the second term of the junior year, and early in the first term of the senior year must submit a Statement of Intention approved by a faculty adviser and the director of undergraduate studies. The Senior Essay (RLST 491, 492) includes research and writing assignments as well as colloquia in which seniors present and discuss their research. The student must submit at least ten pages of the essay to the director of undergraduate studies by the last day of classes of the first term in order to receive a grade of "satisfactory" for that term.

Students in Yale College are eligible to take certain courses in the Divinity School; those interested should consult its bulletin. Some Divinity School courses may count toward the major, with permission of the director of undergraduate studies.

Students majoring in Religious Studies who plan to do graduate work in the subject are strongly encouraged to study languages of which a reading knowledge will be needed for their graduate program.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses *Program I*—12 term courses (incl two-term senior essay); *Program II*—8 term courses in Rel St (incl two-term senior essay), and 4 nonintro courses in another subject linked with senior essay, chosen in consultation with DUS

Specific course required *Both programs*—RLST 490

Distribution of courses *Both programs*—1 course in world religions; 3 courses in historical or textual study of a specific religion, as specified; 1 course in systematic thought, as specified; 1 sem other than junior sem, as specified

Substitution permitted *Program I*—related courses in other depts, incl 2 courses in a related ancient lang, with DUS permission; *Both programs*—Divinity School courses, with DUS permission

Senior requirement *Both programs*—senior essay (RLST 491, 492)

FRESHMAN SEMINAR

***RLST 050b, Islam and Modernity** Frank Griffel

Introduction to contemporary Islam and to the notion of modernity. Focus on whether Islam excludes modernity and a democratic society and how Muslims see the relationship among Islam, modernity, and democracy. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

GENERAL, COMPARATIVE, AND THEMATIC COURSES (GROUP A)

[RLST 100b, Introduction to World Religions]

***RLST 103a, Pilgrimage in Comparative Perspective** Stephen Davis,
Andrew Quintman

A methodological and historical introduction to the practice of pilgrimage in different cultural and religious settings. Anthropological perspectives on pilgrimage as a social phenomenon; case studies from Greco-Roman, Jewish, Christian, Islamic, Indian, and Buddhist pilgrimage traditions; secular forms of ritualized travel. HU

***RLST 104b, World Religions in Beijing** Gerhard Böwering

Introduction to the literature, ideals, practices, rituals, and institutions of four major world religions: Hinduism, Buddhism, Christianity, and Islam. Historical survey combined with a phenomenological treatment of principal topics. Focus on universal religions that took shape outside China, especially in South Asia and the Mediterranean world, yet inspired religious institutions that came to be established in China. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

RLST 111b/AMST 111b/HIST 129b/WGSS 111b, Sexuality and Religion

Kathryn Lofton

The relationship between ideas about sex and ideas about religion; the interrelations of sexual and religious practices. Case studies from religious cultures in the United States. Examination of presumptive norms about sexuality, religion, and American culture. HU

SURVEYS OF RELIGIOUS TRADITIONS (GROUP B)

***RLST 117b/THST 117b, Gods and the Theater in India** Vasudha Dalmia

Relations between the religious and the secular in Indian theater. A study of Sanskrit drama and religious plays on the life of the god Rama; readings of representative works from colonial and contemporary India. All readings in translation. HU

RLST 126a/SAST 262a, Tibetan Buddhism Andrew Quintman

Introduction to major themes in Tibetan Buddhist thought and practice. Buddhist ethics, systems of monastic and ascetic life, ritual applications, sacred geography and pilgrimage, lay religion, and the status of Buddhism in Chinese-occupied Tibet and in the West. HU

***RLST 130a/EALL 202a/HUMS 418a/SAST 367a, Traditional Literature of India, China, and Japan** Koichi Shinohara, Phyllis Granoff

For description see under Humanities.

RLST 134b/EALL 200b, Buddhism in China and Japan Koichi Shinohara

Introduction to Buddhism in East Asia through a close reading of original sources in translation. Focus on the lives and teachings of several leading monks. Topics include meditation, faith, rebirth, and secret rituals. HU

RLST 137b, Introduction to Hinduism Phyllis Granoff

A broad introduction to classical Hinduism, emphasizing the close reading of primary texts in translation. Readings include selections from the major genres of religious writing: RgVeda, Brahmanas, Upanisads, epics and puranas, and philosophical works. HU RP

RLST 142b, Islam along the Silk Road Gerhard Böwering

Introduction to the religious history of Islam from its origins in Arabia through its expansion into Central Asia to its arrival in China. Muhammad and the Qur'an; Muslim tradition and religious law; Islamic philosophy and theology; Sunnism and Shiism; Sufism; fundamentalism and jihad. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

***RLST 147b^G/JDST 235b^G, Introduction to Judaism in the Ancient World**
Steven Fraade

For description see under Judaic Studies.

RLST 148a^G/ER&M 219a/HIST 219a^G/JDST 200a^G/MMES 149a, History of the Jews and Their Diasporas to Early Modern Times Ivan Marcus

For description see under History.

***RLST 150b, The New Testament in History and Culture** Dale Martin

Introduction to the New Testament, with a focus on its historical development and cultural significance. Use of New Testament documents in art, theological readings and debates, and politics. The historical Jesus; authorship of the texts and development of the canon; biblical interpretation and political and cultural use throughout history, with special attention to contemporary settings outside North America. Includes visits to the Yale Art Gallery. HU

RLST 158a^G/HIST 226a^G/HUMS 422a/NELC 326a, Jesus to Muhammad: Ancient Christianity to the Rise of Islam Stephen Davis

The history of Christianity and the development of Western culture from Jesus to the early Middle Ages. The creation of orthodoxy and heresy; Christian religious practice; philosophy and theology; politics and society; gender; Christian literature in its various forms, up to and including the early Islamic period. HU

RLST 163a^G, Modern Christian Thought: The Enlightenment Noreen Khawaja

An introduction to the major intellectual issues of Christianity around the time of the Enlightenment. Emphasis on the religious and philosophical confrontation with radical

doubt and on the meaning of religious truth. Readings from Descartes, Hume, Kant, Voltaire, Reimarus, Lessing, Vico, Hegel, and Feuerbach. HU

RLST 170a/MMES 192a, The Religion of Islam Gerhard Böwering

The rise of Islam in Arabia; Muhammad and the Qur'an; Muslim tradition and religious law; crucial issues of Islamic philosophy and theology; basic beliefs and practices of the Muslim community; Sufism and Shi'ism; religious institutions and modern trends; fundamentalism and violence; freedom and democracy. HU

TOPICS IN RELIGIOUS STUDIES (GROUP C)

***RLST 182b/SAST 459b, Buddhist Traditions of Mind and Meditation**

Andrew Quintman

Buddhist meditation practices examined in the context of traditional theories of mind, perception, and cognition. Readings both from Buddhist canonical works and from secondary scholarship on cognitive science and ritual practice. Recommended preparation: a course in Asian religions. HU

***RLST 184b/SAST 358b, The Ramayana** Hugh Flick, Jr.

Exploration of the religious and ideological interpretations of this epic of ancient India as manifested in performance and in written texts. Emphasis on the religious and historical contexts from which the texts emerged. All readings in translation. HU Tr

RLST 187a/HSAR 142a, Introduction to the History of Art: The Classical Buddhist World Mimi Yiengpruksawan

For description see under History of Art.

RLST 188b/HSAR 143b, Introduction to the History of Art: Buddhist Art and Architecture, 900 to 1600 Mimi Yiengpruksawan

For description see under History of Art.

***RLST 201a/HIST 232Ja/HUMS 443a/JDST 270a/MMES 342a, Medieval Jews, Christians, and Muslims Imagining Each Other** Ivan Marcus

For description see under History.

RLST 230b^c/HIST 269b^c/JDST 286b^c, Holocaust in Historical Perspective

Marc Saperstein

For description see under History.

***RLST 250b^c/JDST 276b^c/NELC 158b, Jews and Minorities in the Islamic State**

Eve Krakowski

For description see under Judaic Studies.

***RLST 260a/HIST 126Ja, Religion, War, and America** Harry Stout

The relationship between religion and war in American history from colonial beginnings through Vietnam. The religious meanings of Americans at war; the mutually reinforcing influences of nationalism and religion; war as the norm of American national life; the concept of civil religion; biblical and messianic contexts of key U.S. conflicts. HU

RLST 268a^c/HIST 281a/HUMS 228a, Christian Mysticism, 1200–1700 Carlos Eire

An introductory survey of the mystical literature of the Christian West, focusing on the

late medieval and early modern periods. Close reading of primary texts, analyzed in their historical context. HU

RLST 273a^c/PLSC 281a, Moral, Religious, and Social Issues in Bioethics

Stephen Latham

For description see under Political Science.

RLST 277b^c, Existentialism Noreen Khawaja

Introduction to key problems in European existentialism. The development of the tradition from its roots in romantic theories of individual autonomy; the sweeping culture critiques of Sartre and Marcuse; the adoption and transformation of religious ideas. Readings from Rousseau, Kierkegaard, Gide, Lukács, Nietzsche, Heidegger, and de Beauvoir. HU

RLST 283b/HIST 215b^c/HUMS 322b, Reformation Europe, 1450–1650 Carlos Eire

For description see under History.

RLST 290a/MMES 290a/PLSC 435a, Islam Today: Jihad and Fundamentalism

Frank Griffel

Introduction to modern Islam, including some historical background. Case studies of important countries in the contemporary Muslim world, such as Egypt, Iran, Pakistan, and Saudi Arabia. Islam as a reactive force to Western colonialism; the ideals of Shari'a and jihad; violence and self-sacrifice; and Islam as a political ideology. HU

***RLST 291b^c/EP&E 273b/MMES 343b/SOCY 343b^c, Sociology of Islam**

Jonathan Wyrzten, Jeffrey Guhin

For description see under Sociology.

***RLST 292b^c/MMES 292b, Salafiyya Movement in Islam** Frank Griffel

Close study of the development of the Salafiyya movement, a widely spread modernist reform movement of Muslim intellectuals during the eighteenth and nineteenth centuries. Further development of the movement during the twentieth century; what "Salafism" means today. HU

***RLST 307b/AMST 303b/HIST 128Jb, Classic American Histories** Harry Stout

Introduction to classic histories of America written by professional American historians, covering the colonial era to the twentieth century. The substantive content of the writing; style and artistic craft; use of foundational evidence. Readings include a variety of methods and fields. HU RP

***RLST 311b^c/AMST 392b, Religion and Popular Culture** Kathryn Lofton

Study of the religious dimensions of popular culture. Religious institutions' engagement in economic markets; the deployment of religious imagery in the cultural marketplace; consumer culture as a religious space. HU

RLST 315b/ANTH 216b, Anthropology of Religion and Ritual Sara Shneiderman

For description see under Anthropology.

ADVANCED TOPICS IN RELIGIOUS STUDIES (GROUP D)

RLST 320b, Gandhi and Hinduism Vasudha Dalmia

Gandhi's notion of Hinduism and his religious and political ideas about truth, nonviolence, fasting, and ashram. New connotations that Gandhi gave concepts drawn from a traditional Indic repertoire. HU

***RLST 325b^G/JDST 247b^G, Rabbis and Others in Late Antiquity** Richard Kalmin
For description see under Judaic Studies.

RLST 402b/PHIL 326b, The Philosophy of Religion John Hare
For description see under Philosophy.

***RLST 409b^G/JDST 393b^G, Midrash Seminar: The Theophany of Sinai**
Steven Fraade
For description see under Judaic Studies.

***RLST 418b^G/JDST 311b^G, Babylonian Aramaic** Yochanan Breuer
For description see under Judaic Studies.

OTHER COURSES

***RLST 490b, Seminar on Approaches to the Study of Religion** Noreen Khawaja
Introduction to the study of religion in anthropology, sociology, phenomenology, philosophy, psychology, and history. Focus on current debates about how religion should be approached and on issues crucial to the investigation of religion in an academic setting. Required for all junior majors in Religious Studies; open to others with permission of the instructor.

***RLST 491a and 492b, The Senior Essay** Stephen Davis
Students writing their senior essay meet periodically in the fall and weekly in the spring for the colloquium directed by the director of undergraduate studies. The essay, written under the supervision of a member of the department, should be a substantial paper between 12,500 and 15,000 words.

Reserve Officers Training Corps (ROTC)

(See under Aerospace Studies and under Naval Science.)

Russian

(See under Slavic Languages and Literatures.)

Russian and East European Studies

Director of undergraduate studies: Molly Brunson, 2699 HGS, 432-7023,
molly.brunson@yale.edu

FACULTY ASSOCIATED WITH THE MAJOR

Professors Vladimir Alexandrov (*Slavic Languages & Literatures*), Paul Bushkovitch (*History*), Katerina Clark (*Comparative Literature, Slavic Languages & Literatures*), Laura Engelstein (*History*), John Gaddis (*History*), Harvey Goldblatt (*Chair*) (*Slavic Languages & Literatures*), Robert Greenberg (*Adjunct*) (*Slavic Languages & Literatures*), John MacKay (*Slavic Languages & Literatures*), Timothy Snyder (*History*)

Assistant Professors Molly Brunson (*Slavic Languages & Literatures*), Bella Grigoryan (*Slavic Languages & Literatures*)

Lecturers Keith Darden, Hilary Fink

Senior Lectors II Irina Dolgova, Krystyna Illakowicz

Senior Lectors Rita Lipson, Constantine Muravnik, Julia Titus, Karen von Kunes

The major in Russian and East European Studies, administered by the Department of Slavic Languages and Literatures, offers an interdisciplinary approach to the study of a broad region: Russia, Ukraine, Belarus, the Caucasus, and Central Asia; Poland, Hungary, the Czech and Slovak Republics, and other areas in east central Europe; and the Balkans. The program is appropriate for students considering careers in international public policy, diplomacy, or business, and is also suited to students wishing to continue academic work.

Languages A full understanding of the area demands a knowledge of its languages. Students must demonstrate either proficiency in Russian or intermediate-level ability in an East European language. Students may demonstrate proficiency in Russian by (1) completing fourth-year Russian (RUSS 160, 161); (2) passing a written examination to demonstrate equivalent ability; or (3) completing a literature course taught in Russian and approved by the director of undergraduate studies. Students may demonstrate intermediate-level ability in an East European language by (1) completing a two-year sequence in an East European language (currently Czech or Polish; students interested in studying other East European languages should contact the director of undergraduate studies); or (2) by passing a language examination demonstrating equivalent ability. Students are encouraged to learn more than one language.

Course requirements Thirteen term courses taken for a letter grade are required for the major. Students must take one course in Russian or East European history selected in consultation with the director of undergraduate studies. If Russian is presented as the primary language to satisfy the requirements of the major, then all East European language courses and third- and fourth-year Russian courses count toward the major. If an East European language other than Russian is presented as the primary language, then all courses in that language designated L3 or higher count toward the major. Electives are chosen in consultation with the director of undergraduate studies from an annual list of offerings. Electives must include at least one course in a social science. Other undergraduate courses relevant to Russian and East European Studies, including residential college seminars, may also count toward the major if approved by the director of undergraduate studies. Qualified students may elect pertinent courses in the Graduate School with the permission of the instructor, the director of graduate studies, and the director of undergraduate studies.

Senior requirement Every major must write a senior essay in RSEE 490, 491. At the beginning of the senior year, students enroll in RSEE 490 and arrange for a faculty member to serve as senior adviser. By the third Friday of October, majors submit a detailed prospectus of the essay, with bibliography, to the adviser. A draft of at least ten pages of the text of the essay, or a detailed outline of the entire essay, is due to the adviser by the last day of reading period. The student provides the adviser with a form that the adviser signs to notify the director of undergraduate studies that the first-term requirements for the senior essay have been met. Failure to meet these requirements results in loss of credit for RSEE 490. The senior essay takes the form of a substantial article, no longer than 13,000 words, excluding

footnotes and bibliography. Three copies of the essay are due in the Slavic departmental office by April 12, 2013. A member of the faculty other than the adviser grades the essay.

Study and travel Students should be aware of opportunities for study and travel in Russia and eastern Europe. The director of undergraduate studies can provide information on these programs and facilitate enrollment. Students who spend all or part of the academic year in the region participating in established academic programs usually receive Yale College credit, and are strongly encouraged to take advantage of study abroad opportunities during summers or through the Year or Term Abroad program. Students wishing to travel abroad as part of the major should consult the director of undergraduate studies by October 1.

M.A. program The European and Russian Studies program does not offer the simultaneous award of the B.A. and M.A. degrees. However, students in Yale College are eligible to complete the M.A. in European and Russian Studies (with concentration in Russia and eastern Europe) in one year of graduate work. Students interested in this option must complete eight graduate courses in the area by the time they complete the bachelor's degree. Only two courses may be counted toward both the graduate degree and the undergraduate major. Successful completion of graduate courses while still an undergraduate does not guarantee admission into the M.A. program. Students must submit the standard application for admission to the M.A. program.

REQUIREMENTS OF THE MAJOR

Prerequisite or corequisite Demonstrated proficiency in Russian or intermediate-level ability in an East European lang

Number of courses 13 term courses (incl senior essay and specified lang courses)

Distribution of courses 1 course in Russian or East European hist approved by DUS; at least 1 course in social sciences

Senior requirement Senior essay (RSEE 490, 491)

*RSEE 205a/ER&M 397a/PLSC 397a/SLAV 205a^c, **Language, Nationalism, and Ethnic Conflict in the Balkans** Robert Greenberg

For description see under Slavic Languages & Literatures.

RSEE 255b/LITR 206b/RUSS 255b, **Studies in the Novel: Tolstoy**

Vladimir Alexandrov

For description see under Slavic Languages & Literatures.

RSEE 256a/LITR 208a/RUSS 256a, **Studies in the Novel: Dostoevsky** Molly Brunson

For description see under Slavic Languages & Literatures.

*RSEE 300b/CZEC 301b/LITR 220b, **Milan Kundera: The Czech Novelist and French Thinker** Karen von Kunes

For description see under Slavic Languages & Literatures.

RSEE 390a/HIST 237a/HUMS 285a/RUSS 241a, **Russian Culture: The Modern Age**

John MacKay, Paul Bushkovitch

An interdisciplinary exploration of Russian cultural history, focusing on literature, art, religion, social and political thought, and film. Conceptions of Russian nationhood; the

myths of St. Petersburg; dissent and persecution; the role of social and cultural elites; the intelligentsia; attitudes toward the common people; conflicting appeals of rationality, spirituality, and idealism; the politicization of personal life; the impact of the Bolshevik Revolution and its aftermath. HU

***RSEE 490a and 491b, The Senior Essay** Molly Brunson

Preparation of the senior essay under faculty supervision. The essay grade becomes the grade for both terms of the course. Required of all seniors majoring in Russian and East European Studies. Cr/year only

RELATED COURSES THAT COUNT TOWARD THE MAJOR

Students are encouraged to examine the offerings in Slavic Languages and Literatures and other departments, as well as residential college seminars, for additional related courses that may count toward the major.

CZEC 110a, Elementary Czech I Karen von Kunes

For description see under Slavic Languages & Literatures.

CZEC 120b, Elementary Czech II Karen von Kunes

For description see under Slavic Languages & Literatures.

CZEC 130a, Intermediate Czech Karen von Kunes

For description see under Slavic Languages & Literatures.

CZEC 140b, Advanced Czech Karen von Kunes

For description see under Slavic Languages & Literatures.

***HIST 222Jb, Russia and the Eurasian Steppe** Paul Bushkovitch

HIST 261a/PLSC 176a, The Cold War John Gaddis

For description see under History.

HIST 263a, Eastern Europe to 1914 Timothy Snyder

HIST 264b, Eastern Europe since 1914 Timothy Snyder

PLSH 110a, Elementary Polish I Krystyna Illakowicz

For description see under Slavic Languages & Literatures.

PLSH 120b, Elementary Polish II Krystyna Illakowicz

For description see under Slavic Languages & Literatures.

PLSH 130a, Intermediate Polish I Krystyna Illakowicz

For description see under Slavic Languages & Literatures.

PLSH 140b, Intermediate Polish II Krystyna Illakowicz

For description see under Slavic Languages & Literatures.

Sanskrit

(See under South Asian Studies.)

Science

Yale College offers two yearlong interdepartmental course sequences for freshmen with strong preparation in the sciences, and a one-term seminar intended for a more general student population. SCIE 030 and 031, Current Topics in Science, is a freshman seminar designed for incoming students who have strong preparation in mathematics and science but who do not intend to major in the sciences. SCIE 198 and 199, Perspectives on Science and Engineering, is a lecture and discussion course that supplements the standard academic program of a selected group of freshmen who have unusually strong preparation in mathematics and science. It presents a broader range of topics than standard science courses and highlights the interdependence of the scientific disciplines. SCIE 141, Science and Pseudoscience, is a seminar designed for students who do not plan to major in the sciences. Although SCIE 141 is open to all classes, freshmen and sophomores are given preference in enrollment.

Students may apply to either SCIE 030 and 031 or SCIE 198 and 199 during the summer before their freshman year. Application information is available on the Web at yalecollege.yale.edu/content/freshman-seminar-program-2 (SCIE 030, 031) and yalecollege.yale.edu/content/perspectives-science-and-engineering-pse (SCIE 198, 199).

*SCIE 030a and 031b, Current Topics in Science Douglas Kankel

A series of modules in lecture and discussion format addressing scientific issues arising in current affairs. Topics are selected for their scientific interest and contemporary relevance, and may include global warming, human cloning, and the existence of extrasolar planets. One course credit is awarded for successful completion of the year's work. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SC Fr sem ½ Course cr per term Cr/year only

*SCIE 141b, Science and Pseudoscience Frank Robinson, Michael Faison

Study of the science behind hypotheses and theories that have been subjects of public debate, including evolution, global warming, cellular phone use and brain cancer, and the possibility of alien visits to Earth. Basic concepts from disciplines such as geology and geophysics, evolutionary and molecular biology, astronomy, and physics. Intended for non-science majors; preference to freshmen and sophomores. SC

*SCIE 198a and 199b, Perspectives on Science and Engineering William Segraves, C. Megan Urry

A series of lectures – one every other week – by science and engineering faculty guest lecturers. In alternate weeks, groups of students and faculty participants meet to discuss the lecture topics more fully. Students are expected to be enrolled in other science courses, usually with laboratory. One course credit is awarded for successful completion of the year's work. Enrollment limited to freshmen. ½ Course cr per term Cr/year only

Slavic Languages and Literatures

Director of undergraduate studies: Molly Brunson, 2699 HGS, 432-7023, molly.brunson@yale.edu; language coordinator: Irina Dolgova, 2704A HGS, 432-1307, irina.dolgova@yale.edu

FACULTY OF THE DEPARTMENT OF SLAVIC LANGUAGES AND LITERATURES

Professors Vladimir Alexandrov, Katerina Clark, Laura Engelstein, Harvey Goldblatt (*Chair*), Robert Greenberg (*Adjunct*), John MacKay

Assistant Professors Molly Brunson, Bella Grigoryan

Lecturer Hilary Fink

Senior Lectors II Irina Dolgova, Krystyna Illakowicz

Senior Lectors Rita Lipson, Constantine Muravnik, Julia Titus, Karen von Kunes

The major in Russian offered by the Department of Slavic Languages and Literatures acquaints students with Russian literature and culture, develops students' appreciation of literary values and skill in literary analysis, and gives them a basic competence in Russian. For an area major in Russian studies, see Russian and East European Studies, an interdisciplinary program administered by the Department of Slavic Languages and Literatures.

Students majoring in Russian may concentrate exclusively on Russian language and literature (Program I), or they may elect to study Russian literature in the context of comparative studies of literature (Program II). For Program II, credit is given for work done in other departments. Specific courses in each program must be arranged with the director of undergraduate studies. Students interested in specializing in Russian or Slavic linguistics may arrange a special concentration in linguistics with the director of undergraduate studies.

The major Prerequisite to the major in both programs is RUSS 151. The department offers two sequences of language courses to fulfill the prerequisite: either (1) RUSS 110, 120, 130, 140, 150, and 151 or (2) RUSS 125, 145, 150, and 151. Prospective majors should complete RUSS 140 or 145 by the end of their sophomore year or accelerate their course of study by taking summer courses or studying abroad. While completing the prerequisite, students are encouraged to begin fulfilling requirements of the major that do not presuppose advanced knowledge of Russian by taking courses in Russian history and Russian literature in translation.

In addition to the prerequisite, the major in Russian requires at least eleven term courses, which must include the following (some courses may fulfill more than one requirement):

1. Two terms of Russian literature in translation: RUSS 250 and 253.
2. Fourth-year Russian: RUSS 160 and 161.
3. Two terms of Russian literature read and discussed in the original language, typically selected from Group A courses numbered 170 or above.

4. At least two term courses in Russian literature of the nineteenth century and two in Russian literature of the twentieth century. Students should select courses from Group A and from the 250 series with this requirement in mind.
5. RUSS 490. The senior essay is the intellectual culmination of the student's work in the major. All primary sources used in the essay must be read in Russian.

In addition to the requirements above, each program requires the following:

Program I One term course in the history or culture of Russia, selected in consultation with the director of undergraduate studies; three additional term courses in the Department of Slavic Languages and Literatures above RUSS 151. These may include literature courses taught either in translation or in the original, advanced language training courses, or graduate courses.

Program II Four term courses outside the Department of Slavic Languages and Literatures that are relevant to the major in the context of comparative studies of literature, selected in consultation with the director of undergraduate studies.

Study abroad Students majoring in Russian are strongly encouraged to spend a summer or a term studying in the Russian Federation under the auspices of programs approved by the director of undergraduate studies. Language courses taken during the summer or during a term in Russia in approved programs may substitute for certain advanced Russian courses at Yale. Students interested in study abroad should consult the director of undergraduate studies well before their junior year.

Senior requirement All majors write a senior essay (RUSS 490), an independent project carried out under the guidance of a faculty member. Three copies of the essay are due in the Slavic departmental office on April 12, 2013.

Placement examination A departmental placement examination will be given before the first day of classes in the fall term; see cls.yale.edu/placement-testing for the time and location. Students who have studied Russian elsewhere must take the placement examination before enrolling in any Russian language course at Yale. For further information consult Irina Dolgova, language coordinator, 432-1307.

REQUIREMENTS OF THE MAJOR

Prerequisite RUSS 151

Number of courses 11 term courses beyond prereq (incl senior essay)

Distribution of courses *Both programs*—2 terms of 19th-century Russian lit; 2 terms of 20th-century Russian lit; 2 courses from Group A numbered 170 or above; *Program I*—1 course in hist or culture of Russia; 3 addtl courses in dept of Slavic Langs and Lits above level of RUSS 151; *Program II*—4 courses relevant to major in other depts, with DUS approval

Specific courses required *Both programs*—RUSS 160, 161, 250, 253

Senior requirement Senior essay (RUSS 490)

GROUP A COURSES

Unless otherwise noted, all Group A courses are conducted in Russian.

RUSS 110a, First-Year Russian I Julia Titus

A video-based course designed to develop all four language skills: reading, writing, speaking, and listening comprehension. Use of dialogues, games, and role playing. In addition to readings in the textbook, students read original short stories and learn Russian songs and poems. Oral and written examinations. Credit only on completion of RUSS 120. L1 RP 1½ Course cr

RUSS 120b, First-Year Russian II Julia Titus

Continuation of RUSS 110. After RUSS 110 or equivalent. L2 RP 1½ Course cr

RUSS 122a, Russian for Bilingual Students I Julia Titus

A comprehensive Russian course for native speakers of Russian or other Slavic languages whose formal education has been in English. Overview of Russian grammar, focusing on the writing system, cases, conjunction, and syntax. Readings from Russian prose, film screenings, discussion, and regular practice in translation and composition. L1–L2

RUSS 125a, Intensive Elementary Russian Constantine Muravnik

An intensive course that covers in one term the material taught in RUSS 110 and 120. For students of superior linguistic ability. Study of Russian grammar; practice in conversation, reading, and composition. Recommended for prospective majors in Russian and in Russian and East European Studies. L1–L2 RP 2 Course cr

RUSS 130a, Second-Year Russian I Irina Dolgova

A course to improve functional competence in all four language skills (speaking, writing, reading, and listening). Audio activities, for use both in the classroom and independently, are designed to help students improve their listening comprehension skills and pronunciation. Lexical and grammatical materials are thematically based. After RUSS 120 or equivalent. L3 RP 1½ Course cr

RUSS 140b, Second-Year Russian II Irina Dolgova

Continuation of RUSS 130. After RUSS 130 or equivalent. L4 RP 1½ Course cr

***RUSS 142b, Russian for Bilingual Students II** Julia Titus

Continuation of RUSS 122. Further development of reading and writing skills. Expansion of vocabulary. After RUSS 122 or equivalent. L3–L4

RUSS 145b, Intensive Intermediate Russian Constantine Muravnik

A continuation of RUSS 125 that covers in one term the material taught in RUSS 130 and 140. For students of superior linguistic ability. Prerequisite: RUSS 125. L3–L4 RP 2 Course cr

RUSS 150a, Third-Year Russian I Constantine Muravnik

Intensive practice in conversation and composition accompanied by review and refinement of grammar. Readings from nineteenth- and twentieth-century literature, selected readings in Russian history and current events, and videotapes and films are used as the basis of structured conversation, composition, and grammatical exercises. Oral and written examinations. Audiovisual work in the Center for Language Study required. After RUSS 140 or 145 or equivalent. L5 RP 1½ Course cr

RUSS 151b, Third-Year Russian II Constantine Muravnik

Continuation of RUSS 150. After RUSS 150 or equivalent. L5 RP 1½ Course cr

***RUSS 155a, The Language of the Russian Revolution** Constantine Muravnik

The political and social landscape of the 1917 Russian Revolution explored through the shifting ambiguities of political slogans. Readings from the memoirs of the revolution's main figures represent the entire political spectrum from right to left. Prerequisite: RUSS 140 or equivalent. L5 RP

RUSS 160a, Fourth-Year Russian I Irina Dolgova

Discussion topics include Russian culture, literature, and self-identity; the old and new capitals of Russia, the cultural impact of the Russian Orthodox Church, and Russia at war. Readings from mass media, textbooks, and classic and modern literature. Use of video materials. After RUSS 151 or equivalent. L5

RUSS 161b, Fourth-Year Russian II Irina Dolgova

Continuation of RUSS 160. After RUSS 160 or equivalent. L5

***RUSS 185b^G, Advanced Russian Conversation and Composition** Rita Lipson

Development of advanced language skills in composition, comprehension, and conversation. Includes grammar review and discussion of Russian stylistics. Readings from a range of contemporary media and Internet sources. Prerequisite: RUSS 151 or equivalent. L5

GROUP B COURSES

The courses in this group, conducted in English, are open to all Yale College students.

***RUSS 022a, The Divine and the Human in Russian Fiction** Vladimir Alexandrov

A study of major works by several of the greatest writers in nineteenth- and twentieth-century Russian literature: Dostoevsky, Tolstoy, Bely, Nabokov, and Bulgakov. Primary attention to the ways the authors embody in their themes, devices, and forms the link between the human realm and the transcendent, a central preoccupation of Russian culture. Readings and discussion in English. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. WR, HU Fr sem Tr

***SLAV 202a, Old Church Slavic** Harvey Goldblatt

A study of Old Church Slavic and its place in the history of Church Slavic. The main features and the grammar of Old Church Slavic. The Glagolitic and Cyrillic writing systems. Close readings from Old Church Slavic literary monuments. Old Church Slavic in relation to modern Slavic languages (especially Russian). Prerequisite: elementary knowledge of a Slavic language. Conducted in English. RP

***SLAV 205a^G/ER&M 397a/PLSC 397a/RSEE 205a, Language, Nationalism, and Ethnic Conflict in the Balkans** Robert Greenberg

The role of linguistic controversies in the polarization of ethnic relations within the former Yugoslavia. Language and nationalism; the integration and disintegration of Yugoslavia; and the Balkans in the context of other charged ethnolinguistic controversies, from the United States to India. SO

***RUSS 219b/HUMS 265b, The Russian Festive Table in Literature, Film, and Art**

Rita Lipson

The Russian custom of the food feast (*zastol'e*) explored as a social and cultural institution. Issues of ritual, communication, and identity. Uniquely Russian modes of celebration, bonding, and interpersonal enjoyment as reflected in literature, film, and visual art. Sharing of biweekly meals prepared in the traditional Russian style. Readings and discussion in English. May not be taken after RUSS <191>. HU Tr

RUSS 220b/HSAR 221b/HUMS 220b, Russian and Soviet Art, 1757 to the Present

Molly Brunson

The history of Russian and Soviet art from the foundation of the Academy of the Arts in 1757 to the present. Nineteenth-century academicism, romanticism, and realism; the Russian avant-garde and early Soviet experimentation; socialist realism and late- and post-Soviet culture. Readings and discussion in English. HU Tr

RUSS 241a/HIST 237a/HUMS 285a/RSEE 390a, Russian Culture: The Modern Age

John MacKay, Paul Bushkovitch

For description see under Russian & East European Studies.

***RUSS 250b/HUMS 276b, Masterpieces of Russian Literature I** Hilary Fink

Introduction to major texts of the nineteenth-century Russian literary tradition. Works by Pushkin, Gogol, Lermontov, Turgenev, Dostoevsky, Tolstoy, and Chekhov examined in their social and historical contexts. Emphasis on the authors' use of genre, language, and literary devices to explore pressing questions posed by Russian modernity. Readings and discussion in English. HU Tr

[RUSS 253b/HUMS 203b, Masterpieces of Russian Literature II]**RUSS 255b/LITR 206b/RSEE 255b, Studies in the Novel: Tolstoy**

Vladimir Alexandrov

A survey of Leo Tolstoy's legacy. Readings include early stories, *War and Peace* and *Anna Karenina*, and short later works. Close textual analysis, with primary attention to the interrelation of theme, form, and literary and cultural contexts. Readings and discussion in English. HU Tr

RUSS 256a/LITR 208a/RSEE 256a, Studies in the Novel: Dostoevsky Molly Brunson

The literary and intellectual legacy of Fyodor Dostoevsky. Focus on *Crime and Punishment* and *The Brothers Karamazov*; consideration of several short stories and novellas. Special attention to Dostoevsky's concept of modernity. Close textual analysis is accompanied by discussion of the historical, biographical, literary, and philosophical contexts of Dostoevsky's novels. Readings and discussion in English. HU Tr

***RUSS 307b^C, Introduction to Medieval and Premodern Russian Civilization**

Harvey Goldblatt

Russian literary culture from the medieval period through the eighteenth century. The development of various literary types and writing techniques; diverse historiographic approaches and methodological perspectives; traditional and innovative theories of literary expression; connections between writing activity and ideological trends. Prerequisite: reading knowledge of Russian. HU RP

***RUSS 311b^G/FILM 409b^G/LITR 311b^G, Montage, Collage, and Politics** John MacKay
For description see under Film Studies.

***RUSS 325a/GMST 319a/LITR 210a, Modernist Berlin, Petersburg, and Moscow**
Katerina Clark, Roman Utkin

A comparative exploration of Soviet Russian, Weimar German, and Russian émigré modes of modernism as produced in three major European cities between 1917 and 1933. Geographical and subjective space, urban modernity, childhood, fashion, gender, ethnicity, power, and avant-garde experimentation in literature, film, photography, architecture, and music. Readings and discussion in English. HU Tr

GROUP C COURSES

***RUSS 480a and 481b, Directed Reading in Russian Literature** Molly Brunson
Individual study under the supervision of a faculty member selected by the student. Applicants must submit a prospectus approved by the adviser to the director of undergraduate studies by the end of the first week of classes in the term in which the course is taken. The student meets with the adviser at least one hour each week, and takes a final examination or writes a term paper. No credit granted without prior approval of the director of undergraduate studies.

***SLAV 485a or b, Directed Reading or Individual Research in Slavic Languages and Literatures** Molly Brunson
Individual study under the supervision of a faculty member selected by the student. Applicants must submit a prospectus approved by the adviser to the director of undergraduate studies by the end of the first week of classes in the term in which the course is taken. The student meets with the adviser at least one hour each week, and takes a final examination or writes a term paper. No credit granted without prior approval of the director of undergraduate studies.

***RUSS 490a or b, The Senior Essay** Molly Brunson
Research and writing on a topic of the student's own devising. Regular meetings with an adviser as the work progresses from prospectus to final form.

CZEC 110a, Elementary Czech I Karen von Kunes
A comprehensive introduction to Czech for students with no previous knowledge of the language. Essentials of grammar, with emphasis on oral proficiency, reading, writing, and listening comprehension. Newspaper articles, annotated excerpts from Čapek's *R.U.R.*, Hašek's *Švejk*, Kundera's *Joke* and *Unbearable Lightness of Being*, and Havel's *Private View*. Audio- and videotapes. Credit only on completion of CZEC 120. L1 RP 1½ Course cr

CZEC 120b, Elementary Czech II Karen von Kunes
Continuation of CZEC 110. After CZEC 110 or equivalent. L2 RP 1½ Course cr

CZEC 130a, Intermediate Czech Karen von Kunes
Continuation of CZEC 120. Grammar and usage, with emphasis on idiomatic expressions, syntax, and stylistics. Readings in modern Czech history, prose, and poetry; discussion of economic, political, and social issues. After CZEC 120 or equivalent. L3 RP 1½ Course cr

CZEC 140b, Advanced Czech Karen von Kunes

Continuation of CZEC 130. Emphasis on writing skills and spoken literary Czech. After CZEC 130 or equivalent. L4 RP 1½ Course cr

***CZEC 301b/LITR 220b/RSEE 300b, Milan Kundera: The Czech Novelist and French Thinker** Karen von Kunes

Close reading of Kundera's novels, with analysis of his aesthetics and artistic development. Relationships to French, German, and Spanish literatures and to history, philosophy, music, and art. Topics include paradoxes of public and private life, the irrational in erotic behavior, the duality of body and soul, the interplay of imagination and reality, the function of literary metaphor, and the art of composition. Readings and discussion in English. HU Tr

PLSH 110a, Elementary Polish I Krystyna Illakowicz

A comprehensive introduction to elementary Polish grammar and conversation, with emphasis on spontaneous oral expression. Reading of original texts, including poetry. Use of video materials. Credit only on completion of PLSH 120. L1 RP 1½ Course cr

PLSH 120b, Elementary Polish II Krystyna Illakowicz

Continuation of PLSH 110. After PLSH 110 or equivalent. L2 RP 1½ Course cr

PLSH 130a, Intermediate Polish I Krystyna Illakowicz

A reading and conversation course conducted in Polish. Systematic review of grammar; practice in speaking and composition; reading of selected texts, including poetry. Use of video materials. After PLSH 120 or equivalent. L3 RP 1½ Course cr

PLSH 140b, Intermediate Polish II Krystyna Illakowicz

Continuation of PLSH 130. After PLSH 130 or equivalent. L4 RP 1½ Course cr

***PLSH 246b/FILM 241b, Polish Communism and Postcommunism in Film**

Krystyna Illakowicz

The Polish film school of the 1950s and the Polish New Wave of the 1960s. Pressures of politics, ideology, and censorship on cinema. Topics include gender roles in historical and contemporary narratives, identity, ethos of struggle, ethical dilemmas, and issues of power, status, and idealism. Films by Wajda, Munk, Polanski, Skolimowski, Kieslowski, Holland, and Kedzierzawska, as well as selected documentaries. Readings by Milosz, Andrzejewski, Mickiewicz, Maslowska, Haltoff, and others. Readings and discussion in English. HU

GRADUATE COURSES

Courses in the Graduate School are open to qualified undergraduates with permission of the instructor and of the director of graduate studies. Course descriptions are available at the office of the director of undergraduate studies.

Sociology

Director of undergraduate studies: Philip Smith, 493 College St., 436-3773,
 philip.smith@yale.edu; www.yale.edu/sociology

FACULTY OF THE DEPARTMENT OF SOCIOLOGY

Professors Julia Adams, Jeffrey Alexander, Elijah Anderson, †James Baron, Scott Boorman, Richard Breen, Hannah Brueckner, †Paul Cleary, Deborah Davis, Ron Eyerman, Philip Gorski, †Vicki Schultz, Philip Smith, †Olav Sorensen

Associate Professors Andrew Papachristos, Peter Stamatov

Assistant Professors Rene Almeling, Emily Erikson, Marcus Hunter, †Sigrun Kahl, Vida Maralani, Christopher Wildeman, Jonathan Wyrzten

Lecturers Jasmina Beširević-Regan, Sadia Saeed

†A joint appointment with primary affiliation in another department or school.

Sociology provides the theoretical and empirical foundation for understanding how societies function and how they change over time. Sociologists are interested in the causes and consequences of processes such as the social construction of groups and identity, the evolution of culture, intersubjective meanings, intergroup relations, and hierarchies and social norms. They conduct research on individual behavior and outcomes such as educational attainment, jobs and careers, religious commitment, and political involvement; interpersonal processes such as intimate relationships, sexuality, social interaction in groups, and social networks; the behaviors of organizations and institutions; the causes and consequences of group differences and social inequality; and social change at the societal and global level.

The Sociology major provides both a solid foundation for students interested in careers in the social sciences and a strong background for a variety of professions in which knowledge about social processes and how societies work is relevant. Many recent graduates have gone on to law school, medical school, or graduate programs in public health, business, education, urban planning, criminology, or sociology. Others work in finance, consulting, publishing, marketing, city planning, teaching, research, and advocacy.

The Sociology department offers two undergraduate programs leading to the B.A. degree. The standard program focuses on sociological concepts, theories, and methods. The combined program provides students with the option to combine sociology with a concentration in another field. For example, students interested in business careers can combine sociology with economics. Students interested in the major are encouraged to contact the director of undergraduate studies early in their academic careers to discuss potential options.

Admission to the major Students interested in the Sociology major should complete either a freshman seminar or at least one introductory course (numbered 110–149) by the end of the sophomore year. This course may be applied toward the requirements of the major. The director of undergraduate studies can waive the introductory course requirement for

students who demonstrate adequate preparation for advanced course work in sociology. All students interested in the Sociology major should meet with the director of undergraduate studies no later than the beginning of the junior year to elect a program of study.

Division of courses Courses in Sociology are divided by level, with introductory courses numbered from 110 to 149, courses in sociological theory from 150 to 159, courses in sociological methods from 160 to 169, intermediate courses from 150 to 299, advanced courses in the 300s, and individual study and research courses in the 400s. Freshman seminars are numbered below 100 and count as introductory or intermediate courses. In addition, qualified students may elect to enroll in graduate courses, with permission of the instructor and of the director of graduate studies. A list of graduate courses and descriptions is available from the director of undergraduate studies.

PROGRAM I. THE STANDARD PROGRAM

The requirements for the standard program are:

1. Thirteen term courses in sociology (including the senior colloquium), of which normally no more than two may be drawn from outside the Sociology department. At least one must be an introductory Sociology course or a substitute approved by the director of undergraduate studies, but no more than two introductory courses may count toward this total. A maximum of two courses taken Credit/D/Fail may count toward the requirements of the major.
2. Two courses in sociological theory and two in sociological methods, normally completed by the end of the junior year. SOCY 151, Foundations of Modern Social Theory, and 152, Topics in Contemporary Social Theory, are the required courses for theory. SOCY 160, Methods of Inquiry, and one additional Sociology course numbered between 161 and 169 are required for methods. Students planning to study abroad in their junior year are strongly encouraged to begin meeting the theory and methods requirements in their sophomore year. They should also discuss the options for their course of study with the director of undergraduate studies before finalizing their plans.
3. One advanced seminar in Sociology (SOCY 300–399).
4. For students in the intensive major, a two-term senior essay and colloquium, SOCY 493, 494. This yearlong biweekly colloquium provides students in the intensive major with an opportunity to share their research experiences. Students in the nonintensive major take one additional 300-level seminar in Sociology and write a one-term senior essay in SOCY 491.

PROGRAM II. SOCIOLOGY WITH ANOTHER SUBJECT

The combined program allows students to unite the study of sociology with the study of another discipline or substantive area. The requirements are:

1. Thirteen term courses (including the senior colloquium), of which at least nine and no more than ten are selected from Sociology, the remainder being chosen from another department or program. At least one must be an introductory Sociology course or a substitute approved by the director of undergraduate studies, but no more than two

introductory courses in any department or program may count toward this total. The courses outside Sociology must constitute a coherent unit alone and form a logical whole when combined with the Sociology courses. A maximum of two courses taken Credit/D/Fail may count toward the requirements of the major.

2. Two courses in sociological theory and two in sociological methods, normally completed by the end of the junior year. SOCY 151, Foundations of Modern Social Theory, and 152, Topics in Contemporary Social Theory, are the required courses for theory. SOCY 160, Methods of Inquiry, and one additional Sociology course numbered between 161 and 169 are required for methods. Students planning to study abroad in their junior year are strongly encouraged to begin meeting the theory and methods requirements in their sophomore year. They should also discuss the options for their course of study with the director of undergraduate studies before finalizing their plans.
3. One advanced seminar in Sociology (SOCY 300–399).
4. A one- or two-term senior essay in which the student integrates sociology and the other subject chosen. Students in the intensive major write a two-term senior essay and attend a yearlong biweekly colloquium (SOCY 493, 494). The colloquium provides students with an opportunity to share their research experiences. Students in the nonintensive major take one additional 300-level seminar in Sociology and write a one-term senior essay in SOCY 491.

The combined program allows students to design a program to satisfy their own substantive interests and future career plans. By the beginning of the junior year, participants in the combined program are expected to consult with the director of undergraduate studies in order to obtain approval for their course of study.

Senior requirement for the nonintensive major Students electing the nonintensive major take one additional seminar in Sociology (SOCY 300–399) and write a one-credit senior essay during the senior year (SOCY 491). The senior essay for nonintensive majors is intended to be an in-depth scholarly review and critical analysis based on secondary sources. Students select a controversial topic in any sociological field and write a literature review that evaluates what is known about the topic. All nonintensive majors are required to enroll in SOCY 491 to receive credit for the senior essay. To register for this course, students must submit a written plan of study approved by a faculty adviser to the director of undergraduate studies no later than the end of registration period in the term in which the senior essay is to be written. Nonintensive majors are not eligible to graduate with Distinction in the Major.

Senior requirement for the intensive major The intensive major gives students an opportunity to undertake a yearlong program of original research resulting in a contribution to sociological knowledge. The yearlong project requires substantial independent research and knowledge of a sociological subfield. Students use research methods such as data gathering through participant observation, in-depth interviewing, conducting of small-scale surveys, or secondary analysis of existing data. They may present findings in a variety of forms, from ethnographic narratives to analytical statistics. Students select primary and secondary advisers from the faculty. Students in the intensive major enroll in SOCY 493, 494, Senior Essay and Colloquium for Intensive Majors, during their senior year. The colloquium provides a forum for discussing the research process and for presenting students'

research at various stages. Intensive majors are eligible to graduate with Distinction in the Major if they meet the grade standards for Distinction (see chapter I) and submit a senior essay written in SOCY 493, 494.

Admission to the intensive major Students should apply to the director of undergraduate studies by the last day of classes in the spring term of their junior year. In special circumstances, applications may be accepted through the end of registration period in the first term of the senior year. Applications should include a one-page statement of interest that includes a list of relevant courses taken and identifies a prospective senior essay adviser. Admission is based on performance and promise. The director of undergraduate studies and the senior essay adviser serve as advisers to candidates for the intensive major.

REQUIREMENTS OF THE MAJOR

Prerequisite 1 freshman sem or intro course (SOCY 110–149) or equivalent

Number of courses 13 term courses (incl prereq and senior essay)

Specific courses required SOCY 151, 152, 160, 1 addtl Sociology course numbered 161–169

Distribution of courses *Program I*—at least 11 term courses in Sociology at intermediate and advanced levels, 1 Sociology sem at 300 level; *Program II*—9 or 10 term courses in Sociology; at least 1 Sociology sem at 300 level; no more than 2 intro courses in any dept or program

Senior requirement *Nonintensive major*—1 addtl 300-level Sociology sem and senior essay (SOCY 491); *Intensive major*—senior essay (SOCY 493, 494)

FRESHMAN SEMINAR

***SOCY 041a, Sociology of Social Control and Criminal Justice** Philip Smith
Social control in everyday life and in the criminal justice system. Routine control through building design, interpersonal behavior, policing, courts, the law, and prisons; costs and benefits of contemporary solutions to crime; the rise of modernity; the role of power and culture in solving the universal problem of social order. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. SO Fr sem

INTRODUCTORY COURSES

***SOCY 121b, The Sociological Imagination** Julia Adams
Introduction to the study of modernity and sociology. Topics include the dramatic rise of capitalism and colonialism, new forms of social inequality, the advent of democracy and bureaucracy, and the contested role of religion in modernity. Readings from contemporary writings on postmodern social life that are informed by, and react against, the classical sociological tradition. Preference to freshmen and sophomores. SO

SOCY 133a, Computers, Networks, and Society Scott Boorman
Comparison of major algorithm-centered approaches to the analysis of complex social network and organizational data. Fundamental principles for developing a disciplined and coherent perspective on the effects of modern information technology on societies worldwide. Software warfare and algorithm sabotage; blockmodeling and privacy; legal, ethical, and policy issues. No prior experience with computers required. SO RP

SOCY 134a/ER&M 264a/WGSS 110a, Sex and Gender in Society Rene Almeling

Introduction to the social processes through which people are categorized in terms of sex and gender, and how these social processes shape individual experiences of the world. Sex and gender in relation to race/ethnicity, class, sexuality, nationality, education, work, family, reproduction, and health. SO

SOCY 147b, Introduction to Social Policy Analysis Scott Boorman

The capabilities and limitations of four fundamental tools of policy: markets, networks, bureaucracy, and legislation. Examples from the policy history of the United States since the 1930s and from formal models of social structure and process. SO

SOCY 149a/ARCH 385a/HIST 152a/PLSC 279a, New Haven and the American City

Alan Plattus, Elihu Rubin

For description see under Political Science.

COURSES IN SOCIOLOGICAL THEORY

Open to all students without prerequisite.

SOCY 151a/HUMS 302a/PLSC 290a, Foundations of Modern Social Theory

Sadia Saeed, Emily Erikson

Major works of social thought from the beginning of the modern era through the 1920s. Attention to social and intellectual contexts, conceptual frameworks and methods, and contributions to contemporary social analysis. Writers include Hobbes, Locke, Rousseau, Kant, Adam Smith, Marx, Freud, Peirce, Weber, and Durkheim. SO

***SOCY 152b, Topics in Contemporary Social Theory** Ron Eyerman

An examination of central issues in contemporary social theory. Influential thinkers and their responses to changes in the modern world since the Second World War. Topics include the nature of modern society and the human condition, the selection of rulers, power, punishment, torture, national trauma, and individual and collective identity. SO

COURSES IN SOCIOLOGICAL METHODS

***SOCY 160a, Methods of Inquiry** Julia Adams and staff

The theory and practice of social inquiry. How social scientists—and aspiring social scientists—actually do their work, including designing research, sampling and measuring, and interpreting results. Examination of thesis proposal writing; ethical quandaries involved in social research. No background in social research assumed. SO

***SOCY 167b, Social Networks and Society** Emily Erikson and staff

Introduction to the theory and practice of social network analysis. The role of social networks in contemporary society; basic properties of network measures, matrices, and statistics. Theoretical concepts such as centrality and power, cohesion and community, structural holes, duality of persons and groups, small worlds, and diffusion and contagion. Use of social structural, dynamic, and statistical approaches, as well as network analysis software. No background in statistics required. SO

INTERMEDIATE COURSES

The prerequisite for intermediate courses is one introductory Sociology course or permission of the instructor.

SOCY 183a/ER&M 283a, Urban America Marcus Hunter

Introduction to urban sociology and to the study of American urban society over the past half century. Emphasis on the economic, political, and cultural dimensions of urban growth and inequality; processes of class, racial, and ethnic group formation; urban social problems and policy; and local community organization and politics. SO

SOCY 188b/PLSC 415b, Religion and Politics Sigrun Kahl

For description see under Political Science.

SOCY 202a^c/HUMS 335a, Cultural Sociology Jeffrey Alexander

Collective meanings that make a profound difference in modern societies; that are symbolic but also sensual, emotional, and moral; that inspire ritual as well as creative performance and strategy. Examination of codes, narratives, icons, and metaphors to analyze how cultural structures energize capitalism, direct politics, create institutions, inspire social movements, and motivate war and peace. SO

***SOCY 216a/EP&E 267a/WGSS 314a, Social Movements** Ron Eyerman

An introduction to sociological perspectives on social movements and collective action, exploring civil rights, student movements, global justice, nationalism, and radical fundamentalism. SO

***SOCY 228a, Norms and Deviance** Elijah Anderson

A sociological analysis of the origins, development, and reactions surrounding deviance in contemporary society. Group labeling, stigma, power, and competing notions of propriety. SO

***SOCY 233a, Political Sociology** Sadia Saeed

An overview of perspectives, issues, and arguments in political sociology. The nature of power and the state, the rise of the modern state, and democracy, authoritarianism, and revolutions. Additional topics include social movements, citizenship, nationalism, gender, and globalization. Classical and contemporary readings. SO

***SOCY 253b, Ethnography of Everyday Political Life** Matthew Mahler

Introduction to ethnographic research for examining the sociological underpinnings that shape, structure, and inform everyday political life in the United States. Empirical realities of organized political life are approached through close analysis of political memoirs and biographies. Various sociological theories are introduced, including interactionism, dramaturgy, cultural sociology, phenomenology, and practice theory. SO

ADVANCED COURSES

Courses in this category are open to students who have completed one intermediate course and any other specified requirement, or by permission of the instructor. Preference is given to Sociology majors in their junior and senior years.

***SOCY 309a^G/EP&E 266a, Religious Nationalism** Philip Gorski

Religious nationalism past and present, East and West; the normative issues the phenomenon raises. Religious roots of Western nationalism; nationalistic propensities of different religious traditions; conditions under which religious nationalism turns violent; and whether religion, nationalism, pluralism, and democracy are compatible. SO

***SOCY 310b/EAST 410b, Urban Development in China** Xiangming Chen

Diverse models of urban development in China during the past thirty years, from global and Asian perspectives. Prerequisite: a course on China after 1949 or extended residence in the People's Republic of China. SO

***SOCY 311a^G/WGSS 301a, Gender, Race, and Genetic Testing** Rene Almeling

Overview of sociological approaches to genetics, including gene/environment interactions and the history of genetic medicine. A focus on genetic testing in Huntington's disease, pregnancy, cancer, and psychological disorders to explore how genetic information is provided to patients, and how patients experience genetic risk. Discussion of commercial firms offering direct-to-consumer genetic testing. SO

***SOCY 312b/WGSS 345b, Identity and Inequality in Urban America** Marcus Hunter

Contemporary and historical manifestations of American cities; focus on ways in which inequality and identity shape urban landscapes, demographics, and lifestyles. The influence of race and class on politics, planning, housing, employment, community organization, and life opportunities. SO

***SOCY 313b^G, Sociology of the Arts and Popular Culture** Ron Eyerman

An advanced introduction to sociological perspectives on the arts and popular culture. Emphasis on the conceptualization of culture within social theory, with the aim of interpreting cultural expressions and artifacts: artworks, music, television, film, and literature. SO

***SOCY 319b/ER&M 419b, Ethnography of the African American Community**

Elijah Anderson

An ethnographic study of the African American community. Analysis of ethnographic and historical literature, with attention to substantive, conceptual, and methodological issues. Topics include the significance of slavery, the racial ghetto, structural poverty, the middle class, the color line, racial etiquette, and social identity. SO

***SOCY 339b^G/GLBL 362b/MMES 282b, Imperialism, Insurgency, and State Building in the Middle East** Jonathan Wyrzten

The historical evolution of political order from Morocco to Central Asia in the past two centuries. Focus on relationships between imperialism, insurgency, and state building. Ottoman, European, and nationalist strategies for state building; modes of local resistance; recent transnational developments; American counterinsurgency and nation-building initiatives in the region. SO

***SOCY 343b^G/EP&E 273b/MMES 343b/RLST 291b^G, Sociology of Islam**

Jonathan Wyrzten, Jeffrey Guhin

Social scientific studies of Islam; introduction to sociology of religion and its application to Islam; the utility of "Islam" and "Muslim" as analytical categories; debates about definitions of Islam and religion in anthropology and religious studies; comparative sociological studies both within Islam and contrasting Islam with other religions. SO

***SOCY 351a/MMES 482a/PLSC 413a, The Arab Spring of 2011** Rabab El Mahdi

For description see under Modern Middle East Studies.

***SOCY 356a/HIST 356Ja, History, Sociology, and Grand Narratives** Gagan Sood

Historical and sociological study of large analytical frameworks that help people in the present make sense of the past. Focus on grand narratives that have enabled and constrained research on major aspects of the world since the fifteenth century. Influential debates of recent decades, including differences over methods and concepts. SO

***SOCY 357a, Neighborhoods and Crime** Andrew Papachristos

The “city problem” of crime contrasted in a variety of neighborhoods; reasons why some neighborhoods have higher rates of crime than others. Topics include street gangs, the underground economy, immigration, and mass incarceration. Attention to ecological, social structural, and cultural aspects of city life. SO

***SOCY 361b, Demography, Gender, and Health** Vida Maralani and staff

Comparative survey of research in demography. The interplay of population processes and socioeconomic development; trends in fertility, mortality, aging, and health in both richer and poorer nations; the relationship between women’s status and health and demographic outcomes. Readings from a variety of fields, including demography/sociology, economics, epidemiology, and public health. SO

***SOCY 363a/ER&M 362a/GLBL 384a, Genocide and Ethnic Conflict**

Jasmina Beširević-Regan

Exploration of the explosion of genocide and violent ethnic conflict in the past seventy years, including contributory historical and political elements. Consideration of ways to prevent or resolve such conflicts. Focus on questions of identity, religion, class, and nationhood as related to violence and conflict. An analytical framework developed from four case studies: the Holocaust, Cambodia, the former Yugoslavia, and Rwanda. SO

***SOCY 369b/EP&E 258b/PLSC 446b, Welfare States across Nations** Sigrun Kahl

For description see under Political Science.

***SOCY 370b, Embodied Sociology** Matthew Mahler

Investigation of how sociology might be different if it were to take seriously the basic fact of our embodied existence. Attention to the growing literature from across the cognitive sciences, social sciences, and humanities on the body’s role in shaping perception, cognition, and behavior. SO

***SOCY 387b/MMES 380b, Law in Muslim Societies** Sadia Saeed

The theory, history, and practice of Islamic law. Its textual foundations in doctrine, evolution over time, and cross-national forms. The relationship of Islamic law to social and cultural forces, including connections between law and social change. Issues of gender, free speech, secularism, and terrorism. SO

INDIVIDUAL STUDY AND RESEARCH COURSES

***SOCY 471a and 472b, Individual Study** Philip Smith

Individual study for qualified juniors and seniors under faculty supervision. To register for this course, each student must submit to the director of undergraduate studies a written plan of study that has been approved by a faculty adviser.

***SOCY 491a or b, Senior Essay and Colloquium for Nonintensive Majors**

Rene Almeling

Independent library-based research under faculty supervision. To register for this course, students must submit a written plan of study approved by a faculty adviser to the director of undergraduate studies no later than the end of registration period in the term in which the senior essay is to be written. The course meets biweekly, beginning in the first week of the term.

***SOCY 493a and 494b, Senior Essay and Colloquium for Intensive Majors**

Philip Smith

Independent research under faculty direction, involving empirical research and resulting in a substantial paper. Workshop meets biweekly to discuss various stages of the research process and to share experiences in gathering and analyzing data. The first meeting is in the second week of the term.

South Asian Studies

Director of undergraduate studies: Sara Shneiderman, Rm. 126, 10 Sachem St., 436-4270, sara.shneiderman@yale.edu; www.yale.edu/macmillan/southasia

FACULTY ASSOCIATED WITH THE PROGRAM OF SOUTH ASIAN STUDIES

Professors Akhil Amar (*Law School*), Tim Barringer (*History of Art*), Vasudha Dalmia (*Religious Studies*), Nihal de Lanerolle (*School of Medicine*), Michael Dove (*Forestry & Environmental Studies, Anthropology*), Sara Suleri Goodyear (*English*), Phyllis Granoff (*Religious Studies*), Inderpal Grewal (*Women's, Gender, & Sexuality Studies*), Kalyanakrishnan Sivaramakrishnan (*Anthropology*), Shyam Sunder (*School of Management*), Steven Wilkinson (*Political Science*)

Associate Professors Karuna Mantena (*Political Science*), Sarah Weiss (*Music*)

Assistant Professors Ashwini Deo (*Linguistics*), Mayur Desai (*Public Health*), Zareena Grewal (*Ethnicity, Race, & Migration*), Shital Pravinchandra (*English*), Andrew Quintman (*Religious Studies*), Kishwar Rizvi (*History of Art*), Tamara Sears (*History of Art*), Sara Shneiderman (*Anthropology*), Tariq Thachil (*Political Science*), Mark Turin (*Adjunct*)

Senior Lecturers Carol Carpenter (*Forestry & Environmental Studies, Anthropology*), Geetanjali Singh Chanda (*Women's, Gender, & Sexuality Studies*), Koichi Shinohara (*Religious Studies*)

Lecturers Harry Blair (*Political Science*), Hugh Flick, Jr. (*Religious Studies*), Elizabeth Hanson (*Political Science*), Sana Haroon, Juned Shaikh

Senior Lector Seema Khurana

Lectors David Brick, Swapna Sharma, Blake Wentworth

The program in South Asian Studies combines the requirements of a discipline-based first major with significant course work in South Asian studies. South Asian Studies can be taken only as a second major. The major is intended to provide students with a broad

understanding of the history, culture, and languages of South Asia, as well as the region's current social, political, and economic conditions. Work in a discipline-based major coupled with a focus on South Asia prepares students for graduate study, employment in nongovernmental organizations, or business and professional careers in which an understanding of the region is essential.

The South Asian Studies major permits students to choose courses from a wide range of disciplines. Individual programs should have a balance between courses in the humanities and those in the social sciences. The proposed course of study must be approved each term by the director of undergraduate studies. Students should also identify an adviser from the South Asian Studies faculty in their area of specialization as early as possible.

Permission to complete two majors must be secured from the Committee on Honors and Academic Standing. Application forms are available from the residential college deans and must be submitted prior to the student's final term.

Requirements of the major In addition to fulfilling the requirements of the primary major, a student choosing South Asian Studies as a second major must complete seven term courses in South Asian Studies numbered 200 or above. At least two of the seven courses must address premodern South Asia, and at least two should be seminars. Students may petition the director of undergraduate studies to include one relevant course from another department or program; approval may require additional course work on South Asian topics. Students must also complete the senior requirement and meet the major's language requirement. A maximum of one course taken Credit/D/Fail may count toward the major.

Language requirement One South Asian language must be studied at the advanced level (courses designated L5). Courses to fulfill this requirement must be taken while the student is enrolled at Yale. Students who matriculate with advanced proficiency in Hindi or Tamil, as demonstrated through testing, are encouraged to study Sanskrit, or to study a second modern language (Bengali, Urdu, Nepali, Telugu, Kannada, Marathi) through the Directed Independent Language Study program. Students may request substitution of another appropriate language (e.g., Persian or Arabic) for the core language requirement, and they are encouraged to pursue intensive language study through courses or work abroad.

Senior requirement The senior requirement may be fulfilled by completion of a seminar that culminates in a senior essay. Alternatively, the requirement may be fulfilled by completion of a one-credit, two-term senior research project in SAST 491, 492. The senior essay should be a substantial paper with a maximum length of 8,000 words for one term and 10,500 words for two terms. The use of primary materials in the languages of the region is encouraged in senior essay projects.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 7 term courses (not incl senior req or lang req)

Distribution of courses 7 term courses in South Asian Studies numbered 200 or above, 2 in premodern; 2 sems

Substitution permitted One relevant course in another dept, with DUS permission

Language requirement Study in a South Asian lang through L5 level

Senior requirement Senior essay in sem, or research project in SAST 491, 492

LANGUAGE AND LITERATURE COURSES

BNGL 110a^c, Introductory Bengali I Sreemati Mukherjee

A comprehensive approach to learning all four language skills: speaking, listening, reading, and writing. At the completion of the two-term sequence students are able to read and write in Bengali, and to converse in formal and informal situations. Course taught through distance learning using videoconferencing technology from Cornell University. Credit only on completion of BNGL 120. L1 1½ Course cr

[BNGL 120b, Introductory Bengali II]

***HNDI 110a^c, Elementary Hindi I** Seema Khurana and staff

An in-depth introduction to modern Hindi, including the Devanagari script. A combination of graded texts, written assignments, audiovisual material, and computer-based exercises provides cultural insights and increases proficiency in understanding, speaking, reading, and writing Hindi. Emphasis on spontaneous self-expression in the language. No prior background in Hindi assumed. Credit only on completion of HNDI 120. L1 1½ Course cr

HNDI 120b^c, Elementary Hindi II Seema Khurana and staff

Continuation of HNDI 110. After HNDI 110 or equivalent. L2 1½ Course cr

HNDI 130a^c, Intermediate Hindi I Seema Khurana and staff

The first half of a two-term sequence designed to develop proficiency in the four language skills. Extensive use of cultural documents including feature films, radio broadcasts, and literary and nonliterary texts to increase proficiency in understanding, speaking, reading, and writing Hindi. Focus on cultural nuances and Hindi literary traditions. Emphasis on spontaneous self-expression in the language. After HNDI 120 or equivalent. L3 1½ Course cr

***HNDI 132a, Accelerated Hindi I** Swapna Sharma

A fast-paced course designed for students who are able to understand basic conversational Hindi but who have minimal or no literacy skills. Introduction to the Devanagari script; development of listening and speaking skills; vocabulary enrichment; attention to socio-cultural rules that affect language use. Students learn to read simple texts and to converse on a variety of everyday personal and social topics. L3

HNDI 140b^c, Intermediate Hindi II Seema Khurana and staff

Continuation of HNDI 130. After HNDI 130 or equivalent. L4 1½ Course cr

HNDI 142b, Accelerated Hindi II Seema Khurana, Swapna Sharma

Continuation of HNDI 132. Development of increased proficiency in the four language skills. Focus on reading and higher language functions such as narration, description, and comparison. Reading strategies for parsing paragraph-length sentences in Hindi newspapers. Discussion of political, social, and cultural dimensions of Hindi culture as well as contemporary global issues. L4

HNDI 150a^c, Advanced Hindi Seema Khurana

An advanced language course aimed at enabling students to engage in fluent discourse in Hindi and to achieve a comprehensive knowledge of formal grammar. Introduction to a variety of styles and levels of discourse and usage. Emphasis on the written language, with

readings on general topics from newspapers, books, and magazines. Prerequisite: HNDI 140 or permission of instructor. L5

***HNDI 198a^c or b^c, Advanced Tutorial** Seema Khurana, Swapna Sharma

For students with advanced Hindi language skills who wish to engage in concentrated reading and research on material not otherwise offered by the department. Work must be supervised by an adviser and must terminate in a term paper or the equivalent. Permission to enroll requires submission of a detailed project proposal and its approval by the language studies coordinator. Prerequisite: HNDI 150 or equivalent.

***SKRT 110a/LING 115a^c, Introductory Sanskrit I** David Brick

An introduction to Sanskrit language and grammar. Focus on learning to read and translate basic Sanskrit sentences in Devanagari script. No prior background in Sanskrit assumed. L1 1½ Course cr

SKRT 120b^c/LING 125b^c, Introductory Sanskrit II David Brick

Continuation of SKRT 110. Focus on the basics of Sanskrit grammar; readings from classical Sanskrit texts written in Devanagari script. After SKRT 110. L2 1½ Course cr

SKRT 130a^c/LING 138a, Intermediate Sanskrit I David Brick

The first half of a two-term sequence aimed at helping students develop the skills necessary to read texts written in Sanskrit. Readings include selections from the *Hitopadesa*, *Kathasaritsagara*, *Mahabharata*, and *Bhagavadgita*. After SKRT 120 or equivalent. L3 1½ Course cr

SKRT 140b^c/LING 148b, Intermediate Sanskrit II David Brick

Continuation of SKRT 130, focusing on Sanskrit literature from the *kavya* genre. Readings include selections from the *Jatakamala* of Aryasura and the opening verses of Kalidasa's *Kumarasambhava*. After SKRT 130 or equivalent. L4 1½ Course cr

***SKRT 150a, Advanced Sanskrit: Dharmasastra** David Brick

Introduction to Sanskrit commentarial literature, particularly to *Dharmasastra*, an explication and analysis of dharma (law or duty). Discussion of normative rules of human behavior; historical traditions of writing on the Indian subcontinent. Prerequisite: SKRT 140 or equivalent. L5

***TAML 110a^c, Introductory Tamil I** Blake Wentworth

An in-depth introduction to modern Tamil, focusing on skills in comprehension, speaking, reading, and writing as well as on cultural understanding. Course work includes graded texts, written assignments, audiovisual material, and computer-based exercises. No prior background in Tamil assumed. Credit only on completion of TAML 120. L1 1½ Course cr

TAML 120b^c, Introductory Tamil II Blake Wentworth

Continuation of TAML 110. After TAML 110. L2 1½ Course cr

TAML 130a^c, Intermediate Tamil I Blake Wentworth

The first half of a two-term sequence designed to develop proficiency in comprehension, speaking, reading, and writing through the use of visual media, newspapers and magazines, modern fiction and poetry, and public communications such as pamphlets, advertisements, and government announcements. Prerequisite: TAML 120 or equivalent.

L3 RP 1½ Course cr

TAML 140b^c, Intermediate Tamil II Blake Wentworth

Continuation of TAML 130, focusing on further development of proficiency in the four language skills. Prepares students to conduct fieldwork in Tamil. Prerequisite: TAML 130 or equivalent. L4 RP 1½ Course cr

***TAML 198b, Advanced Tutorial** Blake Wentworth

For students with advanced Tamil language skills who wish to engage in concentrated reading and research on material not otherwise included in courses offered by the department. The work is supervised by the instructor and concludes with a term paper or its equivalent.

GENERAL COURSES IN SOUTH ASIAN STUDIES

SAST 219a/ANTH 276a, South Asian Social Worlds Sara Shneiderman

For description see under Anthropology.

SAST 244a/PLSC 384a, Indian Democracy in Comparative Perspective Tariq Thachil

For description see under Political Science.

SAST 256b/HSAR 383b, Art of India, 300 B.C.–A.D. 1650 Tamara Sears

For description see under History of Art.

SAST 259a/MUSI 357a, Indian Music Theory and Practice Stanley Scott

For description see under Music.

SAST 262a/RLST 126a, Tibetan Buddhism Andrew Quintman

For description see under Religious Studies.

***SAST 273b/HSAR 330b, Place, Landscape, and Travel in South Asian Art**

Dipti Khera

Ways that artists have explored ideas of topography, mapping, and traveling in South Asian visual culture. Manifestations of place and landscape; epistemological, ideological, and subjective points of view. Examples from Buddhist sculpted panels, pilgrimage maps and devotional manuscripts, Mughal paintings, posters of the Indian nation-state as a mother goddess, fractured landscapes of Kashmir, travel narratives, poetry, films, and fiction. Questions about the continuities and discontinuities of seeing and idealizing place, religious and secular mappings, and Western and non-Western ideas of place-making. HU

SAST 278a/ECON 211a/GLBL 211a, Economic Performance and Challenges in India

Rakesh Mohan

For description see under Global Affairs.

***SAST 324b/FILM 313b/HIST 319Jb, India on Film** Shailaja Paik

The history of India since 1800, examined through historically based films. The impact of colonialism on the Indian subcontinent; the formation of the modern states of India and Pakistan; the representation of Indian society and history in the Bollywood film industry. HU

***SAST 325a/HIST 318Ja, Modern Indian History** Shailaja Paik

The history of modern India from the inception of colonial rule in the late eighteenth century to the establishment of independent India and Pakistan in the middle of the twentieth century. The impact of colonialism on the Indian subcontinent and on the formation

of modern nations. The culture of colonialism, the nature of the colonial state, and the emergence of nationalism. HU

***SAST 341b/PLSC 442b, Development in South Asia** Tariq Thachil

For description see under Political Science.

***SAST 342b/EP&E 425b/PLSC 181b, South Asia in World Politics** Elizabeth Hanson

For description see under Political Science.

***SAST 343a/AFST 345a^G/GLBL 319a/PLSC 370a, Political Economy of Natural Disasters** Jennifer Bussell

Threats posed to developing countries by natural shocks such as the Indian Ocean tsunami, flooding in South Asia, and drought in West Africa. Incentives of national governments to prepare for natural shocks and the resulting disasters. The role of international actors and local communities in disasters. SO

***SAST 358b/RLST 184b, The Ramayana** Hugh Flick, Jr.

For description see under Religious Studies.

***SAST 360b, Introduction to Bhakti Literature** Swapna Sharma

Study of bhakti (devotional literature) in North India, beginning in the sixteenth century. Resistance to Brahmanical forms of social dominance; the role of linguistically based power; the development of vernacular languages and the national language of India. HU

***SAST 367a/EALL 202a/HUMS 418a/RLST 130a, Traditional Literature of India, China, and Japan** Koichi Shinohara, Phyllis Granoff

For description see under Humanities.

***SAST 372a^G/ANTH 338a/FILM 329a, Himalaya through Film and Text** Mark Turin

An exploration of the Himalayan region through film and ethnography. Visual and textual genres of storytelling and narration are used to examine topics such as adventure, caste, education, gender, ritual, and violence. Films and readings are drawn from Bhutan, northern India, Nepal, and Tibet. SO

***SAST 373a/HSAR 463a, Cross-Cultural Encounters in South Asian Art and History** Dipti Khara

The analytic of “difference” as it has shaped interpretations of art, architecture, and history of early modern and colonial South Asia. Debates on questions of discontinuities and continuities, assimilation, circulation, translation, resistance, iconoclasm, and the artistic agency of many anonymous makers within cross-cultural contexts. Case studies from the worlds of the Mughal, Rajput, Deccani, and Maratha kings, regional merchants, religious gurus, and East India Company and British imperial officers. HU

***SAST 374a/LITR 274a, Modern Literature in South Asia** Benjamin Conisbee Baer

The forms and trajectories of modern literature in the Indian subcontinent. Topics of writing, secrets, and gender in nineteenth- and twentieth-century fiction, with a focus on literary prose. Representations of forbidden relationships, transgression, and intersections of the personal, the sexual, and the political. Writers from the present-day states of India, Pakistan, and Bangladesh and from the South Asian diaspora. Readings in English original or in translation. HU

***SAST 419b^G/ANTH 463b^G/ER&M 366b, Ethnicity, Indigeneity, Mobility**

Sara Shneiderman

For description see under Anthropology.

***SAST 449b/WGSS 449b, Fictions of Indian Women** Geetanjali Singh Chanda

For description see under Women's, Gender, & Sexuality Studies.

***SAST 459b/RLST 182b, Buddhist Traditions of Mind and Meditation**

Andrew Quintman

For description see under Religious Studies.

***SAST 461b/LITR 156b, Indian Texts and Contexts** Benjamin Conisbee Baer

Indian texts from the earliest Sanskrit compositions (Vedic hymns) through selections from Upanishads, Puranas, Buddhist texts, the epics (*Ramayana* and *Mahabharata*), Sanskrit drama, and writings on conduct, morality, ethics, and politics. Focus on social and historical context and the points of intersection between sacred texts and sites of social structure and social conflict. Questions of ritual and sacrifice as key figurative, political, and ethical resources in this complex tradition; karma and dharma. Readings in translation. HU

RLST 137b, Introduction to Hinduism Phyllis Granoff

SENIOR ESSAY COURSE

***SAST 491a and 492b, Senior Essay** Tariq Thachil

A yearlong research project completed under faculty supervision and resulting in a substantial paper. ½ Course cr per term Cr/year only

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Graduate courses in South Asian Studies are open to qualified undergraduates. Course descriptions appear in the online Graduate School bulletin and are available in the South Asian Studies program office. Permission of the instructor and of the director of graduate studies is required.

Southeast Asia Studies

Program adviser: Benedict Kiernan, 311 LUCE, 432-3431, seas@yale.edu;
www.yale.edu/seas

FACULTY ASSOCIATED WITH THE COUNCIL ON SOUTHEAST ASIA STUDIES

Professors William Burch (*Emeritus*) (*Forestry & Environmental Studies*), Michael Dove (*Forestry & Environmental Studies*), J. Joseph Errington (*Anthropology*), William Kelly (*Anthropology*), Benedict Kiernan (*Chair*) (*History*), James Scott (*Political Science*), Mimi Yiengpruksawan (*History of Art*)

Associate Professor Sarah Weiss (*Music*)

Assistant Professor Erik Harms (*Anthropology*)

Senior Lecturer Carol Carpenter (*Forestry & Environmental Studies, Anthropology*)

Lecturer Amity Doolittle (*Forestry & Environmental Studies*)

Senior Lector II Quang Phu Van

Senior Lector Indriyo Sukmono

The Council on Southeast Asia Studies oversees an interdisciplinary program that brings together faculty and students sharing an interest in Southeast Asia and supplements the undergraduate curriculum with an annual seminar series, periodic conferences, and special lectures. Yale does not offer a degree in Southeast Asia studies. Majors in any department may consult with Council faculty regarding a senior essay on a Southeast Asian topic, and in certain circumstances students who have a special interest in the region may consider a Special Divisional Major. Students planning to undertake field research or language study in Southeast Asia may apply to the Council for summer fellowship support.

Courses featuring Southeast Asian content are offered within a variety of departments each year, including Anthropology, Economics, History, Music, and Political Science. A list of courses for the current year can be obtained through the Council office or Web site. Yale maintains extensive library and research collections on Southeast Asia.

Language instruction is offered in two Southeast Asian languages, Indonesian and Vietnamese. The Council on Southeast Asia Studies supports language tables and tutoring in other Southeast Asian languages by special arrangement.

INDN 110a^G, Elementary Indonesian I Indriyo Sukmono

An introductory course in standard Indonesian with emphasis on developing communicative skills through a systematic survey of grammar and graded exercises. Credit only on completion of INDN 120. Enrollment limited to 15 per section. L1 1½ Course cr

INDN 120b^G, Elementary Indonesian II Indriyo Sukmono

Continuation of INDN 110. Introduction to reading, leading to mastery of language patterns, essential vocabulary, and basic cultural competence. After INDN 110 or equivalent. Enrollment limited to 15 per section. L2 1½ Course cr

***INDN 130a^G, Intermediate Indonesian I** Indriyo Sukmono

Continued practice in colloquial Indonesian conversation and reading and discussion of texts. After INDN 120 or equivalent. Limited enrollment. L3

***INDN 140b^G, Intermediate Indonesian II** Indriyo Sukmono

Continuation of INDN 130. After INDN 130 or equivalent. Limited enrollment. L4

***INDN 153a^G, Advanced Indonesian** Jolanda Pandin, Indriyo Sukmono

Development of speaking, listening, writing, and grammar skills to an advanced level. A semi-directed study in which the focus of the course depends on the research interests of the students. Prerequisite: INDN 140 or equivalent. Course taught jointly with Cornell University using videoconferencing technology. L5

***INDN 160b^G, Advanced Indonesian II** Indriyo Sukmono

Continuation of INDN 153. Prerequisite: INDN 153 or equivalent. L5

***INDN 470a and 471b, Independent Tutorial** Indriyo Sukmono

For students with advanced Indonesian language skills who wish to engage in concentrated reading and research on material not otherwise offered in courses. The work must be supervised by an adviser and must terminate in a term paper or its equivalent. Permission to enroll requires submission of a detailed project proposal and its approval by the program adviser.

VIET 110a, Elementary Vietnamese I Quang Phu Van

Students acquire basic working ability in Vietnamese, developing skills in speaking, listening, writing (Roman script), and reading. Discussion of aspects of Vietnamese society and culture. Credit only on completion of VIET 120. No previous knowledge of Vietnamese assumed. L1 RP 1½ Course cr

VIET 120b, Elementary Vietnamese II Quang Phu Van

Continuation of VIET 110. L2 RP 1½ Course cr

***VIET 130a, Intermediate Vietnamese I** Quang Phu Van

An integrated approach to language learning aimed at strengthening students' listening, speaking, reading, and writing skills in Vietnamese. Communicative activities such as conversations, performance simulation, drills, role plays, and games. Discussion of aspects of Vietnamese society and culture. After VIET 120 or equivalent. L3 RP 1½ Course cr

***VIET 140b, Intermediate Vietnamese II** Quang Phu Van

Continuation of VIET 130. L4 RP 1½ Course cr

***VIET 150a^c, Advanced Vietnamese** Quang Phu Van

Students improve their fluency and accuracy in Vietnamese and solidify their reading, writing, speaking, and listening skills. Topics include social, economic, and cultural practices, gender issues, notions of power, and taboo. Prerequisite: VIET 140 or equivalent. L5

***VIET 470a and 471b, Independent Tutorial** Quang Phu Van

For students with advanced Vietnamese language skills who wish to engage in concentrated reading and research on material not otherwise offered in courses. The work must be supervised by an adviser and must terminate in a term paper or its equivalent. Permission to enroll requires submission of a detailed project proposal and its approval by the program adviser.

Spanish

Director of undergraduate studies: Susan Byrne, Rm. 205, 82–90 Wall St., 432-1162, susan.byrne@yale.edu; language program director: Ame Cividanes, Rm. 210, 82–90 Wall St., 432-1159, ame.cividanes@yale.edu

FACULTY OF THE DEPARTMENT OF SPANISH AND PORTUGUESE

Professors Rolena Adorno (*Chair*), Aníbal González, Roberto González Echevarría, K. David Jackson, María Rosa Menocal, Noël Valis

Associate Professor Paulo Moreira

Assistant Professors Susan Byrne, Leslie Harkema, Kevin Poole

Senior Lectors II Margherita Tortora, Sonia Valle

Senior Lectors Sybil Alexandrov, Marta Almeida, Pilar Asensio, Teresa Carballal, Mercedes Carreras, Ame Cividanes, Sebastián Díaz, Maripaz García, Oscar González Barreto, María Jordán, Juliana Ramos-Ruano, Lissette Reymundi, Lourdes Sabé-Colom, Bárbara Safille, Terry Seymour

Lector Rosamaría León

The Department of Spanish and Portuguese provides instruction in the languages, literatures, and cultures of the Hispanic and Luso-Brazilian worlds. Courses in Portuguese and the requirements of the major are described under “Portuguese”; the names of faculty teaching Portuguese courses are in the list above.

The major in Spanish is a liberal arts major that offers a wide range of courses in the language, literatures, and cultures of the twenty Spanish-speaking countries in Europe and Latin America. Today Spanish is the second language of the United States, one of the three most widely spoken languages in the world, and one of the five diplomatic languages of the United Nations. The program in Spanish offers students the opportunity to acquire thorough linguistic proficiency as well as in-depth knowledge of both cultural and literary topics. The major explores literature, history, philosophy, art, and cultural studies, and provides excellent preparation for careers in law, diplomacy, medicine, business, the arts, academics, journalism, and education. Students electing Spanish as one of two majors should consult the director of undergraduate studies about a specialized course of study.

Among the Spanish offerings, Group A includes beginning and intermediate language courses designed to help students develop fluency in understanding, speaking, reading, and writing Spanish. Group B courses seek to provide students with a broad but solid introduction to the fields of Hispanic literatures and cultures, and to strengthen their linguistic competence through courses in advanced grammar and composition. Group C courses allow students to perfect their linguistic and critical skills through study of a specific problem or issue, e.g., a literary genre, a type of literary or cultural representation, or a specific writer or text. Students desiring more information about either language or literature offerings should consult the director of undergraduate studies. Juniors and seniors majoring in Spanish may, with the permission of the instructor and the director of graduate studies, enroll in graduate literature courses in Spanish. A list of pertinent graduate courses is available at the office of the director of undergraduate studies.

The standard major Prerequisite to the major is SPAN 140, 142, or 145, or equivalent credit through advanced placement or study abroad. Beyond the prerequisite, twelve term courses from Groups B and C are required, including the senior essay. With prior permission of the director of undergraduate studies, two relevant courses from other departments may be applied toward the major.

Requirements of the major for the Class of 2013 Students must take SPAN 243 and <244>, two courses chosen from SPAN 261, 262, 266, or 267, SPAN 491 (see “Senior requirement” below), and at least five courses from Group C. Successful completion of a special examination given at the beginning of each term may exempt Spanish majors from SPAN 243; details about the examination may be obtained from the course instructor.

Requirements of the major for the Classes of 2014 and 2015 Students must take SPAN 243, <244>, or 250; SPAN 246 or 247; three courses chosen from SPAN 261, 262, 266, or 267; SPAN 491 (see “Senior requirement” below); and six electives, five of which must be chosen from Group C. Successful completion of a special examination given at the beginning of each term may exempt Spanish majors from SPAN 243 and fulfill the requirement for SPAN 243, <244>, or 250. Details about the examination may be obtained from the course instructor. Students exempted from SPAN 243 may count SPAN <244> or 250 toward the major as the allowed Group B elective.

Requirements of the major for the Class of 2016 and subsequent classes Students must take SPAN 250; SPAN 246 or 247; three courses chosen from SPAN 261, 262, 266, or 267; SPAN 491 (see “Senior requirement” below); and six electives, five of which must be chosen from Group C.

Senior requirement Seniors write the senior essay in SPAN 491 in the spring of their senior year under the individual direction of a faculty adviser. Students expecting to complete their degree requirements in December write the senior essay in SPAN 491 in the fall of their senior year. Seniors in SPAN 491 are expected to submit their completed essay to the director of undergraduate studies at 82–90 Wall Street by 4 p.m. on April 26 in the spring term, or by 4 p.m. on December 7 in the fall term. If the essay is submitted late without an excuse from the student’s residential college dean, the penalty is one letter grade, though no essay that would otherwise pass will be failed because it is late. Students in the intensive major both present the essay and take a departmental examination.

Study abroad Students are encouraged to apply to the eight-week summer language courses offered by Yale Summer Session in New Haven and Bilbao, Spain, or in New Haven and Quito, Ecuador. A five-week Spanish course at the L5 level is also offered in Buenos Aires, Argentina. More information about Yale Summer Session is available on the Web at summer.yale.edu. For information about the Year or Term Abroad program, refer to chapter II of this bulletin.

Placement Students with a score of 5 on either of the Spanish Advanced Placement tests, a score of 7 on the higher-level International Baccalaureate examination, a demonstrated proficiency level of C1 in the Common European Framework of Reference for Languages, or a placement of L5 based on the departmental placement examination may enroll directly in any Group B or C course. All other students, including native speakers, who have previously studied Spanish formally or informally must take the departmental placement examination in order to enroll in a Spanish course. Information on the departmental placement examination is available on the department’s Web site at www.yale.edu/span-port/placement.html.

Students with no previous formal or informal Spanish study ordinarily enroll in SPAN 110. Students who take SPAN 110 must continue with 120 in the following term, and no credit is awarded for 110 until 120 has been successfully completed. Students wishing to take intensive beginning Spanish may, with the instructor’s permission, enroll in SPAN 125, which covers the same material as SPAN 110 and 120, but in one term. SPAN 132 and 142 are designed for heritage speakers and are available only to them. Admission to 132 and

142 is based on results of the departmental placement examination; interested students should contact the instructor.

REQUIREMENTS OF THE MAJOR

Prerequisite SPAN 140, 142, 145, or equivalent

Number of courses 12 term courses from Groups B and C (incl senior req)

Specific courses required *Class of 2013*—SPAN 243, <244>; 2 from SPAN 261, 262, 266, 267; *Classes of 2014 and 2015*—SPAN 243, <244>, or 250; SPAN 246 or 247; 3 from SPAN 261, 262, 266, 267; *Class of 2016 and subsequent classes*—SPAN 250; SPAN 246 or 247; 3 from SPAN 261, 262, 266, 267

Distribution of courses At least 5 courses in Group C

Substitution permitted Up to 2 relevant courses in other depts, with DUS permission

Senior requirement *Standard major*—Senior essay (SPAN 491); *Intensive major*—Senior essay (SPAN 491) and dept exam

COURSES FOR FRESHMEN

***SPAN 050b/LAST 001b/PORT 001b, Latin American Short Fiction** Paulo Moreira
For description see under Portuguese.

***SPAN 060a, Freshman Colloquium: Literary Studies in Spanish** Leslie Harkema
Introduction to the study of literature in general and to some of the most important texts in Hispanic literature. Selected texts in Spanish include narratives (Borges, García Márquez, Fuentes, Unamuno), essays (Paz, Fuentes, Sor Juana), lyric (Neruda, Paz, Valle-Inclán), and theater (Lope de Vega, García Lorca). Conducted in Spanish. Counts toward the requirements for the Spanish major. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. L5, HU Fr sem

GROUP A COURSES

SPAN 110a or b, Elementary Spanish I Maripaz García and staff

For students who wish to begin study of the Spanish language. Development of basic skills in understanding, speaking, reading, and writing through a functional approach to the teaching of Spanish grammar. Includes an introduction to the cultures (traditions, art, literature, music) of the Spanish-speaking world. Audiovisual materials are incorporated into class sessions. Conducted in Spanish. To be followed immediately by SPAN 120. Credit only on completion of SPAN 120. L1 RP 1½ Course cr

SPAN 120a or b, Elementary Spanish II Juliana Ramos-Ruano and staff

Further development of understanding, speaking, reading, and writing skills. Class sessions incorporate short authentic texts in Spanish, audiovisual materials, and film. Cultural topics of the Spanish-speaking world (traditions, art, literature, music) are included. Conducted in Spanish. After SPAN 110 or in accordance with placement results. Admits to SPAN 130 or 145. L2 RP 1½ Course cr

***SPAN 125a, Intensive Elementary Spanish** Lourdes Sabé-Colom

An intensive beginning course in spoken and written Spanish that covers the material of SPAN 110 and 120 in one term. Conducted in Spanish. Admits to SPAN 130 or 145. Not open to students who have completed SPAN 110 or 120. L1–L2 RP 2 Course cr

SPAN 130a or b, Intermediate Spanish I Lissette Reymundi and staff

Development of language proficiency in listening, speaking, reading, and writing through communicative activities rather than a sequence of linguistic units. Authentic Spanish language texts, films, and videos serve as the basis for the functional study of grammar and the acquisition of a broader vocabulary. Cultural topics are presented throughout the term. Conducted in Spanish. Admits to SPAN 140. L3 RP 1½ Course cr

***SPAN 132a, Spanish for Heritage Speakers I** Sybil Alexandrov

A language course designed for students who have been exposed to Spanish – either at home or by living in a Spanish-speaking country – but who have little or no formal training in the language. Practice in all four communicative skills (comprehension, speaking, reading, writing), with special attention to basic grammar concepts, vocabulary building, and issues particular to heritage speakers. Admission in accordance with placement results. L2–L3

SPAN 140a or b, Intermediate Spanish II Ame Cividanes and staff

Continuation of SPAN 130. Development of increased proficiency in the four language skills. Greater precision in grammar usage, vocabulary enrichment, and expanded cultural awareness are achieved through communicative activities based on authentic Spanish-language texts, including a short novel. Conducted in Spanish. Admits to L5 courses. L4 RP 1½ Course cr

***SPAN 142b, Spanish for Heritage Speakers II** Sybil Alexandrov

Continuation of SPAN 132. Examination of complex grammar structures; consideration of problems particular to heritage speakers through the reading of both literary and journalistic texts. Practice in all communicative skills (comprehension, speaking, reading, writing). After SPAN 132 or in accordance with placement results. L4

***SPAN 145b, Intensive Intermediate Spanish** Pilar Asensio, Bárbara Safille

An intensive intermediate course in spoken and written Spanish that covers the material of SPAN 130 and 140 in one term. Conducted in Spanish. Admits to L5 courses. Not open to students who have completed SPAN 130 or 140. L3–L4 RP 2 Course cr

***SPAN 150a or b, Advanced Conversational Spanish** Teresa Carballal and staff

Intended to improve active command of the language through readings, discussions, and reports. Conversational skills are stressed. Reading selections include commentaries on political and social problems as well as cultural topics. Conducted in Spanish. After SPAN 140 or 145, or in accordance with placement results. Not open to students who have completed SPAN 132, 142, or <235>. Not open to heritage speakers placed at the L5 level. Does not count toward the major. L5 RP

GROUP B COURSES

Open to students who have placed into L5 courses or who have successfully completed an L4 course in Spanish. Unless otherwise noted, all courses in Group B are conducted in Spanish.

***SPAN 220b/LAST 220b/THST 220b, Theater and Poetry Workshop** Sonia Valle

The dynamics of figurative language, advanced linguistic structures, and aural comprehension through close reading of original Latin American and Spanish dramatic and poetic

texts reflecting on time, memory, identity, and love. Students participate in performance and creation of short dramatic and poetic texts. L5

***SPAN 222a/LAST 222a, Legal Spanish** Mercedes Carreras

An introduction to Spanish and Latin American legal culture with a focus on the specific traits of legal language and on the development of advanced language competence. Issues such as human rights, the death penalty, the jury, contracts, statutory instruments, and rulings by the constitutional courts are explored through law journal articles, newspapers, the media, and mock trials. L5

***SPAN 223b/LAST 223b, Spanish in Film: An Introduction to the New Latin American Cinema** Margherita Tórtora

Development of proficiency in Spanish through analysis of critically acclaimed Latin American films. Includes basic vocabulary of film criticism in Spanish as well as discussion and language exercises. L5

***SPAN 224a or b/LAST 224a or b, Spanish in Politics, International Relations, and the Media** Teresa Carballal

Issues of domestic and international politics are integrated with advanced usage of the Spanish language. A cross-cultural approach is used to analyze Spanish (vocabulary, style, content, and objectives) in political discourse, diplomatic relations, and the media. L5

SPAN 225b/LAST 225b, Spanish for the Medical Professions Mercedes Carreras

Topics in health and welfare. Conversation, reading, and writing about medical issues for advanced Spanish-language students, including those considering careers in medical professions. L5

***SPAN 227a/LAST 227a, Creative Writing** María Jordán

An introduction to the craft and practice of creative writing (fiction, poetry, and essays). Focus on the development of writing skills and awareness of a variety of genres and techniques through reading of exemplary works and critical assessment of student work. Emphasis on the ability to write about abstract ideas, sentiments, dreams, and the imaginary world. L5

SPAN 243a or b/LAST 243a or b, Advanced Spanish Grammar Terry Seymour,
Sybil Alexandrov

A comprehensive, in-depth study of grammar intended to improve students' spoken and written command of Spanish. Linguistic analysis of literary selections; some English-to-Spanish translation. L5

SPAN 246b, Introduction to the Cultures of Spain Susan Byrne, Leslie Harkema

Study of various aspects of Spanish culture, including its continuing relation to the societies of Latin America. Examination of Spanish politics, history, religions, art forms, music, and literatures, from ancient times to the present. Primary sources and critical studies are read in the original. L5, HU

[SPAN 247b/LAST 247b, Introduction to the Cultures of Latin America]

***SPAN 250a, Composition and Analysis** Susan Byrne

Composition in Spanish, with a focus on academic writing. Close analysis of language use in literary texts to improve fluidity and precision in students' own writing. Frequent composition assignments to practice the forms and functions studied. L5, HU

[SPAN 261a/LAST 261a, Studies in Spanish Literature I]**[SPAN 262b, Studies in Spanish Literature II]****SPAN 266a/LAST 266a, Studies in Latin American Literature I** Rolena Adorno

An introduction to Spanish American literature from the Conquest to the nineteenth century. Writings of adventurers, poets, and patriots who won the New World in the sixteenth century, forged new cultural identities in the seventeenth and eighteenth centuries, and fought for independence in the nineteenth century. L5, HU

SPAN 267b/LAST 267b, Studies in Latin American Literature II

Roberto González Echevarría

An introduction to Latin American literature from the nineteenth century to the present. Works by Borges, García Márquez, Paz, Neruda, Cortázar, and others. L5, HU

GROUP C COURSES

Open to students who have placed into L5 courses. Unless otherwise noted, all courses in Group C are conducted in Spanish.

***SPAN 306b, Modernity in Hispanic Poetry** Leslie Harkema

The response to modernization and the modern condition in Hispanic poetry from the late nineteenth through the mid-twentieth century. Topics include attitudes toward the past and tradition, social commitment, art for art's sake, the concept of pure poetry, the constitution of the autonomous literary field, and poetry as resistance. L5, HU

***SPAN 323a/WGSS 403a, Women Writers of Spain** Noël Valis

The development of women's writing in Spain, with a focus on the modern era. Equal attention to the sociohistorical and cultural contexts of women writers and to the narrative and poetic strategies the authors employed. Some readings from critical and theoretical works. L5, HU

***SPAN 335b, Law and History to Novel** Susan Byrne

The role of the *buenas letras* law and history in the development of *bellas letras*, specifically the novel. Readings include works by Rojas, Flores, Montemayor, and Cervantes. L5

***SPAN 351a, Travelers in Latin American Fiction** Aníbal González

Narratives about the reactions of Latin American travelers and migrants to different societies, customs, and languages. Topics include differentiating travelers, exiles, and migrants; theories of tourism; theories of migration; Latin Americans in the United States and Europe; and Latin Americans in Asia and Africa. Readings from a variety of short stories and novels. L5, HU

***SPAN 352a, Ethics and Politics in the Spanish American Short Story**

Aníbal González

Survey of the twentieth-century Spanish American short story, focused on the links among ethics, politics, and writing. Representation of ethics in narrative fiction; metaphorical links between writing and violence; tension between artistic integrity and political commitment. L5, HU

***SPAN 353b, Spanish American Vanguardist Literature** Aníbal González

Introduction to the Vanguardist period in Spanish American cultural history. The effects of political and social change in the early twentieth century on Spanish American writers and artists. Tensions between playfulness and engagement, cosmopolitanism and regionalism, and creativity and conscience in Vanguardist works. HU

SPAN 368a, The Pilgrimage Road to Santiago Kevin Poole

A study of the medieval pilgrimage road to Santiago as it exemplified the cultural meanings and material conditions of religious journeys in the late Middle Ages. Examination of literary texts, architecture, art, and music. L5

***SPAN 393a/LITR 420a, The Jungle Books** Roberto González Echevarría

A study of novels, stories, and films about a journey to the jungle in search of personal fulfillment and the origins of history. Authors include Alvar Núñez Cabeza de Vaca, Arthur Conan Doyle, Joseph Conrad, André Malraux, Alejo Carpentier, W. H. Hudson, Claude Lévi-Strauss, José Eustasio Rivera, and Mario Vargas Llosa. Readings and discussion in English. WR, HU Tr

***SPAN 478a and 479b, Directed Readings and/or Individual Research** Susan Byrne

Individual study under faculty supervision. The student must submit a bibliography and a written plan of study approved by the faculty adviser to the director of undergraduate studies. No reading or research course credit is granted without prior approval from the director of undergraduate studies. The student must meet with the instructor at least one hour a week. A final examination or essay is required.

***SPAN 491a or b, The Senior Essay** Susan Byrne

A research project completed under faculty supervision and resulting in a paper of considerable length, in Spanish.

GRADUATE COURSES OF INTEREST TO UNDERGRADUATES

Graduate courses in Spanish are open to qualified undergraduates. Descriptions of courses are listed in the online Graduate School bulletin. Permission of the instructor and of the director of graduate studies is required.

Special Divisional Majors

Director of undergraduate studies: Jasmina Beširević-Regan, Dean's Office TC, 432-0722, jasmina.besirevic@yale.edu

A Special Divisional Major affords an alternative for students whose academic interests cannot be met by an existing departmental or special major. Students may, with the approval of the Committee on Honors and Academic Standing, design majors of their own in consultation with members of the faculty and in accordance with the procedures outlined below.

Special Divisional Majors differ so widely in content that there is no uniform format, but two patterns prevail. Some majors combine two disciplines (e.g., music and English, religious studies and anthropology), while others draw from several departments to focus

on a particular culture, period, or problem (e.g., French studies, medieval studies, urban studies). Students interested in pursuing a Special Divisional Major in Renaissance studies should visit www.yale.edu/renstudies/undergrad.html. A Special Divisional Major may not be offered as one of two majors.

Students considering a Special Divisional Major should be aware of its particular demands and risks. They face the challenges of interdisciplinary work and must grapple with the conceptual processes of disparate disciplines. They must establish criteria for selecting courses and organize their courses in order to obtain an adequate base in the fields necessary for advanced work on a specific topic.

Students in a Special Divisional Major may get little help in designing their programs. Because they are in separate, independent programs, they forfeit some of the services normally provided as part of a departmental or special major. They must, for example, find their own advisers. They need to ask the help of faculty members already committed to other departments and programs who may not share their interdisciplinary interests. They must acquire the necessary background and sustain their interest without the help of any special seminar. They may lose other advantages of departmental affiliation, such as priority for acceptance in restricted-enrollment courses, opportunities to meet students and faculty members with similar interests, and participation in a program easily understood by graduate schools and others. Their transcripts will carry only the notation “Special Divisional Major,” without specifying the student’s field of concentration.

Before applying for a Special Divisional Major, students are urged to consult the directors of undergraduate studies in their fields of major interest, who can advise them whether a Special Divisional Major is necessary. Special interests can usually be accommodated within an existing major.

Application Students considering a Special Divisional Major are invited to talk with directors of undergraduate studies and with their residential college deans at any stage in their planning. Candidates may apply for admission as early as their fourth term of enrollment, but must have done so no later than one month after their seventh term of enrollment begins. The committee’s experience suggests that the last term of the sophomore or the first term of the junior year is the best time to apply.

Lucidity, coherence, and completeness in an application are of primary importance to a student’s candidacy, since they are indications of a thoughtfully prepared program of study and of the qualities of eagerness and initiative essential to a successful Special Divisional Major. The committee expects that applicants will have worked in close collaboration with the director of undergraduate studies of the Special Divisional Major in developing their proposals, and it will normally view failure to do so as grounds for rejection of the application.

Application forms are available at the Trumbull College dean’s office. They are submitted, along with letters of support from faculty advisers, to the Committee on Honors and Academic Standing in care of the Trumbull College dean’s office. The committee meets to consider proposals several times a year. All students in good standing are eligible, although the committee must be satisfied that candidates have particular aptitude and preparation for the work they propose.

In approving or rejecting proposals for a Special Divisional Major, the committee looks principally at the quality of the student’s planning. What are the objectives of the program?

What are the principles for selecting courses and organizing material? Is the program comparable in breadth and depth to other majors in Yale College? What provisions have been made to guide and evaluate the student's progress? What sort of senior project would focus and integrate the program? Finally, are the objectives of the program best served by a Special Divisional Major? The committee will not approve a major if the student can accomplish the desired aims in an existing major; the committee may consult directors of undergraduate studies and other faculty members to judge whether or not this is the case.

Requirements of the major Because of the variety of programs, there are no uniform prerequisites. All students must satisfy their prospective advisers and the committee that they have obtained adequate preparation for the advanced courses and senior projects they propose.

The major ordinarily comprises at least twelve advanced term courses and a senior project. Advanced courses include all but prerequisites for majors, beginning language courses, and comparable courses. When appropriate, approval is granted for graduate courses, tutorials, and residential college seminars. Courses taken Credit/D/Fail may not be counted toward the major. No distinction is made in the Special Divisional Major between standard and intensive majors.

The director of undergraduate studies in the Special Divisional Major presents proposals for the major to the Committee on Honors and Academic Standing. General problems connected with a student's program may be discussed with the director of undergraduate studies. Students who revise their original proposal or change faculty advisers must obtain the committee's approval. The committee advises the Yale College Faculty whether or not the student has completed a major and may not be able to recommend students for the degree who have changed their programs without proper consultation.

Senior requirement No later than midterm of their seventh term of enrollment, and after consultation with their faculty advisers, students provide the committee with an outline of their plans for the senior project. There are several options: a written or oral examination, a senior essay or project, or, in some circumstances, a graduate course or a tutorial. A senior essay usually offers the most effective means of integrating material from more than one discipline, and students in a Special Divisional Major typically request one course credit in each term of the senior year in SPEC 491, 492, The Senior Project.

Students who offer a yearlong senior project must, in order to continue the course into the second term, provide their advisers with substantial written evidence of their progress (i.e., a draft or detailed outline) by the end of their seventh term. The project must be completed no later than two weeks before the last day of classes in the student's eighth term of enrollment. At least two faculty members evaluate it.

Advisers Candidates must arrange for faculty advisers before applying. Directors of undergraduate studies or department chairs can usually suggest advisers. The committee expects each student to obtain a primary adviser from the department that forms the principal component of the major as well as one or more adjunct advisers from other fields. The primary adviser must be a regular member of the Yale College faculty. Members of the faculties of other schools of the University and visiting faculty members may serve as adjunct advisers.

Both advisers and students assume special responsibilities when designing and completing a major that falls outside existing programs. The special nature of the program and the student's loss of departmental affiliation make it particularly important for the faculty adviser to meet regularly with the student to help plan the program and to supervise its completion, including the senior project.

The primary adviser assumes chief responsibility for reporting the student's progress to the committee and for assigning a grade to the senior project. The primary adviser also consults the student's other advisers and works with them in directing, evaluating, and grading the senior project.

REQUIREMENTS OF THE MAJOR

Prerequisite Approval of 2 faculty advisers and Committee on Honors and Academic Standing

Number of courses 13 term courses (incl one-term senior essay) or 14 term courses (incl two-term senior essay)

Distribution of courses Advanced courses in 2 or more appropriate depts; grad courses, college sems, or tutorials with DUS permission

Senior requirement Senior essay or project (SPEC 491 and/or 492), or, with DUS permission, written or oral exam, or grad course, or tutorial

***SPEC 491a and 492b, The Senior Project** Jasmina Beširević-Regan

An essay or project, prepared during one or two terms by senior Special Divisional Majors. Conducted under the supervision of the student's primary adviser and with the approval of the Committee on Honors and Academic Standing in connection with an approved Special Divisional Major. Spring-term essays are due no later than two weeks before the last day of classes.

Statistics

Director of undergraduate studies: Andrew Barron, 24 Hillhouse Ave., 432-0634, andrew.barron@yale.edu; www.stat.yale.edu

FACULTY OF THE DEPARTMENT OF STATISTICS

Professors †Donald Andrews, Andrew Barron, Joseph Chang, Mark Hansen (*Visiting*), John Hartigan (*Emeritus*), †Theodore Holford, †Peter Phillips, David Pollard, †Heping Zhang, †Hongyu Zhao, Harrison Zhou

Associate Professors John Emerson (*Adjunct*), †Sekhar Tatikonda

Assistant Professors Lisha Chen, Mokshay Madiman, Jing Zhang

Senior Lecturer Jonathan Reuning-Scherer

Lecturer David Salsburg

†A joint appointment with primary affiliation in another department or school.

Statistics is the science and art of prediction and explanation. The mathematical foundation of statistics lies in the theory of probability, which is applied to problems of making inferences and decisions under uncertainty. Practical statistical analysis also uses a variety of computational techniques, methods of visualizing and exploring data, methods of seeking and establishing structure and trends in data, and a mode of questioning and reasoning that quantifies uncertainty.

The Statistics program at Yale is a blend of the mathematical theory of probability and statistical inference, the philosophy of inference under uncertainty, computational techniques, the practice of data analysis, and statistical analysis applied to economics, biology, medicine, engineering, and other areas. Statistical methods are widely used in the sciences, medicine, industry, business, and government; graduates can work in these areas or go on to graduate study.

The curriculum for the Statistics major is a synthesis of theory, methods, and applications. The requirements are designed to achieve some balance and depth in each of the three directions of probability, statistics, and data analysis. Statistics can be taken either as a primary major or as one of two majors, in consultation with the director of undergraduate studies. Appropriate majors to combine with Statistics include programs in the social sciences, natural sciences, engineering, computer science, or mathematics. A Statistics concentration is also available within the Applied Mathematics major.

Prerequisites Multivariable calculus and linear algebra are required and should be taken before or during the sophomore year. This requirement may be satisfied by MATH 120 and MATH 222 or 225, or equivalents.

Requirements of the major for the B.A. degree program The program requires ten term courses beyond the prerequisites, including the senior project. Majors take two courses in the theory and applications of probability (STAT 241 and 251), two courses emphasizing the theory of statistical inference (STAT 242 and 312), and two courses in the methods and practice of data analysis, chosen from STAT 230, 361, and 363. STAT 238 may be substituted for STAT 241 with the permission of the director of undergraduate studies. All majors are also required to take a course in computing (ENAS 130 or CPSC 112). The two remaining courses are electives chosen from Statistics courses numbered above 200. Appropriate courses in other departments or in the graduate school may count toward the major with permission of the director of undergraduate studies.

Requirements of the major for the B.S. degree program The program requires twelve term courses beyond the prerequisites. In addition to the courses indicated for the B.A. degree, the B.S. degree requires a course in mathematical analysis (MATH 260, 300, or 301) and an additional Statistics elective numbered above 200.

Senior requirement In the senior year, majors in both degree programs complete a research project in STAT 490. Students enrolled in this course work on a research project under the supervision of a faculty member, present and share their progress with each other during the seminar meetings, and write a final report.

REQUIREMENTS OF THE MAJOR

Prerequisites *Both degrees*—MATH 120 and MATH 222 or 225, or equivalents

Number of courses *B.A.*—10 term courses beyond prereqs (incl senior project); *B.S.*—12 term courses beyond prereqs (incl senior project)

Specific courses required *B.A.*—STAT 241, 242, 251, 312; 2 from STAT 230, 361, 363; ENAS 130 or CPSC 112; *B.S.*—same, plus MATH 260, 300, or 301

Distribution of courses *B.A.*—2 Stat electives numbered above 200, as specified; *B.S.*—3 Stat electives numbered above 200, as specified

Substitution permitted STAT 238 for STAT 241, with DUS permission; courses in other depts or grad courses, with DUS permission

Senior requirement *Both degrees*—Senior project (STAT 490)

STAT 100b^c, Introductory Statistics Lisha Chen

An introduction to statistical reasoning. Topics include numerical and graphical summaries of data, data acquisition and experimental design, probability, hypothesis testing, confidence intervals, correlation and regression. Application of statistical concepts to data; analysis of real-world problems. May not be taken after STAT 101–106 or 109. QR

STAT 101–106, 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 of classes are attended by all students in STAT 101–106 together, as general concepts and methods of statistics are developed. The remaining weeks are divided into field-specific sections that 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. No prerequisites beyond high school algebra. May not be taken after STAT 100 or 109.

Students enrolled in STAT 101–106 who wish to change to STAT 109, or those enrolled in STAT 109 who wish to change to STAT 101–106, must submit a course change notice, signed by the instructor, to their residential college dean by Friday, September 28. The approval of the Committee on Honors and Academic Standing is not required.

STAT 101a^c/MCDB 215a, Introduction to Statistics: Life Sciences

Jonathan Reuning-Scherer, Walter Jetz

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. QR

STAT 102a^c/EP&E 203a/PLSC 452a, Introduction to Statistics: Political Science

Jonathan Reuning-Scherer, Alan Gerber

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. QR

STAT 103a^G/EP&E 209a/PLSC 453a, Introduction to Statistics: Social Sciences

Jonathan Reuning-Scherer

Descriptive and inferential statistics applied to analysis of data from the social sciences. Introduction of concepts and skills for understanding and conducting quantitative research. QR

STAT 105a, Introduction to Statistics: Medicine Jonathan Reuning-Scherer,

David Salsburg

Statistical methods used in medicine and medical research. Practice in reading medical literature competently and critically, as well as practical experience performing statistical analysis of medical data. QR

[STAT 106a^G, Introduction to Statistics: Data Analysis]**STAT 109a, Introduction to Statistics: Fundamentals** Jonathan Reuning-Scherer

General concepts and methods in statistics. Meets for the first half of the term only. May not be taken after STAT 100 or 101–106. ½ Course cr

STAT 130a, Data: Collection, Processing, and Interpretation Mark Hansen

Exploration of the collection, processing, and interpretation of data, using techniques from computer science, statistics, and media art. Data as material supporting a variety of research and creative practices; how information technologies shape our interactions with data. Tools, techniques, and social implications of modern data and data processing. Data types include recipes, music, social network systems, and GIS applications. Prerequisite: high school mathematics. QR

STAT 230b^G, Introductory Data Analysis John Emerson

Survey of statistical methods: plots, transformations, regression, analysis of variance, clustering, principal components, contingency tables, and time series analysis. The R computing language and Web data sources are used. QR

STAT 238a^G, Probability and Statistics Joseph Chang

Fundamental principles and techniques of probabilistic thinking, statistical modeling, and data analysis. Essentials of probability, including conditional probability, random variables, distributions, law of large numbers, central limit theorem, and 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 for calculations, simulations, and analysis of data. After MATH 118 or 120. QR

STAT 241a^G/MATH 241a, Probability Theory Harrison Zhou

Introduction to probability theory. Topics include probability spaces, random variables, expectations and probabilities, conditional probability, independence, discrete and continuous distributions, central limit theorem, Markov chains, and probabilistic modeling. After or concurrently with MATH 120 or equivalent. QR

STAT 242b^G/MATH 242b, Theory of Statistics Andrew Barron

Study of the principles of statistical analysis. Topics include 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 241 and concurrently with or after MATH 222 or 225, or equivalents. QR

STAT 251b^G/MATH 251b, Stochastic Processes David Pollard

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 chosen from image reconstruction, Bayesian statistics, finance, probabilistic analysis of algorithms, and genetics and evolution. After STAT 241 or equivalent. QR

STAT 312a^G, Linear Models Joseph Chang

The geometry of least squares; distribution theory for normal errors; regression, analysis of variance, and designed experiments; numerical algorithms, with particular reference to the R statistical language. After STAT 242 and MATH 222 or 225. QR

STAT 330b^G/MATH 330b, Advanced Probability David Pollard

Measure theoretic probability, conditioning, laws of large numbers, convergence in distribution, characteristic functions, central limit theorems, martingales. Some knowledge of real analysis assumed. QR

STAT 361a^G/AMTH 361a^G, Data Analysis Lisha Chen

Selected topics in statistics explored through analysis of data sets using the R statistical computing language. Topics include linear and nonlinear models, maximum likelihood, resampling methods, curve estimation, model selection, classification, and clustering. Weekly sessions in the Statistical Computing laboratory. After STAT 242 and MATH 222 or 225, or equivalents. QR

STAT 363b^G, Multivariate Statistics for Social Sciences Jonathan Reuning-Scherer

Introduction to the analysis of multivariate data as applied to examples from the social sciences. Topics include principal components analysis, factor analysis, cluster analysis (hierarchical clustering, k-means), discriminant analysis, multidimensional scaling, and structural equations modeling. Extensive computer work using either SAS or SPSS programming software. Prerequisites: knowledge of basic inferential procedures and experience with linear models. QR

[STAT 364b^G/AMTH 364b^G/EENG 454b^G, Information Theory]**STAT 365b^G, Data Mining and Machine Learning** Lisha Chen

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 242. QR

***STAT 480a or b, Individual Studies** Andrew Barron

Directed individual study for qualified students who wish to investigate an area of statistics not covered in regular courses. A student must be sponsored by a faculty member who sets the requirements and meets regularly with the student. Enrollment requires a written plan of study approved by the faculty adviser and the director of undergraduate studies.

***STAT 490b, Senior Seminar and Project** Andrew Barron

Under the supervision of a member of the faculty, each student works on an independent project. Students participate in seminar meetings at which they speak on the progress of their projects.

GRADUATE COURSES OF PARTICULAR INTEREST TO UNDERGRADUATES

Courses in the Graduate School are open to qualified undergraduates. Descriptions of graduate courses in Statistics are available on the departmental Web site at www.stat.yale.edu. Permission of the instructor and of the director of graduate studies is required.

Study of the City

STCY 176a/ARCH 230a, Introduction to the Study of the City Alexander Garvin
An examination of forces shaping American cities and strategies for dealing with them. Topics include housing, commercial development, parks, zoning, urban renewal, landmark preservation, new towns, and suburbs. The course includes games, simulated problems, fieldwork, lectures, and discussion. SO

Swahili

(See under African Studies.)

Syriac

(See under Near Eastern Languages and Civilizations.)

Tamil

(See under South Asian Studies.)

Teacher Preparation

(See under Education Studies.)

Theater Studies

Director of undergraduate studies: Daniel Larlham, Rm. 102, 220 York St., 432-1310; theaterstudies.yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF THEATER STUDIES

Professors Vasudha Dalmia (*Religious Studies*), Richard Lalli (*Adjunct*) (*Music*),
*Lawrence Manley (*English*), Donald Margulies (*Adjunct*) (*Theater Studies, English*),
J. D. McClatchy (*Adjunct*) (*English*), *Charles Musser (*Film Studies, American Studies, Theater Studies*), *Joseph Roach (*English, African American Studies, Theater Studies*),
*Marc Robinson (*School of Drama, Theater Studies, English*), Ellen Rosand (*Music*),
*Robert Stepto (*African American Studies, English, American Studies*)

Associate Professors *Murray Biggs (*Adjunct*) (*Theater Studies, English*), *Toni Dorfman (*Adjunct*) (*Theater Studies*), Gundula Kreuzer (*Adjunct*) (*Music*), Joan MacIntosh (*Adjunct*) (*Theater Studies, School of Drama*), *Deb Margolin (*Adjunct*) (*Theater Studies*)

Assistant Professors Sarah Demers (*Physics*), Paige McGinley (*Theater Studies, American Studies*), Sam See (*English*), Christopher Semk (*French*)

Senior Lecturer Bettyann Kevles

Lecturers JoAnne Akalaitis, Jessica Berson, Emily Coates, Lacina Coulibaly, Daniel Egan, William Fleming, Andrew Gerle, Grant Herreid, Annette Jolles, Polina Klimovitskaya, Frederick Lamp, Daniel Larlham, Timothy Robinson, Sarah Ruhl, Rachel Sheinkin, Nicole Stanton, Robert Woodruff

Senior Lectors Krystyna Illakowicz, Bárbara Safille

*Member of the Executive Committee for the program.

As a branch of the humanities and as a complex cultural practice, theater claims a rich history and literature and an equally rich repertoire of embodied knowledge and theory. Theater Studies emphasizes the reciprocal relationship between practice and scholarly study. The major combines practical training with theory and history, while stressing creative critical thinking. Students are encouraged to engage intellectual and physical approaches to explore diverse cultural forms, historical traditions, and contemporary life.

The study of theater is interdisciplinary in scope and global in perspective. Students are expected to take courses in cognate disciplines such as history, philosophy, anthropology, political science, film, art, literature, and foreign languages. Faculty members are affiliated with a range of departments; their diverse expertise lends breadth and depth to course offerings and enables students to devise a course of study reflective of their developing interests.

Special features of the program are the production seminars and guided independent study projects. Each production seminar concentrates on study, through practice, of one aspect of work in the theater; examples are approaches to acting, directing, writing, dance, or design. Each seminar involves numerous projects that grow out of the term's work. For example, the project may be production of a play or several plays, adaptation or translation of existing works, or creation of original plays, performance pieces, or set design. Independent study projects give the student freedom to pursue individual and group-generated projects under the guidance of a Theater Studies faculty member. All production seminars require permission of the instructor (by application or audition). Independent study project courses are open only to majors.

Although students need not formally declare an intention to major in Theater Studies until the second term of the sophomore year, the requirements of the major may be difficult to complete in two years. Students intending to apply for admission to the major must have completed THST 110 and 111 before applying, which they must do by the end of the sophomore year. Information about the application process and advice about the program

can be sought at any time from the director of undergraduate studies. Interested students are urged to consult the director of undergraduate studies early in their academic careers.

The major The major consists of ten term courses beyond the introductory prerequisites (THST 110, 111), one of which must be THST 210. Students are encouraged to enroll in a balanced combination of courses involving studio work and courses with literature, history, and theory content. Of the ten required term courses, four must be chosen from four periods of dramatic literature or theater history or from four cultures. A suggested scheme might be one course in each of four of the following categories: Shakespeare, African American theater, Greek drama, melodrama, British drama, modern American drama, contemporary American drama, German drama, or other courses in dramatic literature and theater history. At least one of the four courses should include dramatic literature originating in a language other than English. Students are urged to read plays in the original languages whenever possible.

Students are encouraged to choose additional courses to develop the perspectives achieved in the production and literature courses. These courses may be selected (1) as a study of material that has influenced or provided sources for a playwright or theater; (2) as a study of the historical, political, or religious context of a particular playwright, theater, or literature; (3) as a study of forms of expression contemporary with a particular theater or author, for example, courses in music, art history, architecture, or film; or (4) as a study of theoretical aspects of the theater through courses in such areas as linguistics, aesthetics, psychology, or the history of criticism.

Senior requirement Majors satisfy the senior requirement in one of two ways. They may undertake a one-term senior project (THST 491) or, with the approval of the director of undergraduate studies, they may take one of the courses listed in the dramatic literature and theater history section as a senior seminar. Senior projects may take the form of directing, designing, or writing a play, performing a role, choreographing a dance piece, or writing a critical essay. Performance-oriented projects are in addition to a senior essay, which is an integral requirement of THST 491. Students wishing to undertake a senior project must submit a proposal before the deadline announced by the director of undergraduate studies. Each proposal is submitted to a faculty committee for approval.

Students interested in mounting a production as part of their senior project are encouraged to develop collaborative proposals among actors, writers, directors, designers, dancers, or dramaturgs. Students proposing a collaborative production project have priority for rehearsal time and production slots in the Whitney Theater Space, 53 Wall Street. Proposals for senior project productions will normally be approved only for students who have previously served as producers of other students' senior projects.

REQUIREMENTS OF THE MAJOR

Prerequisites THST 110, 111

Number of courses 10 term courses beyond prereqs (incl senior req)

Specific course required THST 210

Distribution of courses 4 courses in dramatic lit or theater hist, each from a different period or culture as specified (1 with reading in lit other than English)

Senior requirement Senior sem or senior project (THST 491)

***THST 099a/FILM 045a, Dance on Film** Emily Coates

An examination of dance on film from c. 1920 to the present, including early Hollywood pictures, the rise of Bollywood, avant-garde films of the postwar period, translations of stage choreography to screen, music videos, and dance film festivals. The impact of industry, circulation and audience, aesthetic lineages, and craft in the union of the two mediums. Students develop an original short film for a final class project. No prior dance or film-making experience necessary. Enrollment limited to freshmen. Preregistration required; see under Freshman Seminar Program. HU Fr sem

CORE CURRICULUM IN THEATER STUDIES

NOTE: All performance-oriented classes that hold auditions during the first week of the term are marked with a dagger (†). Yearlong courses hold auditions only once, at the beginning of the fall term. Other starred (*) courses, limited in enrollment, are seminars intended primarily for juniors and seniors in the Theater Studies major. When openings are available, sophomores and nonmajors may be admitted with the permission of the instructor. All students interested in taking starred courses must preregister during the reading period of the preceding term. Related courses in dramatic literature and theater history or those double-titled with another department may require earlier preregistration.

Preregistration and audition information is available at the office of the director of undergraduate studies, 220 York Street.

THST 110a and 111b, Survey of Theater and Drama Paige McGinley

An introduction to theater history, plays, aesthetic theories, and performance techniques. From antiquity to the Restoration period in the fall and continuing through to the present in the spring. HU

***THST 210a, Introduction to Performance Concepts** Deb Margolin and staff

A studio introduction to the basic techniques of acting, including the actor's vocabulary and performance tools. Improvisation, performance exercises, and scene work based on Stanislavsky, Vakhtangov, Michael Chekhov, Strasberg, Adler, Meisner, and Hagen.

†Admission by audition. Open to Theater Studies majors only. Required for Theater Studies majors in the year immediately following THST 110, 111. RP

PRODUCTION SEMINARS

Production seminars concentrate on study through practice of a single aspect of work in the theater, for example, acting, directing, designing, dancing, or writing for the stage. Unless otherwise indicated, production seminars are open to junior and senior majors, and to nonmajors with permission of the instructor. Application procedures are given in the course descriptions. Note the information above on both performance-oriented (†) and limited-enrollment (*) courses. Additional information is available at the office of the director of undergraduate studies.

***THST 211b, Intermediate Acting** Joan MacIntosh

Continued study of acting as an art, building on performance concepts introduced in THST 210. Various approaches to the actor's task, requiring deeper understanding of conceptual issues and increasing freedom and individuality in building a character. Exercises, monologues, and scene work.

†Admission by audition. Prerequisite: THST 210. HU RP

***THST 224a/MUSI 228a, Musical Theater Performance I** Annette Jolles

For description see under Music.

***THST 226b/MUSI 229b, Musical Theater Performance II** Andrew Gerle,
Annette Jolles

For description see under Music.

***THST 230b, Advanced Acting and Scene Study** Polina Klimovitskaya

Combination of exercises and scene study to deepen the understanding and playing of action.

†Admission by audition. Open to junior and senior Theater Studies majors only. May be taken more than once. Prerequisite: THST 211. RP

***THST 235b, Dance Theater** Michael Tracy and staff

A practical and theoretical survey of dance theater history. Introduction to movement vocabularies, physical techniques, and repertoire from post-1950 modern and postmodern dance theater. Open to students of all levels and majors. HU

***THST 277b, Moving Texts** Emily Coates, Deb Margolin

The nexus of speech and movement—the locus of all great theater—explored through the development of original works combining text and choreography. The relation of language and movement; the body and motion inherent in writing; the poetic imagery that informs great choreography. Questions relating to syntax and inflection, translation across mediums, and the explosion of semiotic interpretations that arise out of the synthesis of verbal and kinesthetic art forms. HU

***THST 300a, The Director and the Text I** Toni Dorfman

Basic exercises in approaching dramatic or other literary texts from the director's perspective. Particular attention to the many roles and functions of the director in production. Rehearsal and production of workshop scenes. Prerequisite: THST 210. HU RP

***THST 305b, Production Seminar: The Actor and the Text** Toni Dorfman

Critical and theatrical exploration of the relationships among biography, history, and drama, culminating in a public performance.

†Admission by audition, with priority to Theater Studies majors seeking a senior project. HU

***THST 315a, Shakespeare Acted** Murray Biggs

An attempt to realize some of Shakespeare's texts through performance. Emphasis on problems of language: how to give language meaning, clarity, and form, while making it suggestive and natural, in alliance with other acting considerations. Close work with sonnets and monologues, with duologues, and finally with scenes.

†Admission by audition; preference to seniors and juniors; open to nonmajors. HU RP

***THST 318b/MUSI 322b, Analyzing, Directing, and Performing Early Opera**

Grant Herreid, Ellen Rosand

For description see under Music.

***THST 320a/ENGL 453a, Playwriting** Donald Margulies

For description see under English Language & Literature.

***THST 321a, Production Seminar: Playwriting** Deb Margolin

A seminar and workshop in playwriting. Emphasis on developing an individual voice. Scenes read and critiqued in class. Admission by application, with priority to Theater Studies majors. A writing sample and statement of purpose should be submitted to the instructor before the first class meeting. RP

***THST 322b, Advanced Playwriting** Deb Margolin

A seminar and workshop in advanced playwriting that furthers the development of an individual voice. Study of contemporary and classical plays to understand new and traditional forms. Students write two drafts of an original one-act play or adaptation for critique in workshop sessions. Familiarity with basic playwriting tools is assumed. Open to juniors and seniors, nonmajors as well as majors, on the basis of their work; priority to Theater Studies majors. Writing samples should be submitted to the instructor before the first class meeting. Prerequisite: THST 320 or 321, or a college seminar in playwriting, or equivalent experience. RP

***THST 324b, Playwright-Director Laboratory** Toni Dorfman

An exploration of the collaboration between the director and the playwright in the creation of new work. Particular attention to the shaping of dramatic action, structure, and characters. Short scenes are written, staged, critiqued, and revised. Prerequisites: THST 210; for directors: THST 300; for playwrights: THST 320, 321; or with permission of instructor. RP

***THST 327b/ENGL 468b, Advanced Playwriting Workshop** Donald Margulies

For description see under English Language & Literature.

***THST 335a/AFST 435a, West African Dance: Traditional to Contemporary**

Lacina Coulibaly

A practical and theoretical study of the traditional dances of Africa, focusing on those of Burkina Faso and their contemporary manifestations. Emphasis on rhythm, kinesthetic form, and gestural expression. The fusion of modern European dance and traditional African dance.

†Admission by audition during the first class meeting. HU RP

***THST 341b, Comedy in Performance** Daniel Larlham

Comic performance explored through discussion, exercises, and collaborative projects, with an emphasis on improvisation, playfulness, and physical engagement. Use of circus, commedia dell'arte, clowning, and other body-based techniques to extend physical and imaginative capabilities and expressiveness. Experimentation with the language of comedic storytelling through devised performance projects.

†Admission by audition during the first class meeting.

THST 372a, Actor and the Text: *Twelfth Night Toni Dorfman

Critical and practical exploration of Shakespeare's *Twelfth Night*, culminating in a public performance. HU

***THST 386a, Advanced Dance Repertory** Emily Coates

A studio exploration of American concert dance through the repertory of two key choreographers: Yvonne Rainer and Twyla Tharp. Emphasis on each artist's historical context, evolving aesthetic, and performance philosophy. The course culminates in a final performance.

†Admission by audition during the first class meeting. HU RP

***THST 404b, Elements of Composition for the Stage** Robert Woodruff
Workshop focused on enhancing directors' theoretical foundations and theatrical skills. Exploration of elements that serve as sources of inspiration in creating live performance. Historical and contemporary performance theory as it deals with time, visual arts, text, and music. Specific artists who have contributed to the development of contemporary performance. Prerequisites: THST 210 and 300, or with permission of instructor. HU

THST 433b/ENGL 211b, Production Seminar: *Richard III Joseph Roach
A close reading and production of Shakespeare's play in the context of its literary and theatrical history. HU

DRAMATIC LITERATURE AND THEATER HISTORY

***THST 117b/RLST 117b, Gods and the Theater in India** Vasudha Dalmia
For description see under Religious Studies.

***THST 220b/LAST 220b/SPAN 220b, Theater and Poetry Workshop** Sonia Valle
For description see under Spanish.

THST 223a or b/ENGL 223a or b/HUMS 243a or b/LITR 223a or b, Foundations of Modern Drama Murray Biggs and staff
Three representative plays by each of the seven principals of early modern Western drama: Ibsen, Strindberg, Chekhov, Shaw, O'Neill, Pirandello, Brecht. HU

***THST 236a/MUSI 246a, American Musical Theater History** Daniel Egan
For description see under Music.

***THST 279b/ENGL 177b, Medieval Drama** Jessica Brantley
For description see under English Language & Literature.

***THST 289a/JAPN 290a^G, Kabuki Theater from Its Origins to the Present**
William Fleming
For description see under East Asian Languages & Literatures.

***THST 291a/ENGL 288a, Eloquence: Classical Rhetoric for Modern Media**
Joseph Roach
Classical rhetoric, from Demosthenes to the digital age to the current election year: the theory and practice of persuasive public speaking and speech writing. HU

***THST 302b, Making Theater in Our Times** JoAnne Akalaitis
A workshop in which to examine and create theatrical responses to politics, history, philosophy, and the day's news. Student directors, performers, and writers experiment with ways to combine performance, writing, music, and visual media. Works stem from student-written texts, from existing plays (Euripides, Shakespeare, Franz Xaver Kroetz, Caryl Churchill), from works of philosophy (Foucault, Peter Singer), and from found texts, especially stories from newspapers and other media. HU RP

***THST 303b/ENGL 336b/LITR 323b, The Opera Libretto** J. D. McClatchy
For description see under English Language & Literature.

***THST 316a/HUMS 284a/ITAL 311a/LITR 173a, Italian Theater from Antiquity to the Renaissance** Giuseppe Mazzotta
For description see under Italian.

***THST 323a, Big Plays and Little Plays** Sarah Ruhl

A writing and reading class devoted to big plays and small plays. Aesthetics of epic theater as begun by Brecht and continued by Kushner; questions of minimalism posed by Beckett and Stein. In-class writing exercises culminate in a staged reading of plays both big and small (rather than the medium size currently in favor). HU

THST 357b/FILM 407b, The Cinema of War Murray Biggs

For description see under Film Studies.

***THST 369b/AFAM 369b/AMST 378b/ENGL 364b/LITR 271b, African American Theater** Paige McGinley

African American dramatic literature and theater history from the nineteenth century to the present. Key events in black theater history, including the emergence of black musical comedy, the Federal Theatre Project, and the Black Arts movement. Plays by Langston Hughes, Lorraine Hansberry, Adrienne Kennedy, August Wilson, Amiri Baraka, and others. WR, HU

THST 379a/ENGL 408a, Versions of *The Tempest Lawrence Manley

For description see under English Language & Literature.

***THST 380b/AMST 370b, The History of Dance** Emily Coates

An examination of major movements in the history of concert and social dance from the late nineteenth century to the present, including ballet, tap, jazz, modern, musical theater, and different cultural forms. Topics include tradition versus innovation, the influence of the African diaspora, and interculturalism. Exercises are used to illuminate analysis of the body in motion. HU

***THST 399b/HUMS 208b, Politics of Performance** Dominika Laster

The political strands of modern and postmodern theater and performance. Overtly political performance trends in the twentieth century, such as Soviet agitprop, Italian futurism, and the work of Bertolt Brecht, Augusto Boal, and Ngugi wa Thiong'o. Sociopolitical activism of contemporary performance artists and collectives; performative strategies of activist and resistance movements such as Madres de Plaza de Mayo, Orange Alternative, culture jamming, hactivism, and subvertising. HU

***THST 410b/AMST 338b/ENGL 414b/WGSS 333b, Gertrude Stein** Sam See

For description see under English Language & Literature.

***THST 418a, Actors and the Art of Acting** Daniel Larlham

Investigation of the actor's various modes of concentration, imaginative projection, and physical awareness. A laboratory environment combines rigorous conceptual analysis and practical experiment. Intellectual and physical engagement with texts and techniques of acting theory from Quintilian and Zeami to Boal and Anne Bogart.

†Admission by audition during the first class session. Preference to Theater Studies majors. Prerequisites: THST 210, 211, and 230, or with permission of instructor. RP

***THST 421a/AFST 426a⁶, Performance in Africa** Frederick Lamp

Examination of ten specific works of African performance from antiquity to the twenty-first century. Viewing of documentary films and photographs; study of audio recordings; critique of readings in performance theory and case studies; theater and museum visits. HU

***THST 424a, Grotowski and the Workcenter** Dominika Laster

Exploration of the work of Jerzy Grotowski, who revolutionized the way in which Western theater practitioners conceive of the audience-actor relationship, theater staging, and the craft of acting. Focus on the last phases of Grotowski's work, which draw most significantly on the traditional songs and ritual movement of the Afro-Caribbean diaspora. Grotowski's systematic exploration of the human being in a performative context. HU

***THST 425b, Grotowski and the Workcenter Laboratory** Dominika Laster

A laboratory of performance topics such as embodied memory and its transmission, vigilance, and Grotowski's notion of verticality. Ancient African and Afro-Haitian songs of tradition; elements of the physical training developed at the Workcenter. Essential elements of the acting craft, such as the relation of precision to organicity; body resonators and spatial resonance; awareness of space; resonance of the voice; improvisation within a structure; and development of precise vocal and physical performance scores. Prerequisite: THST 424. HU

***THST 444a, Theories of Embodiment** Jessica Berson

Examination of theories about the body and its motion. The inscription of identity on and through the body; ways in which the body resists and rewrites identity through movement. The body as a physical, social, and phenomenological entity; institutional, normative, aesthetic, and virtual bodies. Practical workshops and exercises include movement experiences. HU

***THST 454a/MUSI 454a, Opera on Stage** Gundula Kreuzer

For description see under Music.

RELATED COURSES PERTINENT TO THE THEATER STUDIES MAJOR

CLCV 115a/HUMS 232a, Classical Mythologies Timothy Robinson and staff

For description see under Classics.

ENGL 129a, Tragedy** Margaret Homans and staffENGL 130b, Epic** Stefanie Markovits and staff**ENGL 200b, Shakespeare: Comedies and Romances** Lawrence Manley**ENGL 201a, Shakespeare: Histories and Tragedies** David Scott Kastan***ENGL 410a, Shakespeare and His Dramatic Contemporaries** Brian Walsh***FILM 410b/GMAN 406b/LITR 350b, Theatricality in Film** Brigitte Peucker

For description see under Film Studies.

GMAN 172a, Introduction to German Theater** Paul North, Rüdiger CampeGMAN 361a/GMST 361a/HUMS 255a, Visions of the End and Representations of Transcendence** Kirk Wetters

For description see under Germanic Languages & Literatures.

***HUMS 218a, Shakespearian Character: Falstaff, Hamlet, Iago, Cleopatra**

Harold Bloom

***HUMS 219b, Shakespeare: Four Late Masterworks** Harold Bloom

LITR 122b, World Poetry and Performance Katie Trumpener, David Gabriel

***LITR 469a, The World as Theater** Jan Hagens

***MGRK 217a/CLCV 210a/HUMS 273a/LITR 150a, Receptions of Odysseus in Literature and Drama** George Syrimis

For description see under Hellenic Studies.

***MUSI 337b, Stephen Sondheim and the American Musical Theater Tradition**

Daniel Egan

NELC 121a/HUMS 441a, The Hero in the Ancient Near East Kathryn Slanski

For description see under Near Eastern Languages & Civilizations.

RLST 184b/SAST 358b, The *Ramayana Hugh Flick, Jr.

For description see under Religious Studies.

SPECIAL PROJECTS

***THST 471a and 472b, Directed Independent Study** Daniel Larlham

An independent study should generally conform to the standards and procedures of the senior project, THST 491, even when not undertaken by a senior. If the independent study is a performance or directing project, the adviser visits rehearsals and performances at the mutual convenience of adviser and student. The project must be accompanied by an essay of about 15 pages, worth about half the final grade. Although the paper's requirements vary with the project and its adviser, it must be more than a rehearsal log. The paper typically engages interpretative and performance issues as revealed in other productions of the work (if they exist). The writing should be concomitant with rehearsal, to enable each to inform the other, and a draft must be presented to, and commented on by, the adviser at least a week before – not after – the final performance. The final version of the paper, incorporating adjustments and reflections, should be turned in to the adviser no later than 10 days after the performance closes, and no later than the first day of the final examination period.

An essay project entails substantial reading, at least four meetings with the adviser, and a paper or papers totaling at least 20 pages. A playwriting project normally requires 20 new script pages every two weeks of the term and regular meetings with the adviser. A final draft of the entire script is the culmination of the term's work.

Application forms are available from the director of undergraduate studies. Juniors may use one term of these courses to prepare for their senior projects. Open to juniors and seniors. Prerequisites: THST 210 and one seminar.

***THST 491a or b, Senior Project in Theater Studies**

Students must submit proposals for senior projects to the Theater Studies office by the deadline announced by the director of undergraduate studies. Attendance at weekly section meetings is required for all students undertaking production projects. Application forms are available in the Theater Studies office, 220 York St.

COURSES IN THE SCHOOL OF DRAMA

Undergraduates may not enroll in acting or directing courses offered by the School of Drama. Majors in Theater Studies, however, are encouraged to consider taking selected courses in design, dramaturgy, and theater management, with permission of the instructor in the School of Drama. For a description of these courses, see the director of undergraduate studies. Meeting times and places are posted in Online Course Information, www.yale.edu/courseinfo.

Students enrolling in School of Drama courses should note that only four term courses given in the professional schools may be offered toward the bachelor's degree. Permission to count any School of Drama course toward the major in Theater Studies must be obtained from the director of undergraduate studies at the beginning of the term in which the course is taken. Students also should note that the academic calendars of the School of Drama and of Yale College differ. The School of Drama calendar should be consulted for scheduling.

Unless otherwise specified in individual course descriptions, courses in the School of Drama are not open to the Credit/D/Fail option.

Turkish

(See under Near Eastern Languages and Civilizations.)

Urban Studies

FACULTY ASSOCIATED WITH URBAN STUDIES

Professors Katerina Clark (*Comparative Literature, Slavic Languages & Literatures*), Kathryn Dudley (*Anthropology, American Studies*), Keller Easterling (*School of Architecture*), Dolores Hayden (*School of Architecture, American Studies*), Matthew Jacobson (*History, American Studies*), Jennifer Klein (*History*), Alan Plattus (*School of Architecture*), Douglas Rae (*School of Management, Political Science*), Helen Siu (*Anthropology*), Robert Solomon (*Law School*), Jay Winter (*History*)

Associate Professor Michael Rowe (*School of Medicine*)

Lecturers Karla Britton (*Architecture*), Gordon Geballe (*Forestry & Environmental Studies*), Jay Gitlin (*History*), Cynthia Horan (*Political Science*), Virginia Jewiss (*Humanities*)

Courses related to urban studies may be found in a number of different departments and programs, particularly American Studies, Anthropology, Architecture, Environmental Studies, History, Humanities, Political Science, and Sociology. The course Introduction to the Study of the City is offered each year; details may be found under the heading "Study of the City" in this bulletin.

Urban studies can be incorporated into a number of major programs. The Architecture major includes an urban studies track. American Studies and Ethics, Politics, and Economics majors are required to select an area of concentration, and urban studies meets this requirement. Political Science majors who select the optional interdisciplinary

concentration may focus on urban studies. The Political Science department offers the seminar Poverty, Politics, and Policy in the American City (PLSC 280) for qualified students.

Students interested in pursuing a concentration in urban studies within a particular major are encouraged to contact their director of undergraduate studies. Faculty members listed above are available to help students identify appropriate sequences and combinations of courses and may also be willing to meet with students who are writing senior essays on interdisciplinary urban topics.

Vietnamese

(See under Southeast Asia Studies.)

Women's, Gender, and Sexuality Studies

Director of undergraduate studies: Maria Trumpler, 319 WLH, 432-0309, maria.trumpler@yale.edu; wgss.yale.edu

FACULTY ASSOCIATED WITH THE PROGRAM OF WOMEN'S, GENDER, AND SEXUALITY STUDIES

Professors Julia Adams (*Sociology*), Elizabeth Alexander (*African American Studies*), Carol Armstrong (*History of Art*), Hannah Brueckner (*Sociology*), Alicia Schmidt Camacho (*American Studies*), Jill Campbell (*English*), Hazel Carby (*African American Studies, American Studies*), Kang-i Sun Chang (*East Asian Languages & Literatures*), George Chauncey (*History*), Kamari Clarke (*African American Studies, Anthropology*), Deborah Davis (*Sociology, East Asian Studies*), Ronald Eyerman (*Sociology*), Glenda Gilmore (*History*), Jacqueline Goldsby (*African American Studies, English*), Inderpal Grewal (*American Studies, Anthropology, Women's, Gender, & Sexuality Studies*), Dolores Hayden (*School of Architecture, American Studies*), Margaret Homans (*English, Women's, Gender, & Sexuality Studies*), Marcia Inhorn (*Anthropology, Global Affairs*), Jennifer Klein (*History*), Marianne LaFrance (*Psychology, Women's, Gender, & Sexuality Studies*), Mary Lui (*American Studies, History*), Barry McCrea (*Comparative Literature, English*), Kobena Mercer (*History of Art, African American Studies*), Joanne Meyerowitz (*American Studies, History*), Priyamvada Natarajan (*Astronomy*), Sally Promey (*American Studies, Institute of Sacred Music*), Frances Rosenbluth (*Political Science*), Cynthia Russett (*History*), William Summers (*Molecular Biophysics & Biochemistry*), Emilie Townes (*African American Studies, Religious Studies*), John Treat (*East Asian Languages & Literatures*), Michael Warner (*English*), Laura Wexler (*American Studies, Women's, Gender, & Sexuality Studies*)

Associate Professors Moira Fradinger (*Comparative Literature*), Terri Francis (*Film Studies, African American Studies*), Janet Henrich (*School of Medicine*), Deb Margolin (*Adjunct*) (*Theater Studies*), Karen Nakamura (*Anthropology*), Naomi Rogers (*History of Science, History of Medicine*), Sarah Weiss (*Music*)

Assistant Professors Jafari Allen (*African American Studies, Anthropology*), Rene Almeling (*Sociology*), GerShun Avilez (*African American Studies*), Crystal Feimster (*African American Studies*), Joseph Fischel (*Women's, Gender, & Sexuality Studies*), Marcus Hunter (*Sociology*), Kathryn Lofton (*American Studies, Religious Studies*), Alyssa Mt. Pleasant (*American Studies, History*), Sam See (*English*)

Senior Lecturers Geetanjali Singh Chanda (*Women's, Gender, & Sexuality Studies*), Becky Conekin (*History*), Ron Gregg (*Film Studies*), Maria Trumpler (*Women's, Gender, & Sexuality Studies*)

Lecturers Melanie Boyd (*Women's, Gender, & Sexuality Studies*), Kathleen Cleaver (*African American Studies*), Mikaela Rogozen-Soltar (*Modern Middle East Studies*), George Syrimis (*Hellenic Studies*), Rebecca Tannenbaum (*History*)

Genders and sexualities are powerful organizing forces: they shape identities and institutions, nations and economies, cultures and political systems. Careful study of gender and sexuality thus explains crucial aspects of our everyday lives on both intimate and global scales. The scholarship in Women's, Gender, and Sexuality Studies is interdisciplinary and wide-ranging, drawing on history, literature, cultural studies, social sciences, and natural science to study genders and sexualities as they intersect with race, ethnicity, class, nationality, transnational processes, disability, and religion.

Students majoring in Women's, Gender, and Sexuality Studies take a series of core courses, develop an individual area of concentration, and write a two-term senior essay. The program encourages work that is interdisciplinary, intersectional, international, and transnational. Individual concentrations evolve along with students' intellectual growth and academic expertise. Recent examples of concentrations include literature and queer aesthetics; transnational feminist practices; the intellectual history of civil rights activism; AIDS health policies; gender, religion, and international NGOs; women's health; food, sexuality, and lesbian community; and gender and sexuality in early education.

Requirements of the major Women's, Gender, and Sexuality Studies may be taken either as a primary major or as one of two majors. The major requires twelve term courses, including one gateway course, one intermediate course, one transnational perspectives course, one methodology course, the junior sequence, and the senior sequence. The area of concentration consists of at least five courses, the majority of which should be drawn from program offerings. Courses for the area of concentration may also fulfill the requirements in transnational perspectives and methodology. Substitutions to the major requirements may be made only with the written permission of the director of undergraduate studies.

Gateway course The gateway courses (WGSS 110, 111, 115, 120, and 200) offer broad introductions to the fields of women's, gender, and sexuality studies. Potential majors should aim to take a gateway course during the freshman or sophomore year.

Intermediate course There are two intermediate courses: Globalizing Gender (WGSS 295) and Introduction to LGBT Studies (WGSS 296). Majors are encouraged to take both but need take only one, preferably after the gateway course and prior to the junior sequence.

Transnational perspectives course Ideally, each student's course work engages a broad diversity of cultural contexts, ethnicities, and global locations. Such study illuminates the links among nations, states, cultures, regions, and global locations. Most students take several classes that focus on genders and sexualities outside the U.S. context; majors are required to take at least one. (WGSS 295 cannot fulfill both the transnational perspectives and the intermediate requirements.)

Methodology course Given its interdisciplinary nature, Women's, Gender, and Sexuality Studies necessarily relies on a wide range of methodologies: literary criticism, ethnography, visual analysis, historiography, and quantitative data analysis, among others. Each student is expected to acquire competence in at least one methodology relevant to his or her own concentration and planned senior essay. In preparation for the senior essay, students are advised to complete the methods requirement in the junior year.

Junior sequence The two-term junior sequence consists of Feminist and Queer Theory (WGSS 340) and Junior Seminar: Theory and Method (WGSS 398). All students must take both courses. (Individualized alternatives are found for students who study abroad during the junior year.)

Senior sequence and senior essay The two-term senior sequence consists of the Senior Colloquium (WGSS 490), in which students begin researching and writing a senior essay, followed by the Senior Essay (WGSS 491), in which students complete the essay. The senior essay is developed and written under the guidance and supervision of a WGSS-affiliated faculty member with expertise in the area of concentration. Students are expected to meet with their essay advisers on a regular basis.

REQUIREMENTS OF THE MAJOR

Prerequisites None

Number of courses 12 term courses (incl senior req)

Specific courses required WGSS 340, 398

Distribution of courses 1 gateway course; 1 intermediate course; 1 transnational perspectives course; 1 methodology course; 5 electives in area of concentration

Senior requirement Senior colloq and senior essay (WGSS 490, 491)

GATEWAY COURSES

WGSS 110a/ER&M 264a/SOCY 134a, Sex and Gender in Society Rene Almeling
For description see under Sociology.

WGSS 111b/AMST 111b/HIST 129b/RLST 111b, Sexuality and Religion
Kathryn Lofton

For description see under Religious Studies.

WGSS 115b/AMST 115b/ANTH 115b, Gender in a Transnational World
Inderpal Grewal

Gender and sex as constituted in modern nation-states through the divisions between domestic and foreign spheres. Ways in which the interactions between international and national issues shape gender and sexuality in everyday life. Topics include science, race, and empire; nation and identity formation; media, representation, and art practices; and migration, displacement, and globalization. so

WGSS 120a, Women, Food, and Culture Maria Trumpler
Interdisciplinary exploration of the gendering of food production, preparation, and consumption in cross-cultural perspective. Topics include agricultural practices, cooking, pasteurization, kitchen technology, food storage, home economics, hunger, anorexia, breast-feeding, meals, and ethnic identity. so

WGSS 200a/AMST 135a/HIST 127a, U.S. Lesbian and Gay History George Chauncey
For description see under History.

INTERMEDIATE COURSES

***WGSS 295b, Globalizing Gender** Geetanjali Singh Chanda
The use of gender as an analytical tool to understand a wide range of contemporary issues. Themes include nature versus culture, daily life, economic globalization, war, and fundamentalism; emphasis on connections between women's experiences across national borders. Authors include Woolf, Enloe, Kincaid, Freedman, Mernissi, and Heilbrun. WR, HU

***WGSS 296a, Introduction to LGBT Studies** Joseph Fischel
Sexuality explored as a historical production. Focus on the dynamic, contested relationship between the concepts of gender and sexuality. Investigation of sexuality at the sites of racial difference, psychoanalysis, AIDS, transnationality, U.S. law, publicity, and politics. Includes guest lectures and four screenings on Thursday evenings. SO

JUNIOR SEMINARS

***WGSS 340a/ENGL 357a, Feminist and Queer Theory** Margaret Homans
Historical survey of feminist and queer theory from the Enlightenment to the present, with readings from key British, French, and American works. Focus on the foundations and development of contemporary theory. Shared intellectual origins and concepts, as well as divergences and conflicts, among different ways of approaching gender and sexuality. HU

***WGSS 398b, Junior Seminar: Theory and Method** Joseph Fischel and staff
An interdisciplinary approach to studying gender and sexuality. Exploration of a range of relevant theoretical frameworks and methodologies. Prepares students for the senior essay. WR, HU, SO

SENIOR COURSES

***WGSS 490a or b, The Senior Colloquium** Maria Trumpler
A research seminar taken during the senior year. Students with diverse research interests and experience discuss common problems and tactics in doing independent research.

***WGSS 491a or b, The Senior Essay** Maria Trumpler
Independent research on, and writing of, the senior essay.

ELECTIVES

***WGSS 013b/AFAM 049b/ANTH 013b, Feminism, Race, Gender, and Sexuality**
Jafari Allen
For description see under Anthropology.

WGSS 132b/AMST 132b/HIST 132b, American Politics and Society, 1945 to the Present
Jennifer Klein
For description see under History.

***WGSS 225a/HIST 222a/JDST 263a^c/NELC 159a, Marriage and Kinship in Medieval Near East** Eve Krakowski
For description see under Judaic Studies.

WGSS 226a^c/ARCG 223a^c/NELC 220a^c, Lives in Ancient Egypt Colleen Manassa
For description see under Near Eastern Languages & Civilizations.

WGSS 272b/AMST 272b/ER&M 282b/HIST 183b, Asian American History, 1800 to the Present Mary Lui
For description see under American Studies.

***WGSS 292b/AFAM 296b/AMST 296b/ENGL 296b, African American Literature III: 1970 to the Present** GerShun Avilez
For description see under African American Studies.

***WGSS 301a/SOCY 311a^c, Gender, Race, and Genetic Testing** Rene Almeling
For description see under Sociology.

***WGSS 305b/AMST 482b, History of Feminist Thought** Laura Wexler
Key writings on feminism from the late eighteenth century to the present. The intellectual history of feminism placed in national and transnational contexts, with emphasis on the intersecting histories of social theory, human rights, gender, and organized women's movements. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

***WGSS 314a/EP&E 267a/SOCY 216a, Social Movements** Ron Eyerman
For description see under Sociology.

***WGSS 327a/ER&M 327a/MMES 311a, Constructing the Self: From Autobiography to Facebook** Geetanjali Singh Chanda
Autobiography in its evolving form as literary genre, historical archive, and individual and community narrative in a changing geographical context. Women's life stories from Afghanistan, China, Cambodia, Indonesia, India, Iran, Egypt, Jordan, and Vietnam illustrate the dialectic relationship between the global and the local. What the reading and writing of autobiographies reveal about oneself and one's place in society; how autobiography can be considered a horizontal community formation. WR, HU

***WGSS 333b/AMST 338b/ENGL 414b/THST 410b, Gertrude Stein** Sam See
For description see under English Language & Literature.

***WGSS 336a/AFAM 327a/AMST 373a/ENGL 339a/ER&M 399a, American Literary Nationalisms** GerShun Avilez
For description see under African American Studies.

***WGSS 337b/CLCV 214b/HUMS 278b/LITR 225b/MGRK 202b, The Poetry of C. P. Cavafy** George Syrimis
For description see under Hellenic Studies.

***WGSS 342a/AFAM 279a/AMST 273a/ENGL 298a, Black Women's Literature** Jacqueline Goldsby
For description see under African American Studies.

***WGSS 344a/AFST 322a/FREN 422a/LITR 321a/MMES 362a, Francophone Postcolonial Theory and Literature** Edwige Tamalet-Talbayev
For description see under French.

***WGSS 345b/SOCY 312b, Identity and Inequality in Urban America** Marcus Hunter
For description see under Sociology.

***WGSS 353b/ENGL 331b, World War I, Gender, and Literature** Margaret Homans
For description see under English Language & Literature.

WGSS 366b/ANTH 256b, Minorities and Sexualities in Modern Japan
Karen Nakamura
For description see under Anthropology.

***WGSS 370b, Theorizing Sexual Violence** Melanie Boyd
Examination of varying theoretical frameworks for understanding sexual violence as it unfolds within specific cultural contexts. The influence of representations of gender, race, class, sexual orientation, sexual practice, and violence. Focus on the theoretical implications for efforts to combat sexual violence. Acquaintance rape on college campuses as the central but not sole example. Along with other coursework, students design and implement their own intervention projects. WR

***WGSS 371a/AMST 322a/ER&M 323a, Gender, Family, and Cultural Identity in Asia and the United States** Geetanjali Singh Chanda
A cross-cultural dialogue focusing on family, gender, and identity. An exploration of how specific Asian countries and people approach issues of religion, dress, education, and food as identity markers; U.S. perceptions and reactions to similar issues. WR, HU

***WGSS 372a, Theory and Politics of Sexual Consent** Joseph Fischel
Political, legal, and feminist theory and critiques of the concept of sexual consent. Topics such as sex work, nonnormative sex, and sex across age differences explored through film, autobiography, literature, queer commentary, and legal theory. U.S. and Connecticut legal cases regarding sexual violence and assault. SO

***WGSS 375b/AMST 375b/FILM 375b, LGBTQ Cinema** Ron Gregg
For description see under Film Studies.

***WGSS 380a/AMST 402a/ANTH 302a/FILM 324a, Gender and Sexuality in Media and Popular Culture** Laura Wexler, Inderpal Grewal
Investigation of visual media and popular culture in the United States and transnationally. Gender, race, class, and sexuality in relation to the production, circulation, consumption, and reception of media culture. Focus on theories of media and the visual. Significant lab component in which students use media technologies to make and illustrate theoretical arguments. HU

***WGSS 388a/AFAM 349a/AMST 326a/HIST 115Ja, Civil Rights and Women's Liberation** Crystal Feimster
For description see under African American Studies.

***WGSS 389b/AFAM 389b/ENGL 371b/ER&M 389b, Black Sexuality in Literature and Popular Culture** GerShun Avilez
For description see under African American Studies.

***WGSS 403a/SPAN 323a, Women Writers of Spain** Noël Valis
For description see under Spanish.

***WGSS 410b/AFAM 410b, Interdisciplinary Approaches to African American Studies**

Crystal Feimster

For description see under African American Studies.

***WGSS 426b/ENGL 446b^c, Virginia Woolf** Margaret Homans

For description see under English Language & Literature.

***WGSS 427b/HIST 127Jb, Witchcraft in Colonial America** Rebecca Tannenbaum

For description see under History.

***WGSS 433b^c, Sexuality and Social Justice** Joseph Fischel

The relation of sexuality to recent political theory and debates on social justice. Sexuality at the intersection of maldistribution and misrecognition; political constructions, identifications, and proposed redresses of sexual injury; universalism and relativism in relation to sexual injustice. Preference to junior and senior majors in Women's, Gender, and Sexuality Studies. SO

***WGSS 438b/AFAM 414b, Women, Law, and the Black Freedom Movement**

Kathleen Cleaver

For description see under African American Studies.

***WGSS 448b/HIST 151Jb/HSBM 448b, American Medicine and the Cold War**

Naomi Rogers

For description see under History of Science, Medicine, and Public Health.

***WGSS 449b/SAST 449b, Fictions of Indian Women** Geetanjali Singh Chanda

An exploration of Indian womanhood through novels and short stories by Indian women. Focus on postindependence women's writings in English in India, and on concepts of nation, home, and identity. WR, HU

***WGSS 451b^c/AMST 449b, Photography and Memory: Public and Private Lives**

Laura Wexler

Photographs as a source for the creation of public and private memory in the United States from 1839 to the present. Offered in Beijing, China. See under Peking University–Yale University Joint Undergraduate Program. HU

***WGSS 452a/LITR 480a, Topics in Literary Theory: Psychoanalysis in Literature and Film** Moira Fradinger

For description see under Literature.

***WGSS 460a/HIST 148Ja/HSBM 455a/HUMS 312a, History of the Body: Science, Medicine, and the Arts** Paola Bertucci, Courtney Thompson

For description see under History of Science, Medicine, and Public Health.

***WGSS 471a or b, Independent Directed Study** Melanie Boyd and staff

For students who wish to explore an aspect of women's, gender, and sexuality studies not covered by existing courses. The course may be used for research or directed readings and should include one lengthy or several short essays. Students meet with their adviser regularly. To apply for admission, students present a prospectus to the director of undergraduate studies along with a letter of support from the adviser. The prospectus must include a description of the research area, a core bibliography, and the expected sequence and scope of written assignments.

Yorùbá

(See under African Studies.)

Zulu

(See under African Studies.)

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Index

Abbreviations

- building, 8
- subject, 6, 15

Abroad, study. *See* Study abroad

Academic good standing, 44

- academic warning and, 56
- acceleration and, 82, 83, 86
- dismissal and, 56
- Eli Whitney students and, 74
- leave of absence and, 57
- makeup of course deficiencies and, 56, 86
- nondegree students and, 76
- readmission and, 60
- requirements for, 44
- study abroad and, 62, 64
- withdrawal and, 58–59

Academic Regulations

- acceleration policies, 81–86
- bachelor's degree requirements, 17, 31–37, 64–65, 84
- course credits, 42
- Credit/D/Fail option, 37–40, 46, 70, 76
- credit from other universities, 78–81
- final examinations, 14, 49–51, 53–55
- grades, 37–41, 50–51
- late or postponed work, 52–55
- leave of absence, 57–58
- promotion and good standing, 43–44, 56–57
- reading period, 49
- registration and enrollment, 44–47
- transcripts, 37–38, 40–41, 45, 47, 48, 49
- withdrawal from courses, 40–41, 42–43, 45, 48–49
- withdrawal from Yale, 41, 48–49, 58–60, 84

Academic Warning, 55–56, 74

Acceleration, 81–86

- application deadline for, 83
- course deficiencies and, 56, 86
- Credit/D/Fail option and, 39
- deceleration, 64, 70, 82, 83–84, 85
- distributional requirements and, 35, 85
- eligibility for, 81–86
- fall-term completion of requirements and, 65
- interruption of studies and, 84

- Acceleration (*cont.*)
- outside credit and, 81, 83, 84–85
 - patterns of attendance and, 82, 83
 - Summer Session attendance and, 70, 81, 84, 86
 - transfer students and, 72, 86
 - Year or Term Abroad and, 36–37, 81, 83, 85
- Accounting, 88
- Advanced Placement tests, 32, 33
- Advisers, faculty, 18, 20, 22, 45
- Aerospace Studies, 88–89
- African American Studies, 89–95
- African Studies, 95–102
- Air Force. *See* Aerospace Studies
- Akkadian, 486, 487, 489
- Alumni Auditing Program, 72
- American Sign Language, 35
- American Studies, 102–11
- Ancient and Modern Greek, 181–82
- Angle-bracketed courses, 7
- Animals, use in courses, 47
- Anthropology, 111–22
- Applied Mathematics, 122–25
- Applied Physics, 126–30
- Arabic, 96, 97, 449, 486, 487, 491–93, 573
- Archaeological Studies, 129–34
- Architecture, 134–40
- Art, 140–48
- Art History. *See* History of Art
- Arts distributional requirement. *See* Humanities and arts distributional requirement
- Astronomy, 149–54
- Attendance, 55
- Auditing, 25, 71–72, 76
- Bachelor's degree, requirements for, 17, 31–37, 64–65, 84
- distributional requirements, 18–20, 31–36
 - Eli Whitney students, 23, 73–75
 - fall-term completion of, 64–65, 77–78
 - master's degree simultaneous with, 29, 37, 68, 69–70
 - transfer students, 72–73
 - two majors, 21, 37, 65–66
- Bengali, 573, 574
- Biology, 154–55, 221–29, 453–73
- neuroscience track in Psychology, 537–38, 539
- Biomedical Engineering, 155–61

- Biophysics and Biochemistry, Molecular, 453–59
- Bracketed courses, 7
- British Studies, 161–62
- Building abbreviations, 8

- Calendar, 9–11
- Campus map, 630–31
- Career Services, Undergraduate, 18, 22–23, 75
- Center for International and Professional Experience, 18, 22, 23, 62–63, 75, 85
- Center for Language Study, 27
- Chemical Engineering, 162–66
- Chemistry, 166–77
- Child Study Center, 177–78
- Chinese, 206–8, 209–12
- Chinese Studies. *See* East Asian Studies
- City, Study of the, 595
- Classical Civilization, 179, 180–81, 185–87
- Classics, 178–88
- Cognitive Science, 188–92
- College seminars. *See* Residential college seminars
- Colleges, residential, 13, 22, 28
- Combined Bachelor’s and Master’s Degree Programs in the Professional Schools, 29
- Computer Science, 193–200
 - and Electrical Engineering, 252–53
 - and Mathematics, 200–201
 - and Psychology, 201–2
- Computer use, and postponed work, 53
- Computing and the Arts, 202–4
- Correspondence courses, 81
- Counseling, academic, 18, 20, 22–23
- Courses
 - attendance requirements, 55
 - change in level of, 39, 45, 48
 - course change notice, 45, 46, 48
 - credit value of, 6, 7, 42
 - deficiencies, makeup of, 41, 56
 - double-credit courses, 42
 - double credit for single-credit course, 66–67, 68
 - enrollment in, 44–47
 - evaluations, 41, 46
 - exclusion, 55
 - grades, 37–41, 50–51
 - Graduate School, 29, 68–69
 - half-credit courses, 42

Courses (*cont.*)

- normal load per term, 42–43
 - number designations, 6–7
 - permission required for, 7, 46
 - prerequisites, 6, 46
 - related, 7
 - repeating, 47
 - Special Term, 67
 - student schedules, 38–39, 45–47, 48, 74
 - Summer Session, 22, 25, 70–71
 - withdrawal from, 40–41, 42–43, 45, 48–49
 - yearlong, 7, 38, 40, 42
- Credit/D/Fail option, 37–40, 46
- acceleration credit and, 39
 - in calculation of honors, 30, 39–40
 - distributional requirements and, 35, 38
 - Graduate School courses and, 40
 - nondegree students and, 76
 - Summer Session and, 70
- Credit from other universities. *See* Outside credit
- Credit value of courses, 6, 7, 42
- Cr/year only designation, 7, 38, 40, 42
- Curriculum, undergraduate, 17–18
- distributional requirements, 18–20, 31–36
 - See also* Major programs
- Cut restriction, 55
- Czech, 562–63
-
- Deadlines, summary of, 9–11
- Dean of Yale College, Message from, 16
- Dean's excuse, 52–53. *See also* Temporary Incomplete
- Deceleration, 64, 70, 82, 83–84, 85
- Deficiencies, makeup of, 41, 56
- acceleration and, 56, 86
- Degree requirements. *See* Bachelor's degree, requirements for
- Departmental examinations, senior, 21, 30, 36, 51
- Departmental Major, Special, 66
- DeVane Lectures, 26, 204
- Directed Independent Language Study, 71, 573
- Directed Studies, 25, 205
- Disabilities, Resource Office on, 28–29
- Dismissal for academic reasons, 56, 64
- Distinction in the Major, 30, 39–40, 65, 71
- Distributional designations, 6, 32–34

- Distributional requirements, 18–20, 31–36
 - acceleration and, 35, 85
 - Credit/D/Fail option and, 35, 38
 - credit from other universities and, 34, 35, 80, 85
 - transfer students and, 73
- Divisional Majors, Special, 21, 66, 69, 587–90
- Double-credit courses, 42
- Double credit for a single-credit course, 66–67, 68
- Double-titled courses, 7
- Drama. *See* Theater Studies
- Due dates
 - for course work, 49
 - summary of deadlines, 9–11
 - for term grades, 50–51
- Dutch, 338

- East Asian Languages and Literatures, 206–16
- East Asian Studies, 216–21
- East European Studies. *See* Russian and East European Studies
- Ecology and Evolutionary Biology, 221–29
- Economics, 230–43
 - and Mathematics, 243–44
- Education Studies, 244–45
- Egyptian, 486, 487, 490
- Electrical Engineering, 245–52
 - and Computer Science, 252–53
- Eli Whitney Students program, 29, 73–75
- Engineering, 254–55
 - and Applied Science, 255–57
 - Biomedical, 155–61
 - Chemical, 162–66
 - Electrical, 245–52
 - and Computer Science, 252–53
 - Environmental, 276–79
 - Mechanical, 440–46
- English Language and Literature, 258–75
 - expository writing program, 27–28
- Enrollment, 44–47
 - eight-term limit, 31, 36–37
- Environment, 276
- Environmental Engineering, 276–79
- Environmental Studies, 279–86
- Epidemiology and Public Health. *See* Public Health
- Ethics, Politics, and Economics, 287–95

- Ethnicity, Race, and Migration, 295–301
 Evaluations, teaching, 41, 46
 Evolution. *See* Ecology and Evolutionary Biology
 Examinations. *See* Final examinations
 Exclusion from courses, 55
 Expository writing program, 27–28
- Faculty advisers, 18, 20, 22, 45
 Fall-term completion of degree requirements, 64–65, 77–78
 Field trips, 47
 Film Studies, 301–8
 Final examinations, 49–51
 - group numbers, 14
 - makeup of, 14, 41, 53–55
 - postponement of, 41, 52, 53–55
 - schedules for, 14, 49–51, 53–55
 - take-home, 49, 50
- Financial aid
 - deceleration and, 82, 83
 - Eli Whitney Students and, 74
 - leave of absence and, 58, 84
 - nondegree students and, 77, 86
- Foreign language distributional requirement, 17, 18, 19, 32–35, 36, 80, 85
 Forestry & Environmental Studies, 29, 309–10
 Francis Writer-in-Residence, 26–27
 French, 310–19
 Freshman Seminar program, 25–26, 320–21
 Freshman year
 - Directed Studies program, 25, 205
 - distributional requirements, 31, 36, 43, 73, 79, 85
 - Freshman Seminar program, 25–26, 320–21
 - Perspectives on Science and Engineering, 25, 556
 - registration, 44
- Gender Studies, 606–12
 General Honors, 29–30, 39–40, 47, 65, 71
 Geology and Geophysics, 322–32
 Germanic Languages and Literatures, 332–39
 German Studies, 339–44
 Global Affairs, 344–50
 - Jackson Institute for, 24
- Global Health Studies, 350–52
 Good standing, academic. *See* Academic good standing
 Grade point average (GPA), 29–30, 47

Grades

- in calculation of honors, 29–30, 39, 47, 71
- Credit/D/Fail option, 30, 37–40, 46
- due dates for, 50–51
- letter grades, 37–40
- term reports, 41
- transcripts of, 37–38, 40–41, 47, 48, 49, 53, 70–71, 81
- for work at other universities, 29, 59, 73, 74, 79, 81

Graduate School of Arts and Sciences

- auditing for students of, 71–72
- Credit/D/Fail option and, 39
- foreign language requirements, 70
- nondegree students and, 76
- simultaneous bachelor's and master's degrees, 29, 37, 68, 69–70
- undergraduate enrollment in, 29, 68–69

Greek

- ancient, 179–80, 181–83
- Ancient and Modern, 181–82
- modern, 181–82, 353–54

Half-credit courses, 42

Health plan. *See* Yale Health

Health Professions Advisory Board, 18

Health services. *See* Yale HealthHealth Studies. *See* Global Health Studies

Hebrew, 402, 403, 449, 486, 487, 490–91

Hellenic Studies, 353–54

Hindi, 573, 574–75

History, 180–81, 185–86, 355–75

History of Art, 375–82

History of Science, Medicine, and Public Health, 382–86

Honors, 29–30, 39–40, 47, 65, 71

Humanities, 21, 387–95

Humanities and arts distributional requirement, 18–19, 33

Incomplete work, 41, 49, 50–51, 52–53, 68–69

- Temporary Incomplete mark, 41, 49, 53

Independent study, 35, 40, 43, 67

Indonesian, 579–80

Intensive majors, 21

International Baccalaureate examinations, 33

International education. *See* Study abroad

International and Professional Experience, Center for, 18, 22, 23, 62–63, 75, 85

International Summer Award, 23

- isiZulu, 96, 97, 101–2
 Islamic Studies, 365, 371, 372, 373, 379, 404, 488, 489, 494, 548, 549, 550, 551, 570, 571
 Italian, 396–400
- Jackson Institute for Global Affairs, 24
 Japanese, 206–7, 208–9, 213–15
 Japanese Studies. *See* East Asian Studies
 Journalism Initiative, Yale, 27
 Judaic Studies, 401–6
 Junior year, distributional requirements for, 31, 35, 36, 43, 73, 79, 85
- Kannada, 573
 Key to course listings, 6–7
 Kiswahili, 96, 97, 100
 Korean, 206, 207, 215–16
- Laboratory courses, 31, 42
 Language distributional requirement, foreign, 17, 18, 19, 32–35, 36, 80, 85
 Language Study, Center for, 27
 Language Study, Directed Independent, 71, 573
 Late work. *See* Postponed work
 Latin, 179–80, 183–84
 Latin American Studies, 406–11
 Leave of absence, 44, 54, 57–58, 64, 65, 76, 77
 acceleration and, 57, 84
 financial aid and, 58, 84
 medical insurance and, 58
 third term of, 57, 84
 Letter grades, 37–40
 Level of course, changes in, 39, 45, 48
 Linguistics, 411–418
 Literature major, 418–29
 London, Yale-in-. *See* Mellon Centre for Studies in British Art
- MacMillan Center, 24
 Major programs, 17, 20–21, 31, 35, 36, 38, 64, 65–66, 70, 80, 87
 acceleration and, 82, 85, 86
 Distinction in, 30, 39–40, 65, 71
 Eli Whitney students and, 74
 outside credit and, 80, 81, 85, 86
 prerequisites, 21, 65
 requirements of, 20–21, 36, 38, 64, 65–66, 70
 selection of, 21
 senior requirement, 21, 30, 36, 51, 66
 Special Departmental, 66

Major programs (*cont.*)

- Special Divisional, 21, 66, 69, 587–90
- transfer students and, 72
- two majors, 21, 37, 65–66
- Makeup final examinations, 14, 41, 53–55
- Management Sciences. *See* Operations Research
- Map, campus, 630–31
- Marathi, 573
- Marine Corps. *See* Naval Science
- Master's degree, simultaneous award of the bachelor's degree and, 29, 37, 68, 69–70, 73
- Mathematics, 430–39
 - and Philosophy, 439–40
 - and Physics, 440
 - Computer Science and, 200–201
 - Economics and, 243–44
 - tutoring in, 28
- Mechanical Engineering, 440–46
- Media Theory and History, 446–48
- Medical insurance, 30, 58
- Medical withdrawal, 41, 48–49, 58–60, 84
- Medicine, History of, 382–86
- Mellon Centre for Studies in British Art (London)
 - British Studies courses, 161–62
 - Summer Program, 23, 37, 71, 81, 84
 - Yale College Program, 23, 36, 63, 71, 78, 81, 84, 161–62
- Message from the Dean of Yale College, 16
- Middle East Studies. *See* Modern Middle East Studies
- Military service readmission policy, 60–61
- Modern Middle East Studies, 448–53
- Molecular Biophysics and Biochemistry, 453–59
- Molecular, Cellular, and Developmental Biology, 459–73
- Multiple-titled courses, 7
- Music, 29, 43, 68, 473–83

- Naval Science, 483–85
- Near Eastern Languages and Civilizations, 483–95
- Nepali, 573
- Neuroscience track in Psychology, 537–38, 539
- Nondegree Students program, 35, 73, 76–78, 79, 86
- Numbering, course, 6–7

- Operations Research, 495–96
- Outside credit, 78–81
 - acceleration credits and, 81, 83, 84–85
 - course deficiencies and, 56

Outside credit (*cont.*)

- distributional requirements and, 34, 35, 80, 85
- transfer students and, 72–73, 81
- Year or Term Abroad and, 63, 73, 75, 78–79, 80, 81

Overlapping course times, 46

Peking University–Yale University Joint Undergraduate program, 23–24,
34, 36, 63, 78, 81, 85, 496–97

Penalties and restrictions, academic, 55–56

Permission, courses requiring, 7, 46

Persian, 449, 486, 487, 493, 573

Perspectives on Science and Engineering, 25, 556

Phi Beta Kappa, 30, 39

Philosophy, 497–505

- Mathematics and, 439–40

- Physics and, 514–15

- track in Psychology, 538

Physics, 504–14

- and Philosophy, 514–15

- Mathematics and, 440

Polish, 563

Political Science, 515–32

Portuguese, 532–34, 580–81

Postponed work, 41, 52–55

- computer use and, 53

- final examinations, 41, 52, 53–55

Prerequisites, 6, 21, 46, 65

Prizes, academic, 30, 39

Professional schools

- auditing for students of, 71–72

- Combined Bachelor's and Master's Degree Programs in the, 29

- Credit/D/Fail option and, 40

- nondegree students and, 76

- undergraduate enrollment in, 68–69

Promotion, requirements for, 31, 43, 56

Psychology, 535–44

- Computer Science and, 201–2

- track in Philosophy, 499–500

Public Health, 29, 545

- History of Science, Medicine, and, 382–86

Quantitative reasoning

- distributional requirement, 17, 18, 19–20, 33, 36

- tutoring in, 28

Quantitative Reasoning Center, Science and, 28

- Reading period, 6, 49
- Readmission, 56, 59–60, 81
after military service, 60–61
- Rebates, 59
- Registration, 44–47
- Regulations. *See* Academic Regulations
- Related courses, 7
- Religious Studies, 545–52
- Repeating a course, 47
- Reserve Officers Training Corps. *See* Aerospace Studies *and* Naval Science
- Residential colleges, 13, 22, 28
- Residential college seminars, 26, 67, 79, 192
- Resource Office on Disabilities, 28–29
- Rosenkranz Writer-in-Residence, 27
- ROTC. *See* Aerospace Studies *and* Naval Science
- Russian, 553, 557–62
- Russian and East European Studies, 552–55
- Sanskrit, 573, 575
- Schedules, student, 38–39, 45–47, 48, 74
- Science, 18, 19, 21, 556
Applied, 255–57
distributional requirement, 18, 19, 33
History of, 382–86
Perspectives on, 25, 556
tutoring in, 28
- Science and Quantitative Reasoning Center, 28
- Secondary school, course credit from, 35, 79
- Seminars, residential college, 26, 67, 79, 192
- Senior requirement, 21, 30, 36, 51, 66
departmental examinations, 21, 30, 36, 51
in Special Departmental Major, 66
two majors and, 66
- Sexuality Studies, 606–12
- Simultaneous Award of the Bachelor's and Master's Degrees, 29, 37, 68, 69–70, 73
- Slavic Languages and Literatures, 557–63
- Social sciences distributional requirement, 18, 19, 33
- Sociology, 564–72
- Sophomore year, distributional requirements for, 31, 35, 36, 43, 73, 79, 85
- South Asian Studies, 572–78
- Southeast Asia Studies, 578–80
- Spanish, 580–87
- Special Departmental Major, 66
- Special Divisional Majors, 21, 66, 69, 587–90

- Special Term Courses, 67
- Starred courses, 7, 46
- Statistics, 590–95
- Study abroad, 17, 22–24, 61–64
 - acceleration and, 36–37, 81, 83, 85
 - distributional requirements and, 19, 34, 64
 - eligibility, 61–62
 - Eli Whitney students and, 75
 - final examinations and, 54
 - financial aid and, 62, 64
 - outside credit and, 63, 78–79, 80
 - Peking University–Yale University Joint Undergraduate Program, 23–24, 34, 36, 78, 81, 496–97
 - as term of enrollment, 36–37
 - transfer students and, 73
 - Yale-in-London, 23, 36, 71, 161–62
- Study of the City, 595
- Subject abbreviations, 6, 15
- Summer Award, International, 23
- Summer Program in London, 23, 37, 71, 81, 84
- Summer Session, 22, 25, 37, 38, 70–71
 - acceleration credits and, 70, 81, 84, 86
 - course offerings, 25
 - credits earned in, 25, 35, 70–71, 78, 84, 86
 - readmission and, 59
- Swahili, 96, 97, 100
- Syriac, 487, 490
-
- Take-home final examinations, 49, 50
- Tamil, 573, 575–76
- Teacher Preparation. *See* Education Studies
- Teaching evaluations, 41, 46
- Telugu, 573
- Temporary Incomplete, 41, 49, 53
- Term Abroad. *See* Year or Term Abroad
- Theater Studies, 595–605
- Tracks within majors, 41
- Transcripts, 40–41, 45, 47, 48, 49
 - auditing and, 72
 - Credit/D/Fail option and, 37–38
 - of nondegree students, 78
 - outside courses and, 78, 81
 - Summer Session courses and, 70–71
 - of transfer students, 73, 81

- Transfer students, 65, 72–73, 78, 80, 81, 86
- Translation, literature in, 7
- Turkish, 449, 486, 487, 494
- Tutors
 - foreign language, 27
 - mathematics and science, 28
 - writing, 27–28
- Two majors, 21, 37, 65–66

- Undergraduate Career Services, 18, 22–23, 75
- Undergraduate-graduate courses, 7, 68–69
- Undergraduate Regulations*, online publication, 30, 37, 58, 75, 77
- University Health Services. *See* Yale Health
- Urban studies, 605–6
- Urdu, 573
- U.S. military service readmission policy, 60–61

- Vietnamese, 580

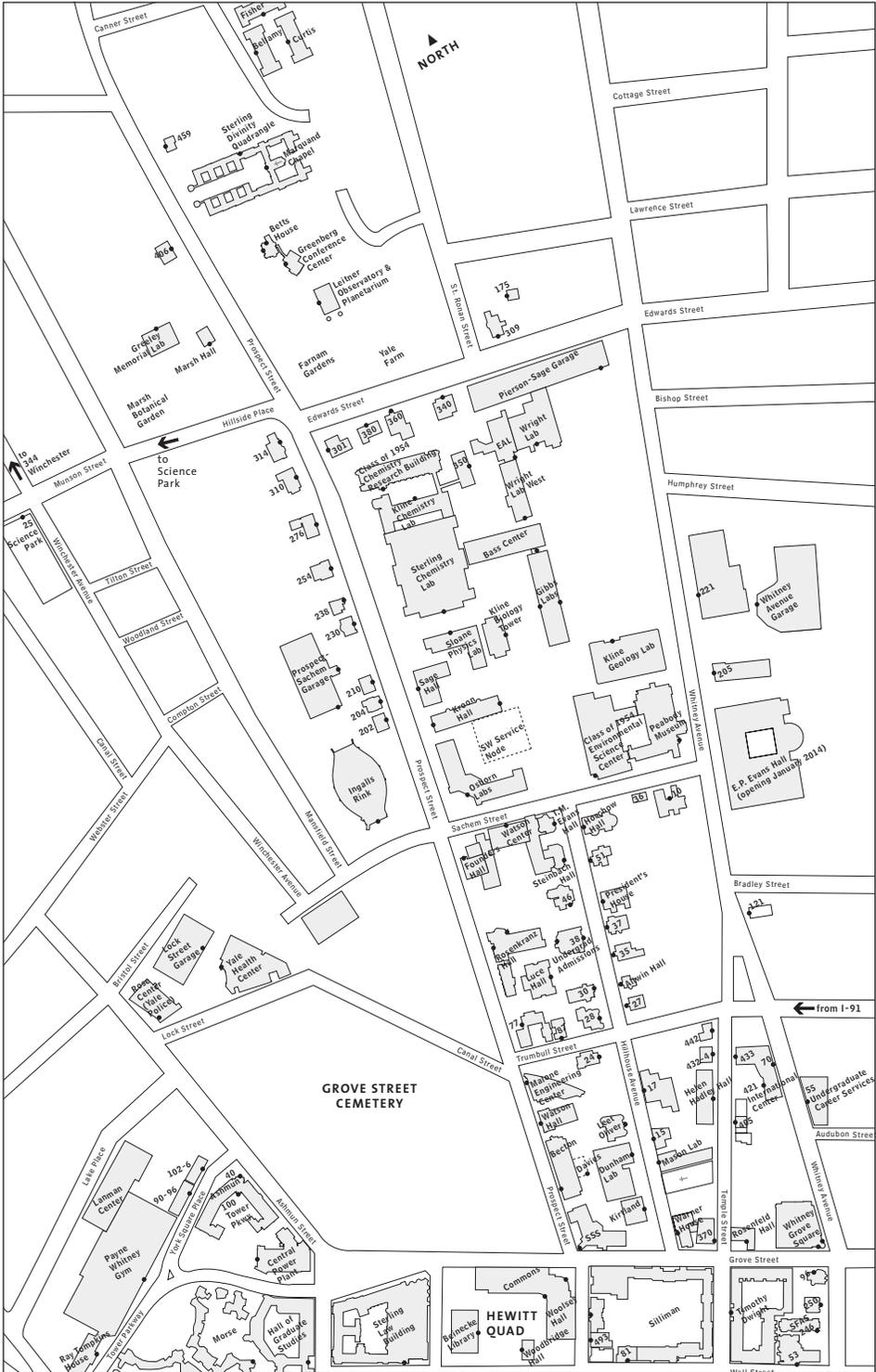
- Warning, Academic, 55–56, 74
- Whitney Students program, Eli, 29, 73–75
- Withdrawal
 - from courses, 40–41, 42–43, 45, 48–49
 - from Yale College, 41, 48–49, 54, 56, 58–60, 64, 75, 77, 84
- Women's, Gender, and Sexuality Studies, 606–12
- Writer-in-Residence
 - Francis, 26–27
 - Rosenkranz, 27
- Writing distributional requirement, 17, 18, 20, 36
- Writing Center, Yale College, 27–28
- Writing tutors, 27–28

- Yale College
 - administrative officers, 12–13
 - description of, 17
- Yale College Viewbook, publication, 30
- Yale Health, 30, 48, 54, 58, 59–60, 65, 75, 77, 84
- Yale-in-London. *See* Mellon Centre for Studies in British Art
- Yale Journalism Initiative, 27
- Yearlong courses, 7, 38, 40, 42
- Year or Term Abroad, 23, 36–37, 61–64, 80
 - acceleration credits and, 36–37, 81, 83, 85
 - eligibility, 61–62
 - Eli Whitney students and, 75

Year or Term Abroad (*cont.*)
 final examinations and, 54
 transfer students and, 73
Yorùbá, 96, 97, 100–101

Zulu, 96, 97, 101–2

YALE UNIVERSITY CAMPUS NORTH



Continued on next page

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, or national or ethnic origin; nor does Yale discriminate on the basis of sexual orientation or gender identity or expression.

University policy is committed to affirmative action under law in employment of women, minority group members, individuals with disabilities, and covered veterans.

Inquiries concerning these policies may be referred to the Director of the Office for Equal Opportunity Programs, 221 Whitney Avenue, 203.432.0849 (voice), 203.432.9388 (TTY). For additional information, see www.yale.edu/equalopportunity.

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. In addition, in accordance with federal law, the University maintains information concerning current fire safety practices and prepares an annual fire safety report concerning fires occurring in on-campus student housing facilities. Upon request to the Office of the Associate Vice President for Administration, PO Box 208322, 2 Whitney Avenue, Suite 810, New Haven CT 06520-8322, 203.432.8049, 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. The Equity in Athletics Disclosure Act (EADA) report is also available online at <http://ope.ed.gov/athletics>.

For all other matters related to admission to Yale College, please write to the Office of Undergraduate Admissions, Yale University, PO Box 208234, New Haven CT 06520-8234; telephone, 203.432.9300; Web site, <http://admissions.yale.edu>.

Yale University's Web site is www.yale.edu; the Yale College Programs of Study is online at <http://yalecollege.yale.edu/content/yale-college-programs-study>.

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